

Sympathetic Vibratory Physics

a

Compendium

of

Terms & Phrases

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"Since the days of the unlucky mediæval philosophers, the last to write upon these secret doctrines of which they were the depositaries, few men have dared to brave persecution and prejudice by placing their knowledge upon record. And these few have never, as a rule, written for the public, but only for those of their own and succeeding times who possessed the key to their jargon. The multitude, not understanding them or their doctrines, have been accustomed to look upon them as either charlatans or dreamers."

H.P. Blavatsky, *Isis Unveiled*, vol. 1

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INTRODUCTION

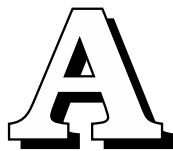
This book began as my notebook in my efforts to learn about and to correlate the vast diversity of Frontier Science as demonstrated by John Keely, Nikola Tesla, Russell, Edgar Cayce and many others of the past as well as the present.

During my time of study (which hasn't ended yet but only now really beginning) it gradually came clear to me that all these people were basically talking about the same things. What they were talking about to all who would listen, and few did, was that there is a broader more comprehensive paradigm of science and philosophy than had hitherto been suspected. This paradigm embraced not only a new (yet very ancient) view of physics but also a wholistic ontology wherein Man is a part and parcel of the Universe that surrounds and pervades him. That man and all else is intimately connected and that the connecting link is music or those laws and modes of activity fully evidenced in and through that which makes music *music* - vibration.

This work is an effort to gather all that could be found on this vast subject of vibration. Of course, the result of all this work is but only a drop in the proverbial bucket of available knowledge. However, these pages represent a good beginning for anyone inclined to this fascinating subject. Included in these pages are the entire contents of the *Snell Manuscript*, which contained a great deal of explanations of Keely's work. The contents of this manuscript were incorporated here as an aid to referencing the material. Mr. Snell's great work was but a collection of short quotes and Mr. Snell's attempts at explaining them. I felt it would do this material well to be alphabetized and cross referenced where possible.

It is my hope that those who read and study this volume will derive at least as much enjoyment from it as they do knowledge.

Dale Pond



A: 1) The note called Proslambanomenos in the greater perfect system of the Greeks. The letter-name of Mese, the highest note of the middle tetrachord; and of Nete, the highest note of the upper tetrachord. [Greek Music] 2) The first note of (1) the Hypo-Dorian mode, or church-scale, commencing four notes below the Dorian; (2) the Hyper-Phrygian mode, or church-scale, commencing four notes above the Phrygian; (3) the Eolian mode. [Greek Music] 3) The next note above Gamma Ut, in the Grave Hexachord of the Guidonian system, where it is A re. Also, the first note of the acute and super-acute Hexachords, in which it is a la mi re. 4) The normal minor scale of modern music, so-called because it is the relative minor of C. It is sometimes also named the natural minor scale, because no sharps or flats are required in its signature. 5) The normal sound because the instruments of an orchestra tune to this note, as given by the oboe or organ. 6) The keynote of the major scale, which has three sharps for its signature. 7) The name given to a string tuned to the sound A. The A-string of a violin is its second string; of a viola, its first string; of a violoncello, its first string; but on this instrument it is one octave lower in pitch than the A-string of a violin or viola; of Double-Bass, its third string, which is two octaves lower in pitch than the first string of a violoncello; of a guitar, its sixth string. The string tuned highest in pitch is called the first string of an instrument; the next below it, the second, and so on. 8) The actual sound is in some systems represented by A (capital letter), while AA represents the note one octave below that sound, and AAA the note two octaves below it. Proceeding upwards, the note one octave above A is represented by *a* (italic); that two octaves above it by a (once underlined); and so on. (125)

ABEGG'S RULE: For use in regard to a helical periodic system. If the maximum positive valence exhibited by an element be numerically added to its maximum negative valence, there is evidently a tendency for the sum to equal 8. This tendency is exhibited especially by the elements of the 4th, 5th, 6th, and 7th groups and is known as Abegg's Rule.

ABESSI or REBIS: Refuse; dead matter; excrementitious substances. (131)

ABIOTENESIS: The spontaneous generation of life. (121)

ABSOLUTE HUMIDITY: Amount of moisture in the air, indicated in grains per cubic foot. (128)

ABSOLUTE MOTION: Vibration of an object measured with respect to an inertial (fixed) reference frame. Vibration of an object is measured with respect to a fixed point in space, or "free space." Seismic transducers measure the absolute vibration of machine housings and structures. Dual probes and shaft riders measure the absolute vibration of rotating shafts. (100)

ABSOLUTE PRESSURE: Gauge pressure plus atmospheric pressure equals absolute pressure. (128)

ABSOLUTE TEMPERATURE: Temperature measured from absolute zero. (128)

ABSOLUTE ZERO TEMPERATURE: Temperature at which all molecular motion ceases (-460°F and -273°C). (128)

ABSORBANCE: Negative logarithm to the base 10, of the transmittance (T)

$$A = -\log_{10} (T)$$

(not used: absorbancy, extinction, or optical density). (5)

ABSORBENT: Substance with the ability to take up or absorb another substance. (128)

ABSORPTION: See **LAW OF SYMPATHETIC VIBRATION, LAWS OF BEING**

ABSORPTION REFRIGERATOR: Refrigerator which creates low temperatures by using the cooling effect formed when a refrigerant is absorbed by chemical substance. (128)

ABSORPTIVITY: Absorbance divided by the product of the sample path length (b) and the concentration of the absorbing substance (c).

$$a = A/bc$$

IUPAC - Specific absorption coefficient (not used: absorbancy index, extinction coefficient, or specific extinction). (5)

ABSORPTIVITY, MOLAR: Product of the absorptivity (a) and the molecular weight of the absorbing substance.

IUPAC - Molar absorption coefficient (not used: molar absorptivity index or molar extinction coefficient). (5)

ACCELERATING DISSOCIATION: "When the ether flows from a tube, its negative center represents molecular subdivision carrying interstitially (or between the molecules) the lowest order of liberated ozone. This is the first order of ozone and is wonderfully refreshing and vitalizing to those who breathe it. The second order, or atomic separation, releases a much higher grade of ozone, in fact too pure for inhalation, as it produces insensibility. The third order, or etheric, is the one that has been (though attended with much danger to the operator) utilized by Keely in his carbon register to produce the circuit of high vibration that breaks up the molecular magnetism which is recognized as cohesion."

"The acceleration of these orders is governed by the introductory impulse on a certain combination of vibratory chords, arranged for this purpose in the instrument, with which Keely disassociates the elements of water, and which he calls a Liberator.

"In molecular dissociation one fork of 620, is used, setting the chords of the first octave.

"In atomic separation two forks, one of 620 and one of 630 per second; setting the chords on the second octave.

"In the etheric three forks: one of 620, one of 630, and one of 12,000 - setting the chords on the third octave." (1) See **OZONE, LIBERATOR, OCTAVE, LAWS OF BEING**

ACCELERATION: The time rate of change of velocity. For harmonic motion, this is often expressed as G , A , x , or d^2x/dt^2 . Acceleration leads displacement by 180 degrees in time. Typical units for acceleration are feet per second per second (ft./sec.²), meters per second per second (m/sec.²), or more commonly G 's (where G = acceleration of gravity = 32.17 ft./sec.² = 9.81 m/sec.²). Acceleration measurements are generally made with piezoelectric accelerometers and are typically used to evaluate high frequency machine casing or bearing housing response characteristics. (100)

ACCELERATION: The rate of change of speed or velocity. (75)

ACCELERATION OF PROGRESSIVE OVERTONES: "The division into increased nodes occurs much faster with a tuning fork than with a string"; this is explained very well page 168 of (**SOUND**) (6)

ACCELEROMETER: An accelerometer is a seismic transducer which converts acceleration motion and/or gravitational forces capable of imparting acceleration

into a proportional electric signal. (100)

ACCESSIBLE HERMETIC: Assembly of motor and compressor inside a single bolted housing unit. (128)

ACCORD: 1) The series of notes to which an instrument is tuned. 2) A chord. Concord, hence, D'accord, in tune.(125)

ACCUMULATOR: Storage tank, which receives liquid refrigerant from evaporator and prevents it from flowing into suction line before vaporizing. (128)

ACCURACY: The ratio of the error to the full scale output, or the ratio of the error to the output expressed as a percent. Also, the capability of an instrument to follow the true value of a given phenomenon. Often confused with inaccuracy, which is the departure from the true value into which all causes of error are combined, *i.e.*, hysteresis, nonlinearity, drift, temperature effects and random errors. While this definition is unique, the word "accuracy" is often incorrectly used as a synonym for repeatability.(100)

ACHROMATIC: Not chromatic. (125)

ACID CONDITION IN SYSTEM: Condition in which refrigerant or oil in system is mixed with fluids that are acid in nature. (128)

ACOUSTICS: 1) The **science** which treats of the nature and laws of sound.

2) The **sensation of sound** consists in the communication of a vibratory motion to the tympanic membrane of the ear, through slight and rapid changes in the pressure of the air on its outer surface.

3) The **mode of propagation** of sound in air may be explained in the following manner. Suppose a small particle of fulminating silver to be exploded in free air; the air particles immediately contiguous are driven outwards in all directions by the explosion, their motion is almost instantaneously communicated to the adjacent ones, those first agitated coming at the same time to rest; the adjacent ones pass on the impulse in the same way to those at a greater distance, and so on; thus the explosion gives rise to what may be looked on as a rapidly expanding shell or constant thickness, containing at any instant between its exterior and interior surfaces a stratum of agitated air particles each one of which performs a single vibration to and fro during the passage of the shell over it; in other words the exterior and interior surfaces of the shell are at any time the *loci* of all those points at which the particles at that instant come under the influence of the impulse, and are left at rest by it respectively, so that its thickness depends both on the rapidity of their vibration and the rate at which they pass on the impulse, one to another. Let us suppose now that immediately after the first explosion a second were to take place; then, in exactly the same way there would be a second pulse propagated in all directions. If a series of explosions at regular intervals

were to take place, there would be a regular series of expanding shells; and if the intervals were sufficiently small, the alternate changes of pressure, due to the successive collisions of the air particles against the tympanic membrane of an ear in the neighborhood of the explosions would convey to the brain a sensation of a continuous note. Exactly the same thing occurs if, for a series of explosions, are substituted the vibrations of an elastic body; and it is, in general, by the latter means that all sounds, and especially musical ones, are produced. The motion of a sound wave must not be confounded with the motion of the particles which transmit the wave. In the passage of a single wave each particle over which it passes makes only a small excursion to and fro, the semi-length of which is led the amplitude of the vibration, the time occupied during one vibration being called its period.

4) The **intensity of a sound** is proportional to the square of the maximum velocity of the vibrating particle. It also approximately varies inversely as the square of the distance from the origin of the sound; for, supposing the latter to be produced at a uniform loudness, the same amount of energy has to be communicated to the particles contained within the external and internal surfaces of shells of the same thickness but of different radii. For example, if we take a shell of air whose internal radius is one foot, one of the same thickness whose radius is two feet will contain four times the quantity of matter; one whose radius is three feet, nine times the quantity, and so on. Thus the amount of matter over which a given quantity of energy has to be distributed augments as the square of the distance from the origin of sound, and therefore the amount of energy, or, what comes to the same thing, the intensity of the sound, diminishes in the same ratio.

5) At a temperature of zero Centigrade sound is propagated at the rate of about 1090 feet per second, and this speed augments about two feet per second for every additional degree of temperature; thus at 15° C. the rate of propagation would be about 1120 feet per second. The **velocity of sound** in air depends on the elasticity of the air in relation to its density. It is also directly proportional to the square root of the elasticity, and inversely proportional to the square root of the density. Now for a constant temperature the elasticity varies as the density, hence in this case they neutralize one another, and the velocity of the sound is independent of the density of the air.

6) One sound differs from another not only in quantity, but also in quality and pitch. The **pitch of a sound** depends on the number of vibrations per second by which it is caused; the greater this number is the higher is the sound, and vice versa; thus pitch is a more or less relative term, and it is therefore necessary to have some standard to which different sounds may be referred. This standard is so chosen that the middle C of the pianoforte shall be produced by 264 vibrations per second. (That is, according to German musical pitch, Western pitch is set at 244 cps.)

7) Knowing the velocity of sound in air we can estimate the different **wave lengths** corresponding to notes of different pitch in the following manner. The wave length is the distance through which the sound travels while any particle over which it passes describes a complete vibration; hence, if we know the number of vibrations the particle performs per second, the required wave length will be found by dividing the number of feet over which the sound travels per second, by that number. Now, by means of an instrument invented by Cagniard de la Tour, and by him named syren, the number of vibrations corresponding to a note of any given pitch can be determined very exactly. For a detailed account of this instrument and of its improvements by Helmholtz, the reader is referred to Tyndall's *Lectures on Sound*, p. 64; but to describe it shortly may be said in its original form to consist of two equal disks, one forming the top of a hollow fixed cylinder, into which are can be driven, the other capable of revolving concentrically upon it with the smallest possible amount of friction. A circle of small holes equidistant from each other is bored upon each disk and concentric with it; those in the upper disk being inclined slantwise to its plane, those in the lower being slantwise also but in the opposite direction; there are also arrangements both for driving a constant supply of air into the hollow cylinder, and for registering the number of revolutions the upper disk performs in a minute; thus, when the upper disk is so turned that its holes coincide with those of the lower, and air is forced into the cylinder, it will pass out through the perforations, and by reason of their obliquity will cause the moveable disk to revolve with a rapidity corresponding to the pressure; and each time that the holes of the former coincide with those of the latter a number of little puffs of air get through simultaneously, giving rise to an agitation in the surrounding atmosphere which spreads round in all directions in the way before described, and if the pressure of the air in the cylinder is sufficient, the series of impulses thus given will link themselves together, forming a continuous note. (It should be remarked that the pitch of the sound would be exactly the same of there were only one perforation in the revolving disk, the number of holes merely serving to increase its intensity; if the number of holes in the revolving disk is less than the number in the lower one, those of the former must be situated so as all to coincide simultaneously with an equal number of the latter. It should also be remarked that this syren is an old invention. Today there are any number of electronic and computer instruments that are far more accurate and precise than this mechanical device.)

Hence to determine the number of vibrations per second, corresponding to a sound of a given pitch, we have only to maintain such a pressure of air in the syren as will cause it to produce the same sound for the space of a minute, and note the number of revolutions registered in that time. Now, for every revolution of the upper disk, the same number of sound waves are propagated around as there are perforations, hence

the whole number propagated in a second will be the product of the number of holes and number of revolutions per minute divided by 60; and this result will evidently be the required number of vibrations per second caused by the given sound.

To apply this to find the wave length corresponding to the note given by the open C string of the violoncello, we should adjust the supply of air to the syren until it gives a note of the same pitch. Supposing the number of holes in each disk to be 18, the number of revolutions per minute would be found to be 220. Hence the number of vibrations per second of the string, and therefore of the surrounding particles of air, would be $\frac{220 \times 18}{60} = 66$. Supposing the temperature were 16° C the velocity of sound would be about 1122 feet per second, and the number by 66 gives the wave length corresponding to that number of vibrations per second; that is, just 17 feet; the sound then will travel through this distance during the time the string takes to perform one complete vibration.

8) If the number of vibrations per second be increased, the pitch of the sound caused by them is raised, and vice versa, as can easily be illustrated by driving more or less air into the syren, and observing the sound it produces. Dr. Wollaston has shown (Phil. Trans. 1820, p. 336) that if the number be increased, beyond a certain limit the **sound becomes inaudible**, although this limit is not the same for all ears, some persons being perfectly sensible to sounds inaudible to others. In general it is probable that no sound is heard when the number of vibrations per second exceeds 40,000; while on the other hand the perception of pitch appears to begin when the number of vibrations is somewhere between 8 and 32, the wave length being in the former case about 0.03 of an inch - in the latter ranging from 140 feet to 35 feet.

9) Sounds are primarily divided into two classes, musical and unmusical; the former being defined as those produced by regular or periodic vibrations, the latter by such as are irregular or non-periodic. These definitions require some explanation, since, by sounding together a sufficient number of notes sufficiently near in pitch, it is plain that we could produce as unmusical a sound as we pleased, although the components would be themselves due to periodic vibrations, and would therefore musical. The answer to this is found in the fact that when two or more sets of sound waves impinge on the ear at the same instant, since each one cannot impress its own particular vibration on the tympanum contemporaneously with those of the others, the motion of the latter membrane must be in some way the *sum* of all the different motions which the different sets of waves would have separately caused it to follow; and this is what in fact does happen, *i.e.*, the vibrations due to each set combine and throw the tympanum into a complicated state of vibration, causing the sensation of the consonance or combination of the different sounds from which the sets of sound waves proceed.

Now the unassisted ear is only able to distinguish the separate notes out of a number sounded at once up to a certain point; beyond this it fails to distinguish them individually, and is conscious only of a confused mixture of sounds which approaches the more nearly to the character of noise the more components there are, or the nearer they lie to one another. A noise, then, may be defined as a sound so complicated that the ear is unable to resolve or analyze it into its original constituents.

10) As the character of a sound depends upon that of the vibrations by which it is caused, it is important to know of what kind the latter must be in order that they may give the sensation of a perfectly simple tone, *i.e.*, one which the ear cannot resolve into any others. Such a vibration is perhaps best realized by comparison with that of the pendulum of a clock when it is swinging only a little to and fro. Under these circumstances it is performing what are called harmonic vibrations, and when the air particles in the neighborhood of the ear are caused by any means to vibrate according to the same law as that which the pendulum follows, and also with sufficient rapidity, a perfect simple tone is the result. Such a tone is, however, rarely heard except when produced by means specially contrived for the purpose. If a note on the pianoforte is struck, the impact of the hammer on the string throws it into a state of vibration, which, though periodic, is not really harmonic; consequently we do not hear a perfectly simple tone, but one which is in reality a mixture of several higher simple tones with that one which corresponds to the actual length of the string. The former are, however, generally faint, and become associated by habit with the latter, appearing to form with it a single note of determinate pitch. These higher tones are harmonics of the string, and are produced by vibrations whose numbers per second are respectively twice, three times, four times, etc., as great as those of the fundamental tone of the string. The same may be said of the notes of all instruments, including the human voice, which are usually employed for the production of musical sounds.

11) Since the consonance of two or more such simple tones always gives a more or less musical sound, and since also the ear is always more or less capable of resolving the latter into its components, the question naturally arises whether all sounds are not, theoretically at least, resolvable into simple tones. The answer to this is contained in a celebrated theorem due to the French mathematician Fourier. He has shown that any periodic vibration is the result of combining together a certain number of simple harmonic vibrations whose periods are aliquot parts of that of the former; and we have conclusive reasons for supposing that, in the same way as a compound periodic vibration gives rise to a compound sound, so the simple tones into which the ear resolves the latter are respectively due to the simple harmonic vibrations which, as the above mentioned theorem proves, make up the former.

12) The theorem of Fourier referred to in the preced-

ing article is of such great importance in all questions connected with acoustics that a few words illustrative of it may not be out of place.

If a peg is fixed into the rim of a wheel capable of revolving about a fixed center, and at right angles to the plane of the wheel, and if the latter is caused to rotate uniformly and is looked at edgewise the peg will appear to move up and down in a straight line, its velocity being the greatest at the middle of its course, and diminishing as it approaches each end. Under these circumstance the peg appears to perform harmonic vibrations.

Now suppose a second wheel, also furnished with a peg in its rim, is made to revolve about the peg of the first as an axis. If the latter is at rest the peg of the second will appear, looked at as above, to perform harmonic vibrations; but if the former is also caused to revolve these vibrations are no longer harmonic, but are the result of adding together the separate harmonic vibrations of the two pegs, in other words of *superposing* the harmonic vibrations which the second peg performs if the first wheel is at rest, upon those which the first peg performs when it is itself in motion. Now it is evident that by continuing this process indefinitely, and by giving the wheels different radii, and different uniform velocities of rotation, the final motion of the last peg looked at sideways as before, would be an exceedingly complicated one, and that an indefinite number of different vibrations could be produced by varying the number, position at starting, radii, and velocities of the wheels, though it could not be assumed without proof that *every possible variety* could be so produced. This however is what Fourier's theorem asserts, provided that the velocities of rotation of the several wheels of the series are in the proportion of 1, 2, 3, 4, 5, etc. In other words, every periodic vibration is the resultant of a certain number of harmonic vibrations whose periods are one-half, one-third, one-fourth, etc., that of the former.

13) A harmonic scale is formed by taking a series of notes produced by vibration whose numbers in a given time are respectively as 1, 2, 3, 4, et.

If we take as fundamental tone the open C string of the violoncello, the series of tones which with it form a harmonic scale will be as pictured:

The notes marked with an asterisk do not exactly represent the corresponding tones; but are the nearest representatives which the modern notation supplies. All the notes of the harmonic scale can theoretically be produced by wither a single string, or by a simple tube used as a trumpet. If we lightly touch the string of a violin, without causing it to come in contact with the finger board, at any one of a series of points dividing it into a number of a equal parts, and excite it by means of a bow, it no longer vibrates as a whole, but separates into the number of equal vibrating segments which is the least possible consistent with that point forming one of their points of diversion; the

latter remain stationary, or very nearly so, and are called nodes, their number being evidently just one less than that of the segments. It is plain that if the point of application of the bow be one of a series of nodes, no sound will be produced, provided, of course, the finger remains on any other of the same series, and this may serve to explain why it is sometimes difficult to bring out the higher harmonics of a violin, as the bow may, unconsciously to the performer, be passing exactly over one of the corresponding nodes. The first harmonic, as it is called, of the open string is produced by touching it while on a state of vibration at its middle point, and thereby dividing it into two equal portions, both of which vibrate twice as fast as the whole, and accordingly give the octave. The second harmonic, or the twelfth of the fundamental, corresponds to a division of the string into three equal portions, and so on. And generally, in order to produce the n th harmonic the finger should touch the string at any one of the series of points which divide it into n equal portions. In practice, however, the finger should always touch the string at the point of division adjacent to either end.

14) The harmonics of simple tube used as a trumpet are the same as those of a vibrating string, *viz.*, the octave, twelfth, fifteenth, etc., and are produced by modifications of the breath and lips; but there is a great difference between the nature of the vibrations which produce sound, in the case of strings and pipes. In the former case the vibrations are executed at right angles to the length of the string, that is, are *lateral or transverse*, while in the latter they are in the direction of the pipe, or *longitudinal*, and are the vibrations of the air itself with it. Actually the string has all three primary modes of vibration with the lateral or transverse predominating. **See LONGITUDINAL VIBRATIONS; TRANSVERSE VIBRATION; TRIPLE CURRENTS; TRIPLE FLOWS; VIBRATION MODES**

15) When an open organ pipe is sounding its fundamental tone, the particles of the column of air within it are all, more or less, in a state of vibration parallel to the length of the pipe, of which the intensity is at its maximum at the two ends, growing less and less towards the middle, where there is a node, that is, a point of no disturbance. The harmonics of an open organ pipe follow the same law as those of a simple trumpet, or vibrating string.

The fundamental note of a stopped organ pipe is an octave below the fundamental note of an open organ pipe of the same length. When it is sounding this note there is no node, and the first harmonic is a fifth above the octave, the second a major sixth above the first, the third a diminished fifth above the second, and so on. Or, more simply, the successive tones of the harmonic scale of an open pipe are produced by vibrations which are as 1, 2, 3, 4, etc., those of a stopped pipe by vibrations which are as 1, 3, 5, 7, etc. **See HARMONICS, RATES OF; LAW OF VIBRATING STRING**

16) It was stated (§10) that the sound of a vibrating string was in general compounded of a number of

simple tones, and a well trained ear can detect a considerable number of them. If it were not for these harmonic components the tones of strings, pipes, of the human voice, or in short, of every instrument most generally used for the production of sound, would be flat and uninteresting like pure water. Each harmonic component is by itself a simple tone, and is due to the vibration of the corresponding segment of the string superposed upon that of the whole*. The same statement applies, *mutatis mutandis* to pipes, whether open or stopped. That the harmonics of different instruments greatly influence their several characters is observable in the difference of the tones of a flute, and clarinet. A flute is an open pipe, a clarinet a stopped one; in the former, therefore, the harmonics follow the order of the natural numbers 1, 2, 3, 4, and in the latter the order 1, 3, 5, 7; the intermediate notes being supplied by opening the lateral orifices of the instrument.

* Society is an accurate analogy to this statement: The whole is made up of individualized whole tones of the individuals.

17) When two simple tones, that is (as explained above), notes deprived of all the harmonic components which under ordinary circumstances accompany them, are sounded together very nearly in unison, there are heard what are called beats succeeding one another at regular intervals, their rapidity depending inversely on the smallness of the interval between the two tones. Their origin may be explained thus: Suppose the tones to be produced by vibrations numbering 500 and 501 per second respectively, then every 500th sound wave of the former will strike on the tympanum at exactly the same instant as every 501st of the latter and will reinforce it; while at the 250th of the first the corresponding wave of the other will be just half a period in front of it. Now a sound wave consists of a condensed and rarified stratum of air particles, and therefore the condensed portion of one wave here coincides with the rarified portion of the other and neutralizes it. Thus there will be an alternate reinforcement and diminution of sound, every second, from the maximum intensity when both waves impinge on the tympanum at the same instant to the minimum when they counteract each other as much as possible and vice versa.

In the above case it was supposed that the number of vibrations of one tone were only *one* more per second than those of the other; but if the difference of the numbers had been *two*, for instance, then in one second the first tone would have gained two vibrations on the other, and there would have been two beats; and in general the number of beats per second is always equal to the difference between the two rates of vibrations per second. **See BEATS; DIFFERENCE TONES; LAW OF THE TRIANGLE; LAW OF SUPERPOSITION; LAW OF PROPORTION**

18) In the preceding section, the cause of beats due to two simple tones of nearly the same pitch was explained, and it was seen that the number of beats per second was always equal to the difference of the

numbers of vibrations per second of each tone; so that as the interval between them increased so would the number of beats increase in a given time. Hence it is obvious that if the interval became sufficiently large, the beats would succeed each other so rapidly as to become undistinguished. For instance, in the case of the fifth whose lower and upper tones are produced by vibrations numbering 264 and 396 per second respectively, the number of beats per second would be 132 and would therefore be undistinguished – and still more so supposing the upper tone to have 397 or more vibrations per second; but, on the other hand it is a well-known fact, that if an imperfect fifth, octave, or any other tolerably simple interval is played on a violin or violoncello, the beats are most distinctly heard succeeding each other at perceptible intervals – whereas according to what was said above they should occur so rapidly as not to be heard at all. Two explanations of this phenomenon have been given, of which by far the most simple is due to Helmholtz – and which here follows. It appears that when the tones are simple and at a sufficiently large interval the beats should occur too rapidly to be heard, whereas when the interval is played on a violin they are easily distinguishable. The reason of this fact is that in the latter case the tones are no longer simple but compound – and the beats which are heard are not due to the fundamental tones themselves but arise from two of their harmonic components which are nearly unison. Suppose the ratio of the interval between the fundamental tones to be m/n , that is, let m/n be the fraction, reduced to its lowest terms, which is formed by putting in the numerator the number of vibrations per second of the upper tone, and in the denominator those of the lower. Then it is plain that the n^{th} harmonic component of the tone m , will be of the same pitch as the m^{th} harmonic component of the tone n ; for they will each have exactly mn vibrations per second. Now let M/N be the ratio, expressed in the same way, of another interval, nearly, but not quite, equal to m/n ; then the n^{th} harmonic component of M will have Nm vibrations per second, while the m^{th} component of N will have Mn . Now since M/N is nearly equal to m/n , the difference between Mn and Nm will be a small number; and when the two notes are sounded together the number of beats per second will be equal to that difference.

For example, let m/n be the ratio of a fifth, that is the fraction $3/2$, and let M/N represent very nearly the same interval, say $397/264$; then the difference between Mn and Nm , or 794 and 792, is 2; hence if two strings tuned apart at an interval represented by $397/264$ are sounded simultaneously there will be two beats heard per second. **See BEATS, DIFFERENCE TONES, RATIOS**

19) When the vibrations of the air due to a number of

different sounds which co-exist at the same time are infinitely small, they are merely superposed one on another, so that each separate sound passes through the air as if it alone were present; and this law of supposition holds, though only approximately, until the vibrations have increased up to a certain limit, beyond which it is no longer true. Vibrations which give rise to a large amount of disturbance produce secondary waves; and it is to there that the phenomena of resultant tones are due.

Thus if two notes a fifth apart, for instance, are forcibly sounded together, a third tone is heard an octave below the lower of the two, and this ceases to be perceptible when the loudness of the concord diminishes. In general the resultant tone of any combination of two notes is produced by a number of vibrations per second equal to the difference of the numbers per second of the notes. This fact formerly led to the supposition that the resultant tone was produced by the beats due to the consonance, which, when they occurred with sufficient rapidity, linked themselves together so as to form a continuous musical note. If this were so it is clear that the resultant ought to be heard when the original notes are sounded gently as well as forcibly; and it was the failure of this condition that led Helmholtz to the re-investigation of their origin. These resultant tones have been named by him *difference tones*; he has also discovered the existence of resultant tones formed by the sum of the numbers of vibrations of the primaries. These *summation tones* as they are called cannot be explained on the old theory. See **BEATS, DIFFERENCE TONES, SUMMATION TONES**

20) The theory of beats explains the law that the smaller the two numbers are, which express the ratio of their vibrations, the smoother is the combination of any two tones. When two simple tones are sounded together whose rates of vibration per second differ by more than 132, the beats, according to Helmholtz, totally disappear. As the difference grows less the beats become more and more audible, the interval meanwhile growing proportionately dissonant, till they number 33 per second, at which point the dissonance of the interval is at its maximum.

This, however, depends upon the position of the interval as regards its pitch. For it should be remembered that though the *ratio* of any given interval remains the same whatever the absolute pitch of its tones may be, yet the difference of the actual numbers of their vibrations, and therefore the number of beats due to their consonance, alters with it. And vice versa, if the difference of the number of vibrations remains constant, the interval must diminish as its pitch rises. For instance, either of the following combinations would give rise to 33 beats per second, since the numbers of vibrations of their tones per second, are 99-66, and 528-495, respectively. Now it is obvious that in the latter case the dissonance would be far greater than in the former.

The above explanation of the cause of dissonance is

also due to Helmholtz, and completely solves a question which had remained unanswered since the time of Pythagoras, although that philosopher made the important discovery that the simpler ratio of the two parts into which a vibrating string was divided, the more perfect was the consonance of the two sounds.

21) The sound of the piano, violin, etc., is only in a small measure due to the actual vibration of the strings themselves. The latter communicate their own motion to the sound board of the piano, and to the front, back, and enclosed air of the violin. In the latter instrument communication is made to the surrounding air from that within it by means of the *f* holes.

If a string were merely stretched between two pegs firmly fixed in a stone wall and caused to vibrate, scarcely any sound would be heard at all, owing to the mass and rigidity of the wall, which would refuse to be thrown into vibration by so small an amount of energy as that which the string would possess. On the other hand, the sound board of a piano readily answers to the vibrations imposed on it when the string is struck, and having a large surface in contact with the air, every point of which originates a system of waves, it causes a full and powerful sound. See **RESONANCE, SYMPATHETIC VIBRATION**

22) The vibrations of straight rods may be either longitudinal or transversal. The former have not been generally employed for the production of musical sounds; the latter are such as take place when a tuning fork is struck, or when a musical box or triangle is played. In the case of a curved rod the vibrations are more complicated, but there is one interesting case, namely, that in which the curved rod takes the form of a circular ring. In this case the fundamental tone is obtained by suspending it horizontally by four strings attached at equidistant points in the circumference, and by lightly tapping it midway between any two. If the number of vibrations then given be $2n$ per second, those of the successive harmonics are proportional to $3n\sqrt{6}$, $4n\sqrt{13}$, $5n\sqrt{22}$, etc. See **RESONATING RINGS; HARMONICS, RATES OF**

23) The nature of the vibrations of a bell may be partly inferred from those of a ring, as the bell may be considered as consisting of a connected series of rings of different diameters all vibrating simultaneously; thus the fundamental tone of a bell would cause it to divide itself longitudinally into four equal segments, corresponding to the four quadrants into which the suspended ring divides. The period of its vibrations could not, however, be similarly inferred.

24) The vibration of plates is not, musically speaking, a subject of much interest, as the only instruments which depend upon it directly for the production of their sounds, are gongs and cymbals, and the same may be said of membranes. Chladni was the first to show the positions of the lines of nodes on a plate, by clamping it horizontally in a vice, and causing it to vibrate by passing a violin bow over one edge, hav-

ing previously sprinkled it with a little sand. The lines of nodes being those parts of the plate which, like the nodes of a string (§13), are not thrown into vibration, remain covered with the sand which collects there from the vibrating portions, and in this way very curious and interesting figures are produced. (125) See **HARMONICS, RATES OF**

ACOUSTIC CENTERS: See **MOLECULAR DISSOCIATION**

ACOUSTIC EMISSION: As applied to rolling element bearings, acoustic emission refers to an incipient failure detection method using high frequency ultrasonic transducers to detect signals in the 80 to 120 kHz region. Similar in concept to the spike energy method. (100)

ACOUSTIC EMISSION: [NDT] When a solid material is stressed, imperfections within the material emit short bursts of energy called "emissions". In much the same manner as ultrasonic testing, these acoustic emissions can be detected by special receivers. The source of "emissions" can be evaluated through study of their strength, rate, and location.

ACOUSTIC FEEDBACK: Acoustic feedback occurs when sound vibrations from the loudspeaker travel back to the record player. The phono stylus then picks up the vibrations from the speaker along with the modulations in the record groove and feeds both signals to the amplifier and speaker. The result is - at best - a slight tonal blur or a rumbling noise. At worst, the re-amplified vibrations pile up, overload the amplifier, and produce a loud rumbling, humming sound that, if sustained, could damage the speakers. (103)

ACOUSTIC IMPULSE, SYMPATHETIC: See **THIRDS**.

ACOUSTIC LEVITATION: See **LEVITATION**.

ACOUSTICAL PROPERTY: The ability of material to conduct vibratory energy. (102)

ACRANIA: Animals without skulls. (121)

ACROGANGLION: A rudimentary vertical brain. (121)

ACR TUBING: Tubing used in air conditioning and refrigeration. Ends are sealed to keep tubing clean and dry. (128)

ACTHNA: An invisible, subterrestrial fire, being the matrix from which bituminous substances take their origin, and sometimes producing volcanic eruptions. It is a certain state of the "soul" of the earth, a mixture of astral and material elements, perhaps of an electric or magnetic character. [It is an element in the life of the "great snake" Vasuki, that according to Hindu mythology encircles the world, and by whose movements earthquakes may be produced. (131)]

ACTHICI: Elemental spirits of fire; spirits of Nature. They may appear in various shapes, as fiery tongues, balls of fire, etc. They are sometimes seen in spiritual seances. [They are the Devas of fire in India, and bulls were sometimes sacrificed to them.] (131)

ACTINIC RAYS: The active rays emanating from the sun. See **CELESTIAL, SOLAR-FORCE, RAYS**. See also (7)

ACTIVATED ALUMINA: Chemical which is a form of aluminum oxide. It is used as a drier or desiccant. (128)

ACTIVATED CARBON: Specially processed carbon used as a filter-drier; commonly used to clean air. (128)

ACTIVE FILTER: A device which employs high gain amplifiers to drive linear resistor-capacitor (RC) networks towards realizing near-ideal filter transfer functions. Advanced feedback techniques utilizing high performance operational amplifiers (op-amps) tend to idealize the input, output and transfer characteristics relative to equivalent passive implementations.

ACTIVE FORCES: See **FORCES-ACTIVE**

ACTIVE PRINCIPLE: "The vibratory force is the active principle all radiates from." (195-54) A-12 (2); See **LAW OF OCTAVE, FORCE-RADIAL, SOUND, SYMPATHETIC VIBRATION THEORY**

ACTIVE PRINCIPLE: Q.: Concerning the expansion of vibrations in active principle of motive force in motor, is this a 4th dimensional phenomena ?

A.: Yes.

Q.: Is electricity, sound, light and heat, similarly 4th dimensional phenomena?

A.: Phases of same. Else how would there be the variation in the activity of the atomic forces through etheric forces as radiate from the sun itself, changed in the activity when same is considered in that of any form of vacuum? In the active principle as is set forth in the motive energy created by the expansions as are seen in the motor, with the sprangle and the motor with the race - this is the same energy, only increased by its activity being expanded in action, see? Just as the sun's rays piercing that of the various phases of a vacuum force that is then come in accord with atmospheric force, that impregnated with the various forms of energy in its constant change as taking place about the sphere in its motion, creating that as called high or low barometer activity, and in same bringing about the force of wind. This an expansion of the gravity in same in elements create energy and force, see? That's a good one! That's why we have wind - that's why Capricorn, or those of the opposite point, we reach that radial center as is seen from the sprangle on drum where each element takes on its activity in both down and upward movement, or as is more

crudely given in how that one may be a similar motion continue to keep a pan, hat, glass, or any object with a convex surface continually in the air, as long as that particular motion is kept in action. Just the same as is its action keeps the expanding of the force set in motion to create just that continual motion." (195-56) (2) See **VACUUM, FORCE-RADIAL, GRAVITY, FORCE-CENTRIFUGAL**

ACTIVITY METER: A meter that indicates the power drawn from the generator or power supply. (102)

ACTUALISM: The system of development by actually existing agencies. (121)

ACTUATOR: That portion of a regulating valve which converts mechanical fluid, thermal energy, or electrical energy into mechanical motion to open or close the valve seats. (128)

ADDITIVE SYNTHESIS: Adding sine waveforms together to create new waveforms. (69)

ADECH: The inner (spiritual) man; the lord of thought and imagination, forming subjectively all things in his mind, which the exterior (material) man may objectively reproduce. Either of the two acts according to his nature, the invisible in an invisible, and the visible one in a visible manner, but both act correspondingly. The outer man may act what the inner man thinks, but thinking is acting in the sphere of thought, and the products of thought are transcendently substantial, even if they are not thrown into objectivity on the material plane. The inner man is and does what he desires and thinks. Whether or not his good or evil thoughts and intentions find expression on the material plane is of less importance to his own spiritual development than to others who may be affected by his acts, but less by his thoughts. (131)

ADIABATIC COMPRESSION: Compressing refrigerant gas without removing or adding heat. (128)

ADMISURAL: Earth (literally and allegorically). (131)

ADRE: An acronym for Automated Diagnostics for Rotating Equipment. An off-line microcomputer-based system for the acquisition, reduction, and documentation of information from rotating machinery. (100)

ADROP, AZANE or AZAR: "The Philosopher's Stone." This is not a stone in the usual sense of that term, but an allegorical expression, meaning the principle of wisdom upon which the philosopher who has obtained it by practical experience (not the one who is merely speculating about it) may fully rely on, as he would rely on the value of a precious stone, or as he would trust to a solid rock upon which to build the foundation of his (spiritual) house. (131)

ADSORBENT: Substance with the property to hold molecules of fluids without causing a chemical or physical change. (128)

ADSR: Attack, decay, sustain and release.

AERATION: Act of combining substance with air. (128)

AERIAL NAVIGATION: Keely's third system embraced AERIAL and SUBMARINE navigation.

November, 1884, he states: "I have the only true system of aerial navigation. My airship will be operated by the vibratory lift and the vibratory push process." (Polar propulsive force.)

The secret of production of the "vibratory lift" is embraced in his statement elsewhere: "Any metallic mass can be so impregnated with certain vibrations as to give it the mental attributes of attraction and repulsion." He simply impregnated the particular metallic mass with vibrations which caused it to assume self-repulsion to the terrestrial or earth mass chord, and this repulsion thrust it away, out to us, upwards.

In the spring of 1890 he succeeded in raising the metal weight composing his airship model, by means of a force still unknown to science. One of his friends stated "When he has gained as perfect control of it as we now have over steam, airships weighing thousands of tons can easily traverse the highways of the air."

"He has gained control of the mysterious polar current to that extent that he has been able to exhibit on the thirds or molecular graduation of the propellor of his airship, 120 revolutions per minute, and on the sixths or atomic graduation, 360 revolutions per minute. He still has the etheric field to conquer."

Keely says "By exciting the metallic mass composing a navigator of any given weight, it may be suspended and propelled. The vibratory neutral negative attraction evolved will bring it into perfect commercial control by keeping it in sympathy with the earth's polar stream." This is why he sought to find the sympathetic connection between luminous ether, or inflowing celestial streams, and the radiating or terrestrial streams, which, by their interaction "solar tensions against terrestrial condensations" cause the polar current and its kindred phenomena.

While he used "sympathetic negative attraction" for running machinery, he sought to use for aerial navigation, another force, a "negation" of "sympathetic negative attraction" or the same force that regulates the recession of the planets from each other. This is probably simply polar propulsion, although he terms this elsewhere as gravity.

"The power of the terrestrial propulsive and celestial attractive is to lift and of the celestial propulsive and terrestrial attractive is to descend. Certain polar or antipolar vibrations can intensify either of these qualities so as to cause either of them to predominate. Intensifying the celestial will cause a metallic mass to

rise with a speed proportionate to the concentration of the dominant bearing on the negative thirds of its mass chords, thereby inducing high neutral radiation together with celestial attraction."

"An airship of any number of tons weight can, when my system is completed, float off into space with a motion as light as thistledown, or with a velocity out rivaling the cyclone. With the force of corpuscular bombardment its movements can be as varied as is necessary for commercial use at any desired elevation and at any speed." (11)

AERIATIC FORMATIONS: See **FORCE, ATOMIC**

AETIOLOGY: The science of causes. (121)

ÆTHER: See **ETHER**

AFC (AUTOMATIC FREQUENCY CONTROL): AFC is used in many FM tuners to lock in a station to keep it from drifting out of tune. Since AFC tends to "pull" the tuning to the stronger of two adjacent stations, an AFC-defeat(on-off) control is necessary to permit tuning in weak stations. Some tuners dispense with AFC altogether, relying on a circuit design that is inherently free of drift problems to hold a station steady on the dial. The absence of AFC in a quality FM tuner is therefore not necessarily a drawback.(103)

AFFINITY: Connection by relation. Keys of affinity. [Relative Keys]. (125) See **ATTENDANT KEYS; AUXILIARY KEYS; RELATIVE KEYS**

AGITATOR: Device used to cause motion in confined liquid. (128)

AIR BREAK: An inverted opening placed in the chimney of a gas furnace to prevent back pressure from outside wind from reaching the furnace flame or pilot. (128)

AIR CLEANER: Device used for removal of airborne impurities. (128)

AIR COIL: Coil on some types of heat pumps used either as an evaporator or a condenser. (128)

AIR CONDITIONER: Device used to control temperature, humidity, cleanliness, and movement of air in conditioned spaces. (128)

AIR CONDITIONING: Control of the temperature, humidity, air movement, and cleaning of air in a confined space. (128)

AIR COOLED CONDENSER: Heat of compression is transferred from condensing coils to surrounding air. This may be done either by convection or by a fan or blower. (128)

AIR COOLER: Mechanism designed to lower temperature of air passing through it. (128)

AIR CORE SOLENOID: Solenoid which has a hollow core instead of a solid core. (128)

AIR DIFUSER: Air distribution outlet or grille designed to direct airflow into desired patterns. (128)

AIR GAP: The space between magnetic poles or between rotating and stationary assemblies in a motor or generator. (128)

AIR HANDLER: Fan-blower, heat transfer coil, filter, and housing parts of a system. (128)

AIR INFILTRATION: Leakage of air into rooms through cracks, windows, doors, and other openings. (128)

AIR SENSING THERMOSTAT: Thermostat unit in which sensing element is located in refrigerated space. (128)

AIR, STANDARD: Air having a temperature of 68°F (20°C), a relative humidity of 36 percent, and pressure of 14.7 psia (101.3 kPa). The gas industry usually considers 60°F (16°C) as the temperature of standard air. (128)

AIR VENT: Valve, either manual or automatic, used to remove air from the highest point of a coil or piping assembly. (128)

AIR WASHER: Device used to clean air while increasing or lowering its humidity. (128)

A'KASA or AKASA or AKASHA: An Eastern term. Living primordial substance, corresponding to the conception of some form of cosmic ether pervading the solar system. Everything visible is, so to say, condensed A'kasa, having become visible by changing its supra-ethereal state into a concentrated and tangible form, and everything in nature may be resolved again into A'kasa, and be made invisible, by changing the attractive power that held its atoms together into repulsion; but there is a tendency in the atoms that have once constituted a form, to rush together again in the previous order, and reproduce the same form; and a form may therefore, be making use of this law, be apparently destroyed and then reproduced. This tendency rests in the character of the form preserved in the Astral Light. (131) See **NEGATIVE ATTRACTION, ASTRAL LIGHT**

ALAMOTH: (Heb.) This word occurs in Ps. lxxviii. 25. "First go the sharim (singers), then follow the neginim (kinnors), in the midst are alamoth (damsels playing on the timbrels)." Gesenius and others understand the word to signify treble music, "vox clara et acuta, quasi virginum". But, on the other hand, in I Chron. xv. 20 the names of men are given as players of "nebels on alamoth". It is one of the many obscure musical terms which are met with in the Bible. It however seems to have been associated with nebels, much as the expression sheminith is with kinnors, and my therefore be supposed to refer to the pitch or

method of playing on those instruments. (125) See **AZOR; NEBEL**

ALCAHEST: An element which dissolves all metals, and by which all terrestrial bodies may be reproduced into their *ens primum*, or the original matter (a'kasa) of which they are formed. It is a power which acts upon the astral forms (or souls) of all things, capable of changing the polarity of their molecules and thereby to dissolve them. The power of Will is the highest aspect of the true Alcahest. In its lowest aspect it is a visible fluid able to dissolve all things, not yet known to modern chemistry. (131) See **FORCE, MIND; FORCE, WILL; A'KASA, ETHER; DISSOCIATION; DISINTEGRATION; UNFED FLAME**

ALCHEMY: A science by which things may not only be decomposed and recomposed (as is done in chemistry), but by which their essential nature may be changed and raised higher, or be transmuted into each other. Chemistry deals with dead matter alone, but Alchemy uses life as a factor. Everything is of a threefold nature, of which its material and objective form is its lowest manifestation. There is, for instance, immaterial spiritual gold, ethereal fluid and invisible astral gold, and the solid visible, material and earthly gold. The two former are, so to say, the spirit and soul of the latter, and by employing the spiritual powers of the soul we may induce changes in them that may become visible in the objective state. Certain external manipulations may assist the powers of the soul in their work; but without the possession of the latter the former will be perfectly useless. Alchemical processes can therefore only be successfully undertaken by one who is an Alchemist by birth or education. Everything being of a threefold nature, there is a threefold aspect of Alchemy. In its higher aspect it teaches the regeneration of the spiritual man, the purification of the mind, thought, and will, the ennobling of all the faculties of the soul. In its lowest aspect it deals with physical substances, and as it leaves the realm of the living soul, and steps down to dead matter, it ends in the science of modern chemistry of the present day. (131)

ALCOHOL BRINE: Water and alcohol solution which remains a liquid below 32°F (0°C). (128)

ALCOL: The substance of a body free from all earthly matter; its ethereal or astral form. (131)

ALEPH: The first Hebrew letter, like the Greek Alpha (A), signifies the Primal One, the Great Original whence all phenomena proceed. Letters, according to all Kabbalists, are not looked upon as arbitrary characters artificially invented, but as thought-pictures, symbolically expressive of mental states, too profound to be stated in words. Each letter, then can stand alone in a distinctive value, like a figure, and we know that in Hebrew there are no figures apart from letters, each letter having its definite numerical value. As Aleph literally means an ox it has often been astrologically associated with the sign Taurus, the Bull. A has stood in Hebrew as the first letter of one of the names applied to Deity, AHIH signifying I

AM, or underived Being, the source and permanent support of all manifest existence. All Kabbalists declare that God is partly concealed and partly revealed. The letter A denotes revelation and also signifies, strength, unity and concord. (72)

ALGAE: Low form of plant life, found floating free in water. (128)

ALIGNMENT: A condition whereby the axes of machine components are either colinear, parallel, or perpendicular, according to design requirements. A measurement of the relative position of a machine component with respect to another. Relative alignment measurements can be made from bearing to bearing, rotor to rotor, rotor to bearing, bearing to casing, casing to foundation, casing to piping, *etc.* Various alignment requirements utilize different techniques of cold and hot machine measurement including optical, mechanical (dial indicators), and electronic (proximity probes).(100)

ALIGNMENT: Alignment is the term used to describe certain maintenance adjustments to be made periodically to keep tuners and tape recorders in top working condition. On tuners, alignment involves the adjustment of certain internal circuits; on tape recorders it means adjusting the position of the heads for optimum response.(103)

ALQUOT TONES: Also aliquot parts. Overtones or harmonics. Component parts. (125) See **ACOUSTICS § 9**

ALL PASS DATA: See **STATIC DATA**

ALPHA PARTICLES: Alpha particles can cause fission, alpha particles are positively charged atoms of helium at tremendous velocities. See **ONE SUBSTANCE, BETA PARTICLES, ELECTRONS**

ALTERNATE STRESSES: See **OSCILLATING STRESSES.** (84)

ALTERNATING CURRENT: (AC) Electric current in which direction of flow alternates or reverses. In 60-cycle (Hertz) current, direction of flow reverses every 1/20th of a second or 60 times. (128)

ALUECH: The pure spiritual body (the Atma). (131)

AM (AMPLITUDE MODULATION): AM is a method of broadcasting in which sound waves are transmitted as variations in the intensity of a radio-frequency signal. This method of broadcasting is subject to atmospheric and man-made interference, and in practice is too limited in frequency and dynamic (loudness) range to satisfy high-fidelity requirements. A newer system of radio transmission, FM (or Frequency Modulation), does not have these problems and is therefore preferred for high-fidelity applications. (103)

AMBIENT NOISE: [Acoustics] The sound pressure

levels associated with a given environment. Ambient noise is usually a composite of sounds from near and far sources none of which is particularly dominant. (85)

AMBIENT TEMPERATURE: Temperature of fluid (usually air) which surrounds object on all sides. (128)

AMMETER: Electric meter, calibrated in amperes, used to measure current. (128)

AMMONIA: Chemical combination of nitrogen and hydrogen (NH₃). Ammonia refrigerant is identified as R-117. (128)

AMOEBOID: After the manner of the amoeba, a microscopic organism. (121)

AMPERAGE: Electron or current flow of one coulomb per second past a given point in circuit. (128)

AMPERE: Unit of electric current equivalent to flow of one coulomb per second. (128)

AMPERE TURNS: Term used to measure magnetic force. Represents product of amperes times number of turns in coil of electromagnet. (128)

AMPHIGONY: The coalescence of the cells and their properties. (121)

AMPLIFIER: An electronic circuit which increases the power of an electrical signal. (69)

AMPLIFIER: Electrical device which increases electron flow in a circuit. (128)

AMPLIFIER: The amplifier, a basic component in any sound system, receives from the cartridge weak electrical signals representing the music recorded in the record grooves or similarly weak signals from the tuner or tape recorder. It then enlarges (amplifies) these signals to make them powerful enough to drive the speakers. (103)

AMPLITUDE: Amount of a waveform's deviation from center. When used to describe sound, amplitude means volume. (69)

AMPLITUDE: The difference between 0 and maximum or minimum changes of polarity within a wave or cycle. See **SOUND INTENSITY**

AMPLITUDE: The magnitude of periodic dynamic motion (vibration). Amplitude is measured in terms of peak-to-peak, zero-to-peak, rms, or average. (100)

AMPLITUDE: Amplitude refers to the strength, or loudness, of a sound, or of the strength of an electrical signal representing sound. If the sound or signal is represented as a wave pattern on an oscilloscope or graph, the amplitude corresponds to the height of the wave (*i.e.*, the magnitude of the swing in each cycle).

(103)

AMPLITUDE OF VIBRATION: The distance from the point of rest of a particle, to either end of its journey, when a sound-wave passes over it. (125) See **ACOUSTICS § 3**

AMPLITUDE MODULATION: A periodic change in the amplitude of a sound; for instance, tremolo. (69)

AMPLITUDE TRANSFORMER: A half wave-length resonator having a change in cross-sectional area between the input and output surfaces for mechanically altering the amplitude of vibration. (102)

ANALYSIS: The ascertainment of the identity and/or the concentration of the constituents or components of a sample. [Authors of papers on quantitative analysis frequently use analysis incorrectly in place of determination (*q.v.*). Only samples can be analyzed; constituents or components are determined. Examples of correct usage are: Analysis of steel for Mn, Cu, and Ni; determination of Mn, Cu, and Ni in steel.] (5)

ANAKE: Fate, necessity. (121)

ANDROGYNE PRINCIPLE: See **MOTION**

ANCHOIC ROOM: [Acoustics] A room in which all of the boundaries are highly absorptive so that sound may propagate in all directions without being reflected off room surfaces. Free field conditions exist within a room that is perfectly anechoic. (85)

ANCHOIC TERMINATION: [Acoustics] A highly absorptive duct termination often used for testing purposes. (85)

ANEMOMETER: Instrument for measuring the rate of airflow or motion. (128)

ANGER: "From Mars we find a tendency for the body-mind at times to be easily aroused to anger. Anger is correct, provided it is governed. For it is like material things in the earth that are not governed. There is power, even in anger. He that is angry and sinneth not, controls self. He that is angry and allows such to become the expression in the belittling of self or the self-indulgence or self in any direction -- brings to self those things that partake of the spirit or product or influence of anger itself." (361-4) (2)

ANGLE OF CONTACT (CONTACT ANGLE): In a ball bearing, the angle between a line connecting the points where a ball contacts the inner and outer races and a plane through the centers of the balls. (100)

ANGLE VALVE: Type of globe valve design, having pipe openings at right angles to each other. Usually, one opening is on the horizontal plane and one is on the vertical plane. (128)

ANGSTROM: Unit of length = 10⁻¹⁰ m and 0.1 nm.

Not a SI unit, should be replaced by nm. (5)

ANGULAR CONTACT BALL BEARINGS: A ball bearing designed to support a heavy thrust load in one direction. It uses a steep contact angle, with high shoulders on opposite sides of the outer and inner races. If two opposite oriented bearings of this type are used in tandem, bidirectional thrust loads may be supported. (100)

ANGULAR MOTION: Rectangular vibrations or resultant motions of a pendulum caused by forces acting at right angles to each other on the motion of the pendulum.

ANHYDROUS CALCIUM SULPHATE: Dry chemical made of calcium, sulphur, and oxygen (CaSO_4). (128)

ANIADA: The activities that are caused by astral influences, celestial powers; the activity of imagination and phantasy. (131)

ANIADUM: The spiritual (re-born) man; the activity of man's spirit in his mortal body; the Seat of Spiritual Consciousness. (131)

ANIADUS: The spiritual activity of things. (131)

ANNEALING: Process of heat treating metal to get desired properties of softness and ductility (easily formed into new shapes). (128)

ANODE: Positive terminal of electrolytic cell. (128)
See **CATHODE**

ANTHROPISM: A system of thought which makes man the measure of all things. (121)

ANTHROPOCENTRIC: Making man the center of the universe. (121)

ANTHROPOCENTRIC DOGMA: The anthropocentric dogma culminates in the idea that man is the preordained center and aim of all terrestrial life - or, in a wider sense, of the whole universe. As this error is extremely conducive to man's interest, and as it is intimately connected with the creation-myth of the three great Mediterranean religions, and with the dogmas of the Mosaic, Christian and Mohammedan theologies, it still dominates the greater part of the civilized world. (121)

ANTHROPOGENY: The science of the origin of man. (121)

ANTHROPOLATRIC: "man-worshipping", exaggerating man's importance. (121)

ANTHROPOLACTRIC DOGMA: The anthropolactic dogma naturally results from this comparison of the activity of God and man; it ends in the apotheosis of the human organism. A further result is the belief in the personal immortality of the soul, and the dualistic dogma of the twofold nature of man, whose

"immortal soul" is conceived as but the temporary inhabitant of the mortal frame. (121)

ANTHROPOLOGY: The science (or sciences) of man. (121)

ANTHROPOMORPHIC DOGMA: The anthropomorphic dogma is likewise connected with the creation-myth of the three aforesaid religions (Mosaic, Christian and Mohammedan), and of many others. It likens the creation and control of the world by God to the artificial creation of the skillful engineer or mechanic, and to the administration of a wise ruler. God, as creator, sustainer, and ruler of the world, is thus represented after a purely human fashion in his thought and work. Hence it follows, in turn, that man is god-like. "God made man to his own image and likeness." The older, naive mythology is pure "homotheism" attributing human shape, flesh, and blood to the gods. It is more intelligible than the modern mystic theosophy that adores a personal God as an invisible - properly speaking, gaseous-being, yet makes him think, speak, and act in human fashion; it gives us the paradoxical picture of a "gaseous vertebrate". (121)

ANTHROPOMORPHISM: The tendency to conceive god in human form. (121)

ANTI-ALIAS FILTER: Also called presampling filter. A lowpass filter which sharply bandwidth-limits the input to an analog-to-digital converter (ADC) to prevent extraneous noise and frequency components from causing erroneous output data codes; too low an ADC sampling frequency is a major offender that generates uncorrectable aliasing or frequency folding errors when signal reconstruction is implemented.

ANTIGRAVITY: See **LEVITATION**.

ANTILIGHT: See **LEVITATION**.

ANTIMATTER: See **LEVITATION**.

ANTINODAL REGION: The area of maximum mechanical amplitude in the direction of sound transmission. (102)

ANTI-NODE: See **NODE**, **MATTER**, **NEUTRAL CENTER**, **NEGATIVE ATTRACTIVE**

ANTIPHONY: (Voice against voice), accord of two voices with the octave or the double octave. (81)

ANTI-POLAR & POLAR: "Under certain orders of sympathetic vibration, polar & anti-polar, the attractive sympathies of either stream (celestial & terrestrial) can be intensified, so as to give the predominance to the celestial or to the terrestrial." (Keely and His Discoveries) pg 303. Polar chord: B flat, D natural and F. Depolar chord: D, F# and A. See **POLAR/DEPOLAR**, **SYMPATHETIC NEGATIVE TRANSMITTER**

ANYODEL: The spiritual life; the subjective state into which the higher essence of the soul enters after death, and after having lost its grosser parts in Kama-loca. It corresponds to the conception of Devachan. (131)

APERIODIC WAVEFORM: Irregular, nonrepeating waveform. (69)

APOTOME: A major semitone. (125)

APOTOMES: Smaller fractions of an interval than the comma. (8)

AQUASTOR: A being created by the power of the imagination - *i.e.*, by a concentration of thought upon the A'kasa by which an ethereal form may be created (Elementals, Succubi and Incubi, Vampires, etc.). Such imaginary but nevertheless real forms may obtain life from the person by whose imagination they are created and under certain circumstances they may even become visible and tangible. (131)

AQUEOUS DISINTEGRATION, THEORY AND FORMULA OF: The peculiar conditions as associated with the gaseous elements of which water is composed, as regards the differential volume and gravity of its gases, make it a ready and fit subject of vibratory research. In submitting water to the influence of vibratory transmission, even on simple thirds, the high action induced on the hydrogen as contrasted with the one on the oxygen (under the same vibratory stream) causes the antagonism between these elements that induces dissociation. The differential antagonistic range of motion, so favoring the antagonistic thirds as to become thoroughly repellant. The gaseous element thus induced and registered, shows thousands of times much greater force as regards tenuity and volume than that induced by the chemical disintegration of heat, on the same medium. In all molecular dissociation or disintegration of both simple and compound elements, whether gaseous or solid, a stream of vibratory antagonistic thirds, sixths, or ninths, on their chord mass will compel progressive subdivisions. In the disintegration of water the instrument is set on thirds, sixths, and ninths, to get the best effects. These triple conditions are focalized on the neutral center of said instrument so as to induce perfect harmony or concordance to the chord note of the mass chord of the instruments full combination, after which the diatonic and the enharmonic scale located at the top of the instrument, or ring, is thoroughly harmonized with the scale of ninths which is placed at the base of the vibratory transmitter with the telephone head. The next step is to disturb the harmony on the concentrative thirds, between the transmitter and the disintegrator. This is done by rotating the siren so as to induce a sympathetic communication along the nodal transmitter, or wire, that associates the two instruments. When the note of the siren becomes concordant to the neutral center of the disintegrator, the highest order of sympathetic communication is established. It is now necessary to operate the transferable vibratory negatizer or negative

accelerator, which is seated in the center of the diatonic and enharmonic ring, at the top of the disintegrator, and complete disintegration will follow (from the antagonisms induced on the concordants by said adjunct) in triple progression, thus: First thirds: Molecular dissociation resolving the water into a gaseous compound of hydrogen and oxygen. Second: sixths, resolving the hydrogen and oxygen into a new element by second order of dissociation, producing what I call low atomic ether. Third: ninths, the low atomic ether resolved into a new element, which I denominate high or second atomic harmonic. All these transmissions being simultaneous on the disturbance of sympathetic equilibrium by said negative accelerator.

EXAMPLE:

Taking the chord mass of the disintegrator B flat, or any chord mass that may be represented by the combined association of all the mechanical parts of its structure (no two structures being alike in their chord masses) taking B flat, the resonators of said structure are set at B flat first octave, B flat third octave and B flat ninth octave by drawing out the caps of resonators until the harmony of thirds, sixths, and ninths are reached; which is simple movement of the fingers on the diatonic scale, at the head, will determine by the tremulous action which is highly sensible to the touch, on said caps. The caps are then rigidly fixed in their different positions by set screws. The focalization to the neutral center is then established by dampening the steel rods, on the back of the scale, representing the thirds, sixths and ninths, drawing a piece of small gum tube over them, which establishes harmony to the chord mass of the instrument. Concordance is thus effected between the disintegrator and the ninths of the scale at base of transmitters with telephonic head.

This scale has a permanent sympathetic one, set on the ninth of any mass chord that may be represented, on any and all the multiple variations of mechanical combinations. In fact, permanently set for universal accommodations.

The next step is to establish pure harmony between the transmitter and the disintegrator, which is done by spinning the siren disk, then waiting until the sympathetic note is reached, as the siren chord, decreasing in velocity, descends the scale. At this juncture, the negative accelerator must be immediately and rapidly rotated, inducing high disturbance of equilibrium between the transmitter and the disintegrator by triple negative evolution, with the result that a force from five to ten, fifteen, twenty, and thirty thousand pounds to the square inch is evolved by the focalization of this triple negative stream on the disintegrating cell, or chamber, whether there be one, two, three, five, or ten drops of water enclosed within it."

"When moist air is subdivided by atomic vibration, the hydrogen is dissociated or separated from the oxygen but neither of them pass from the intermolecular

state. Not until the intermolecular structure of hydrogen is subdivided by interatomic vibrations can it assimilate with the introductory etheric element."

"The latent force from liquids and gases differs from that liberated in metals in that it results from the breaking up of their rotating etheric envelopes, increasing simultaneously the range of their corpuscular action giving under confinement forces of almost infinite variety of pressures. When liberated from the tube it is confined in it seeks its medium of corresponding tenuity with a velocity exceeding that of light."

"The sympathetic neutral flow (from the molecular neutral centers to the mass neutral center) is the latent power liberated in the disintegration of water. In water this power is dispersive, liberating latent elastic energy, while in metals the latent force manifests itself only in negative attraction and when these vibrations are applied to minerals, there is evolved the primal ether which is dissipated, leaving behind only an impalpable intermolecular dust, in which is contained in virgin form an metals originally in the mineral mass."

A non-intermittent flow of sympathy must flow along the Trexar, consisting of harmoniously adjusted thirds. Differential molecular weight is required, that is, the gas must contain heavy atoms and light atoms. This condition is satisfied by water, which consists of two light atoms of hydrogen and one heavy atom of oxygen. The oxygen atom weighs sixteen times as much as the hydrogen.

It is absolutely necessary to release the molecular ether by reducing the water to the interatomic state, before the atoms within the intermolecules can be released. Also the etheric capsules of the atomic and interatomic must be ruptured before the interatomic force can be produced. The ether from one subdivision is essential to subdividing the next higher.

Keely systemized the proper vibratory chords progressively, from the introductory molecular to the interetheric, embracing seven distinct orders of triple subdivision. He proved to his own satisfaction that progressive subdivision evolves new and distinct elements "too multiple to enumerate."

Water is a ready and fit subject for vibratory research on account of its "differential volume" and gravity of its gases. Even on simple thirds the differential action between hydrogen and oxygen causes antagonism and dissociation. The differential of mass is such that the hydrogen and oxygen become thoroughly repellant and thereby exhibit thousands of times more force than could be induced by heat on the same amount of water. Vibration of antagonistic thirds, sixths and ninths on the mass chord will compel progressive subdivisions and to get the best effect on water, the instrument is set on all of these. First, the focalizing chord of sixths induces perfect harmony to the mass chord. Then the diatonic scale and en-

harmonic scale at the top of the instrument (or ring) is harmonized with the scale of the ninths at the base of his Trexar with the telephone transmitter. His next procedure was to disturb the harmony between the transmitter and disintegrator on the concentrative thirds or sixths, by rotating a siren. This he used to induce sympathetic communication along the Trexonar between the vibrator and disintegrator. When the siren concurred to the neutral center it established the highest order of sympathy. He then operated the "transferable vibratory negatizer" or "vibratory accelerator" in the center of the "diatonic and enharmonic ring" at the top of the disintegrator and complete disintegration followed. The thirds first resolved the water molecules into hydrogen and oxygen, then the sixths resolved the hydrogen and oxygen into new elements by dissociation, producing "low atomic ether." Then the ninths resolved the low atomic ether into a new element or "high or second atomic harmonic." All these transmissions were simultaneous on the sympathetic equilibrium being disturbed by the negative accelerator.

Keely's first efforts toward disintegration of the elements of water were successful because of the differential weight of the respective atoms composing its molecules. Subsequently, he discovered that this same method, disintegration by differential mass, may be carried out with any gas, in other words, it must contain heavy atoms and light atoms. The heavy atom or oxygen in water weighs just sixteen times as much as either of the hydrogen atoms to which it is joined by chemical affinity.

"In the dissociation of water, molecular and intermolecular dissociation produces the first order of ozone, which is refreshing and vitalizing to breathe. Atomic and interatomic dissociation produces the second order of ozone, which is too pure to breathe, for it produces insensibility." The third order of ozone, produced by etheric and interetheric dissociation, Keely used in his "carbon register" to produce a high vibratory circuit to break up cohesion, which he recognized as molecular magnetism. It is possible that this "dissociation" in the "carbon register" depolarized the iron molecules by allowing the corpuscular outreach to return within the molecular embrace. The acceleration of vibration producing these different orders is governed by the introductory impulse and the subsequent chords, as arranged in his Liberator, by which he dissociated water. In molecular dissociation he used one fork of 620, setting chords on the first octave. In atomic separation, he used two forks, one of 620 and one of 630, setting chords on the second octave. In etheric separation he used three forks, one of 620, one of 630 and one of 12,000, setting the chords on the third octave.

"Not until the intermolecular structure of hydrogen is subdivided by interatomic vibrations, can it assimilate with the introductory etheric element."

Certain differential, dual, triple or quadruple chords act as an introductory impulse exciting action

on molecular masses (liquid or gaseous) decreasing molecular oscillation. They are then in a receptive state for vibratory disintegration. The diatonic-enharmonic is sounded, increasing molecular oscillation. Molecular subdivision takes place when oscillation exceeds 50% of their diameters. (Molecular or intermolecular?) The gas is now molecularly subdivided and assumes a high velocity of rotation in any confining container, be it sphere or tube and becomes the medium or prepared subject for further disintegration. At this particular time Keely sought to further excite this preparatory medium by the use of an "illuminated revolving prism" a condenser (concave mirror or convex lens) and colored lenses, thereby giving the vibratory frequencies of their respective colors. In his disintegrator a glass tube of sufficient strength to withstand a pressure of 1000 lbs. per square inch was arranged leading to the neutral center and the Trexar was attached to the external end of this glass tube. His use of this tube was probably also to convince the skeptics that the production of his power was genuine and possibly also was used to transmit color vibrations of such frequencies as to release the energy in the neutral center of the sphere.

When the triple introductory impulse or chords in three octaves, are transmitted to the disintegrator it SUBSERVES OR RENDERS NON-OPERATIVE THE MOLECULAR CONCORDANT THIRDS AND ANTAGONIZES WITH DISCORDANT THIRDS, extending their range of oscillation and thereby inducing the highest degree of repellant antagonism or repulsion toward the neutral center of the sphere volume.

The etheric dominant or celestial current induces aqueous disintegration and thermal concentration which two prime conductors display a coincident chord of sympathy with the celestial current. These two prime conductors link the terrestrial to the celestial, without which electricity and magnetism would tend to become static or stable, all life and motion are governed by a dual power disturbance of equilibrium and sympathetic equation, both of which are in turn moved and regulated by electricity and magnetism.

Progressive molecular and intermolecular dissociation reproduces on a small scale Nature's system of light production and also invariably results in vortex motion. All corpuscular action in Nature is vortex motion. The vortex action between the terrestrial and celestial streams, terrestrial condensation against solar tensions, shows conditions analogous to those displayed in the dissociation of water into hydrogen and oxygen, that is, vortex motion of the highest order, but peripheral only.

EXAMPLE OF DISINTEGRATION

If the mass chord of the disintegrator is B flat, the resonators of that structure are set at B flat first octave, B flat third octave and B flat ninth octave, by drawing out the resonator caps and clamping the set screws. A simple movement of the fingers on the di-

atonic scale at the head will determine by the tremulous action of the caps when exactly resonant. Neutral focalization is then established by dampening the steel rods on the back of the scale representing thirds, sixths, and ninths, by drawing a piece of small gum tube over them, which establishes harmony to the mass chord of the instrument. This effects concordance between the disintegrator and the ninths of the scale at base of transmitter with telephone head.

This instrument had a universal accommodator for all ninths in all multiple variations. This was possibly his sphere resonator.

Concordant harmony must now be established between the transmitter and the disintegrator by spinning the siren disk and waiting for the sympathetic note as its velocity decreases. As soon as this note sounds, the negative accelerator must be rapidly rotated inducing high disturbance of equilibrium between the disintegrator and the transmitter by triple negative evolution resulting in enormous pressure. By triple negative evolution he doubtless means disintegration to the etheric stage. (11) **See DISINTEGRATION; RADIATION CHEMISTRY; WATER RADIOLYSIS; CAVITATION; WATER; BROWN'S GAS; LATENT FORCE**

ARCHAEUS: The formative power of Nature, which divides the elements and forms them into organic parts. It is the principle of life; the power which contains the essence of life and character of everything. (131)

ARCHATES or ARCHALLES: The element of the mineral kingdom. (131)

ARCHICEMBALO: A cembalo with an enharmonic scale, supposed to have been invented about the year 1537 in Italy, described by Salinas as having each tone divided into parts, of which three were given to the greater semi-tone and two to the less, the whole octave being divided into thirty-one parts. (125)

ARCHIGONOUS: Born by spontaneous generation. (121)

ARCHIGONY: Spontaneous generation, "primitive birth". (121)

ARCING, ELECTRICAL: Band of sparks formed when an electrical discharge from a conductor jumps to another conductor. (128)

ARCS: Arcs produce continuous waves; Ticker tapes receive continuous waves.

ARES: The spiritual principle; the cause of the specific character of each thing. (131)

ARGHOOL: A simply constructed wind instrument, now used in Egypt. It is made of common cane, and is played by mouth-pieces containing reeds. There are two species of arghool; the first consists of two

tubes both pierced with holes, so that the performer may play in thirds and sixths; the second consists also of two tubes, but one only is pierced with holes, the other being longer and used as a drone. The pitch of the drone can be altered by the addition of extra pieces, which are attached to the instrument, as are also the mouth-pieces, by waxed thread. (125) See **AULOS**

ARISTOXENIANS: The followers of the musical system of Aristoxenus. (125) See **PYTHAGORAS**

ARMATURE: Part of an electric motor, generator, or other device moved by magnetism. (128)

ARMONICA: Harmonica, Armonicon, Harmonicon. The musical glasses, a series of glass cups of various sizes and thicknesses, capable of producing the different notes of the diatonic scale by friction upon the edges. The name armonica was given to this instrument by Benjamin Franklin, to whom also the credit of the invention is sometimes given, but the idea was suggested by Mr. Pickeridge, and Irish gentleman, and first carried out by M. Delaval, and was in use long before the name armonica was given to it by Franklin. (125)

ARTIST: One who possesses in a high degree that appreciation of the beautiful and that refined temperament, which, when duly trained and educated, become active faculties, and render their owner an able and influential exponent of Art. (125)

ASA: Formerly, abbreviation for American Standards Association. Now known as American National Standards Institute. (128)

A.S.M.E. BOILER CODE: Standard specifications issued by the American Society of Mechanical Engineers for the construction of boilers. (128)

ASPECT RATIO: Ratio of length to width of rectangular air grille or duct. (128)

ASPIRING PSYCHROMETER: Device which draws sample of air through it to measure humidity. (128)

ASPIRATION: Movement produced in a fluid by suction. (128)

ASSOCIATED SOUND WAVE: In an associated sound wave, the direction of particle vibration is represented, for the sake of convenience, as being at right angles to its true direction. (68) See **MUSICAL SOUND**.

ASSONANCE: Agreement of tone, consonance. (125)

A.S.T.M. STANDARDS: Standards issued by the American Society of Testing Materials. (128)

"A" **STRING:** See **Acoustics § 7**

ASTRAL LIGHT: The same as the Archæus. A universal and living ethereal element, still more ethereal and highly organized than the A'kasa. The former is

universal, the latter only cosmic – viz., pertaining to our solar system. It is at the same time an element and a power, containing the character of all things. It is the storehouse of memory for the great world (the Macrocosm), whose contents may become reembodied and reincarnated in objective forms; it is the storehouse of memory of the little world, the microcosm of man, from which he may recollect past events. It exists uniformly throughout the interplanetary spaces, yet it is more dense and more active around certain objects on account of their molecular activity, especially around the brain and spinal cord of human beings, which are surrounded by it as by an aura of light. It is this aura around the nerve cells and nerve tubes by which a man is enabled to catch impressions made upon the astral aura of the cosmos, and thereby to "read in the Astral Light." It forms the medium for the transmission of thought, and without such a medium no thought could be transferred to a distance. It may be seen by the clairvoyant, and as each person has an astral aura of his own, a person's character may be read in his Astral Light by those who are able to see it. In the case of a child who has not yet generated any special characteristics that emanating aura is milk white; but in the adult there is always upon this fundamental color another one, such as blue, green, yellow, red, dark-red, and even black. Every living nerve has its astral aura, every mineral, every plant or animal, and everything of life, and the glorified body of the spirit is made to shine by its light. (131)

ASTRONOMICAL CIRCLES:

Propositions of astronomical circles revealing proportion and ratio by John Keely, 1874.

See **GEOMETRY** and the book (Quadrature of the Circle) for greater detail.

PROPOSITION I

"The respective and relative motion of three gravitating bodies revolving together and about each other, is as four to three, or one and one-third of one primary circumference."

First Proportion: As one primary circumference of a circle is to the moon's time about the earth, so is the moon's time about the earth to the earth's time about the sun.

Second Proportion: The square of the diameter of the moon is to the square of the diameter of the earth, as the moon's time around the earth is to the earth's time round the sun,-- the time here meant being circular time, as before.

PROPOSITION II

"The moon's orbit (or moon's time) round the earth in a sidereal lunation, over the value of a complete circle, is one and one-third of one primary circumference."

PROPOSITION III

"The earth's time round the sun over the value of a complete circle in space is as four to three, or one and one-third the moon's time round the earth over the value of a complete circle in space."

PROPOSITION IV

First Proportion: As one primary circumference of a circle is to the moon's time about the earth over the value of a complete circle in space, so is the moon's time round the earth to the earth's time round the sun over the value of a complete circle in space.

PROPOSITION V

Second Proportion: The square of the diameter of the moon is to the square of the diameter of the earth, as the moon's time round the earth over the value of a complete circle in space, is to the earth's time round the sun over the value of a complete circle in space.

PROPOSITION VI

"The mean distance of the sun's center from the center of the earth, or that at which the earth would revolve, if the area or plane of her elliptical orbit were made the area of a circle, is eleven thousand six hundred and sixty four diameters of the earth, neither more nor less; admitting, therefore, that the earth's diameter is 7,912 English miles (which no doubt is pretty nearly), then the sun's center is distant from the earth's center as above 92,285,568 English miles, and neither one mile more or less."

Axioms as proven herein and as self-evident:

First: The circle is the basis or beginning of all magnitude or area. (Prop. III See **GEOMETRY**)

Secondly: Any expression of numbers in relation to material things is also an expression of magnitude. (Prop. XVIII See **GEOMETRY**)

Third: A point is therefore a magnitude when considered as one. (Prop. XVIII See **GEOMETRY**)

Fourth: A point in reference to space or extension on all sides of it, is therefore a molecule or globe, and in reference to a plane, it is a circle. (Prop. XVIII See **GEOMETRY**)

For greater details See **GEOMETRY** and (Quadrature of the Circle)

ASTRUM: This term is frequently used by Paracelsus, and means the same as Astral Light, or the special sphere of mind belonging to each individual, giving to each thing its own specific qualities, constituting, so to say, its world. (131)

ASYMMETRICAL SUPPORT: Rotor support system which does not provide uniform restraint in all radial directions. This is typical for most heavy industrial

machinery where restraint (or dynamic stiffness) of the supports in one direction perpendicular to the shaft axis (e.g., vertical) may be substantially different than the restraint in another direction perpendicular to the shaft axis (e.g., horizontal). (100)

ASYNCHRONOUS: Vibration frequency component which is different than shaft rotative frequency. Sometimes used to mean any vibration frequency which is not an integer multiple or fraction of rotative frequency. Also referred to as nonsynchronous motion. See **SYNCHRONOUS**. (100)

ATAVISM: Reversion in heredity to earlier types. (121)

ATMOSPHERIC DUST SPOT EFFICIENCY: Measurement of a device's ability to remove atmospheric air from test air. (128)

ATMOSPHERIC PRESSURE: Pressure that gases in air exert upon the earth; measured in pounds per square inch (kilopascals [kPa]). (128)

ATOM: For Keely's definition, See **ELEMENT**.

ATOM: Smallest particle of element that can exist alone or in combination. (128)

ATOM: Keely said the form of the atom eludes the grasp of the imagination, for it is the introductory step to a conception of the eternity of the duration of matter. The magnitude of the molecule, as compared to the inter-atom, is about on the same ratio as a billiard ball to a grain of sand, the billiard ball being the domain wherein the triple inter-molecules rotate, the intermolecules again being the field wherein the atomic triplets sympathetically act, and again progressively, in the interatomic field, the first order of the etheric triplets begins to show its sympathetic in-reach for the centers of neutral focalization. It is impossible for the imagination to grasp such a position. Inter-atomic subdivision comes under the order of the fifth dimensional space in etheric condensation. Atoms and corpuscles can be represented by degrees of progressive tenuity, as according to progressive subdivision, but to imagine the ultimate position of the atomic alone would be like trying to take a measurement of immeasurable space. We often speak of the borders of the infinite. No matter what the outreach may be, nor how minute the corpuscular subdivisions, we still remain on the borders, looking over the far beyond, as one on the shore of a boundless ocean who seeks to cross it with his gaze. Therefore, philosophically speaking, as the atom belongs to the infinite and the imagination to the finite, it can never be comprehended in any form or light, nor by any right, for in the range of the imagination, it is a bridge of mist which can never be crossed by any condition that is associated with a visible molecular mass, that is, by mind as associated with crude matter. (11)

ATOM: The "indivisible" smallest piece of matter

first postulated by the Greeks, but now known to be composed of a nucleus circled by electrons. (116)

ATOM, DETERMINATION OF SIZE:

*Mathematical Demonstration
of the Size of an Atom.
Its Weight and Volume.*

by John Keely

"A rectangular, or preferably, a circular, disk is suspended from the ceiling of a room in such a manner that vibrations cannot be communicated to it from the vibrating walls of the room. It is then experimentally determined to what fundamental note the metal plate sympathetically vibrates. Then, according to the law of linear dimensions, which is equally applicable to solids, liquids, or gases, it is mathematically determined what size of plate will produce successive octaves above that pitch, until a size of plate is obtained capable of producing a period-frequency corresponding to that of dark radiant heat, which we know is produced by the oscillations of atoms, and is termed therma. The vibrating atomic substance of the plate is capable of producing the transmissive force called sound and sono-thermism, which is propagated through atomic media by wave-motion, but which cannot be propagated through space devoid of atomic substance. But when the plate has been reduced theoretically to a size sufficiently infinitesimal to correspond to the maximum or minimum size of an atom, as determined by the atomic researches of Professors Tait & Clerk Maxwell, reach vibration frequency so high that it can be propagated through a vacuum devoid of atomic substance, as a transmissive force called rad-energy, beginning with dark radiant heat. And be it carefully observed that period-frequency corresponds with that of dark rad-energy. The law of linear dimensions may be thus stated: The vibration-periods of two similarly circumstanced homologous bodies are to each other as their cubical contents, and therefore the vibration-frequencies of homologous metal plates are to each other as the inverse ratio of their linear dimensions. The octave of a given plate will be a homologous plate having $\frac{1}{8}$ of its volume. A circular disk twenty inches in diameter and one inch thick vibrates, e.g., 1024 times per second. The ten octaves from unity successively reducing the size of the disk by $\frac{1}{8}$, we get at each reduction the octave of the previous pitch, and at any given octave we have the volume, weight, and vibration-frequency of the vibrating atomic substance.

Ten octave, 1024 vibrations per second; metal disk, twenty inches in diameter, one inch thick. To get the cubical contents of this vibrating aggregate it is necessary to square the diameter; we multiply by 0.7854, which is equal to 314.16 inches in volume. Starting from this point, we progress through successive octaves upward, increasing in pitch and diminishing in size." (9)

ATOM, DISINTEGRATION: See **FORCE-GASEOUS**

ATOM, FORM OF: "To comprehend the form of even the atom is to take the introductory or first step toward understanding the eternity (infinity of time) of duration of matter. But to attempt to comprehend the neutral center - the compound etheric or seventh subdivision - is attempting to comprehend the Infinite, for although it is a point and has substance, it is so small that if it were enlarged to the size of the sun, its structure would not be visible under the highest power microscope that can be constructed. No process of mathematics can comprehend or measure such minuteness, for it transcends both logic and computation. Molecules, intermolecules, atoms, interatoms, etherons, interetherons, can be represented by progressive degrees of tenuity, although the degree of tenuity of the latter four is such as we cannot comprehend because we have not and cannot sense them, but the neutral center, with its marvelous properties, its infinite power, is as incomprehensible to our minds as the aggregate power, mass and extension of the objective Universe. We may measure the outreach of the progressive subdivisions to and including the neutral center, but to attempt to comprehend its properties and powers is to attempt to cross a bridge of mist. No attribute of mind linked with crude molecular matter can actually comprehend the neutral center." (11)

"Harmonic sympathetic evolution indicates the atom is of wonderfully complex structure. The progressive disintegratory steps in the molecular and intermolecular fields also indicates wonderfully complex structure of those subdivisions." (11)

ATOMIC ENERGY RADIATION ANGLE: "15 degrees and 30 seconds." (195-57) (2). See **GRAVITY, VACUUM, ACTIVE PRINCIPLE, FORCE-ROTARY**

ATOMIC FORCE: See **FORCE-ATOMIC**

ATOMIC MIND: See **FORCE-ATOMIC**

ATOMIC MOTION: See **MOTION-ATOMIC, ATOMIC THEORY-KEELY'S**

ATOMIC ORDER OF VIBRATION: A term used by Keely to designate those rates of vibrations between the 15th and 30th octaves of the Electromagnetic Spectrum. Or those vibrations that have an effect upon atoms. Atomic vibrations reach 900,000,000 cps. See **DIATONIC NINTHS, RATES OF VIBRATIONS, LAWS OF BEING**

ATOMIC POSITION: See **GRAVITATION DIFFERENTIATION**

ATOMIC SEPARATION: Two forks, one of 620 and one of 630 per sec.; setting the chords on the second octave. See **ACCELERATING DISSOCIATION, MOLECULAR DISSOCIATION, LAWS OF BEING**

ATOMIC THEORY: For an explanation on how the atomic theory is fully applicable in healing, see entire Edgar Cayce Reading (4356-1). See **SPACE**

Q.: "In occult chemistry it is given that force was begun in the interstices or bubbles in space and therefore space is the negation of force or matter."

A.: "This is just what is given here (See **GRAVITATION DIFFERENTIATION**), in how these negations are formed in that as is called a bubble or becomes a sphere, in its attractability to the forces as are in formation within our own sphere, see? That's the creation of worlds - that's the creation as is kept in force, see?"

Q.: "This being so, gravity drawing everything to the center according to density, there comes a position from without a planet where space and lightest etheric matter meet - and the planet together with its atmosphere revolve through space. The planet, consisting of all degrees of vibrations - even to lightest etheric matter - have no relationship to space. An example some- what similar on objective plane can be given as to the passage of etheric matter through what we term as solid substance. Is this theory correct?"

A.: "That's the atomic theory! That is the theory as is seen - not theory, but the actual conditions as exist, as has been given and shown here in the activity of how forces build in their radiation without the application of space (as physically known), and how that there is the radiation through the forces as they move about one another." (195-57) (2). See **RADIAL CENTER, SYMPATHETIC OUTREACH, NEUTRAL NEGATIVE AGGREGATION, ATOMIC TRIPLETS, THREE REVOLVING BODIES**

ATOMIC THEORY, KEELY'S: This theory or philosophy is the basis of Keely's system of sympathetic vibratory physics.

"All such experiments that I have made, resulted in vortex motion invariably, both sympathetically and otherwise. Vortex motion follows nature in all corpuscular action.

"The undulatory theory, regarding light, I have not been able to reconcile myself to, as anything but hypothetical. The conditions which govern electromagnetic radiation disprove the theory in many particulars. The vortex action induced in space, by the differential conflict between the low and high tenuous, shows up results that harmonize with the conditions accompanying the dissociation of hydrogen and oxygen, in disintegrating water; viz., vortex action of the highest order, but peripheral only. It is were not so, the ether could not be held in suspension, neither in the molecular nor atomic envelopes. Undulatory effects are produced by certain conditions of sound; and by other conditions quite opposite effects. In organ pipes, of a certain caliber, very sensitive waves occur at intervals; as according to the character of the sound evolved; but on a combination of resonators composed of brass tubes of more than nine in number, a wave of sound, induced by certain chords passing over them, produces high vortex action of the

air enclosed in them. The vibration of tuning forks induces alternate conditions of the air that surrounds them, if in open atmosphere; but quite a different action presents itself when the forks are exercised in resonating tubes, set to thirds of the mass chord they represent. Then high vortex action is the instant result. Vibrators cannot be set promiscuously in tubes, and get such results, any more than a musician can render a musical composition on the violin before tuning it. The conditions under which light is evolved negativize whatever is associated with undulation, as this word is understood by physicists. Aqueous undulations there are, but not etheric undulations.

"The mighty forces latent in corpuscular matter, by which we are surrounded, are all held in oscillating vortex action by the Infinite Designer of workings hidden from us, until the time is ripe for their disclosure. This latent, registered power inter-changes sympathetically with the celestial radiating streams, whereby light, heat, electricity, magnetism and galvanic action are propagated in their different orders, vitalizing all nature with their life giving principals.

When this great scientific and religious truth has been made known, and established by demonstration, all controversy as to the source of energy will be forever silenced. If I am the chosen instrument to develop this knowledge, and to make known the conditions which surround this pure truth, it is only that I may hand the key to those who will use it to enter the doorway that opens into the inaudible, and thus gain an insight into the now invisible region of the operation of Nature's most powerful governing forces, in the control over terrestrial matter by celestial mind." Keely in (Keely and His Discoveries) pg. 365-367

ATOMIC - THIRD SUBDIVISION OF MATTER: Each of the three individual "atomic triplets" composing the intermolecule, is itself composed of three "interatoms". Each atom is surrounded by its own etheric envelope, is governed by the same mass action as in the first and second subdivisions, and has an oscillating frequency exceeding that of the first two, the molecular and intermolecular. The fundamental mode of vibration changes in the atomic subdivision to the harmonic, or true fifth of the mass chord.

The properties of this subdivision, the atomic, are not known to science, except in its electric and magnetic manifestations, which are known to a small degree. It was only in perfecting the Trexar - the differentiated wire of silver, gold and platinum - that Keely discovered the laws governing the association of the "atomic triplets". He found that compound negative vibration of their neutral centers causes antagonism by means of differentiation and that their attractive power of aggregation then becomes radiant force with great rotational velocity, which is sufficient to carry the radiant force beyond the inner one-third neutral volume of the sphere.

Keely's researches lead him to believe electricity to be but one of the forms of the atom, a "certain con-

denser form of atomic vibration," beneficial in mild flows and "destructive in its explosive positions." He advanced these ideas at the same time Maxwell's theory of the electromagnetic origin of light, heat and radiant energy, was being accepted by the scientific world as the very dictum of truth. Michelson's work on the isolation of electrons on oil drops has proved that Keely's ideas, held so absurd by the "scientists" of his time, were correct after all. "The electric current is the "first and second order" of the atomic vibration - a dual force - the flow of which is altogether too tenuous to displace any molecules. The highest conditions associated with electricity come under the fourth descending order of sympathetic condensation, in the atomic subdivision, which is altogether too remote to take any direct part in etheric disturbances."

To this subdivision also belong the manifestation of odor. Its unit particles, which are of the atomic subdivision, oscillate with a rotatory orbit relatively large compared with the unit-mass, and its properties arise through sympathetic negative interference with all other nuclei. For this reason a glass bottle can contain odor, although the glass molecules, which are, relatively speaking, like a coarse sieve, actually are able to contain the odor particles, which are in comparison as fine sand. The circular motion of the odor particles, because of the interference with the molecular centers which its rotatory atoms avoid, prevents the escape of the odor atoms from a molecular container.(11)

ATOMIC TRIPLE REVOLUTION: "Atomic triple revolution, which should be mathematically considered as one force and one element which are highly radiophonic and independent of outside elements." (1) See **THREE REVOLVING BODIES, QUADRATURE OF THE CIRCLE**

"All operations of nature have for their sensitizing centers of introductory action, triple vacuum evolutions. These evolutions are centered in what I call atomic triple revolutions, highly radiophonic in their character, and thoroughly independent of all outside forces in their spheres of action. In fact, no conceivable power, however great, can break up their position that, within a circle that would enclose the smallest grain of sand, hundreds of billions of them perform, with infinite mathematical precision, their continuous vibratory revolution of inconceivable velocity. These triple centers are the very foundations of the universe, and the great Creator has, in His majestic designs, fixed them indissolubly in their position. Mathematically considered, the respective and relative motion of these atomic triplets, gravitating to and revolving around each other, is about one and one-third of their circumference. The problem of this action, when reduced to a mathematical analysis (presupposing taking it as the quadrature of the circle would baffle the highest order of mathematical science known to bring it to a numerical equation." Chapter 5 of (Keely and His Discoveries) See **ATOMIC THEORY, FORCE-ATOMIC, QUADRATURE OF THE CIRCLE, GEOMETRY**

ATOMIC TRIPLETS: "Every revolving body is impressed by nature with certain laws making it susceptible of the operation of force which, being applied, impels motion. These laws may all be expressed under the general term, "Forces", which, though various in their nature, possess an equalizing power; controlling each other (as in the case of the atomic triplets) in such a way that neither can predominate beyond a certain limit. Consequently, these bodies can never approach nearer each other than a fixed point. Hence, these forces are, at some mean point, made perfectly equal, and therefore may be considered as but one force; therefore, as but one element. It matters not that other and disturbing forces exist outside or inside the space these bodies revolve in, because if this force must be considered as acting uniformly - applying itself to each of these bodies in a way to produce a perfect equation on all, it is as if this outside force were nonexistent." Chapter 5 (Keely and His Discoveries). See **LAW OF THE TRIANGLE, ATOMIC THEORY, LAWS OF BEING, GEOMETRY**

"The structure of the air molecule, as believed in by Keely, is as follows: - Broken up, by vibratory action, he finds it to contain what he calls an atomic triplet. The position of a molecule, on the point of a fine cambric needle sustains the same relation to the point of the needle that a grain of sand sustains to a field of ten acres. We will, then, imagine a molecule magnified to the size of a billiard ball, and the atomic triplet magnified to the size of three marbles, in the triangular position, within that molecule, at its center; unless acted upon by electricity, when the molecule, the billiard ball, becomes oblate, and the three atoms are ranged in a line within, unless broken up by the mighty force of vibratory action. Nature never gives us a vacuum; consequently, the space within the molecule not occupied by the atomic triplet must be filled with something. This is where the Genii - "the all-pervading ether" - has made its secret abode through untold eons." Chapter 7 of (Keely and His Discoveries) See Force and Energy to understand Keely's term "Force". See **QUADRATURE OF THE CIRCLE** wherein Keely talks of the arithmetic and geometric relationships of these three revolving bodies. See **LAWS OF BEING, ATOMIC THEORY-KEELY'S, GEOMETRY**

ATOMIC VIBRATIONS: "In a diatomic molecule, the distance between atoms is not fixed. There is an equilibrium separation corresponding to a minimum in potential energy. The actual magnitude of the interatomic distance oscillates about the equilibrium distance (point of mutual attraction) (see Keely's work on Three Rotating Bodies) with a motion that is approximately simple harmonic, if the energy of the oscillation is small.

"In a polyatomic molecule or in a crystalline solid, the atoms also vibrate about equilibrium positions. For a description of this phenomenon in crystalline solids (see **LATTICE VIBRATIONS**, also **THREE ROTATING BODIES**.) Because of the large number of degrees of freedom, however, the situation is more

complicated. For example, in the carbon dioxide (CO₂) molecule neither oxygen atom by itself moves harmonically, or even periodically. On the other hand, the motion of the CO₂ molecule can be analyzed into a number of independent motions, called normal modes, each of which is by itself simple harmonic. In one such motion, for example, the two oxygen atoms move in phase toward or away from the carbon atom. (see diagram) The actual motion of the atoms in a molecule is a superposition (see **LAW OF SUPERPOSITION**) of the various normal modes and a rotation of the molecule as a whole." (3) See **MAGNETISM, MOLECULE**

CHART FOR USE WITH ATOMIC MOTION

(a) O C O Lower Frequency in-line mode

--> - <--

(b) O C O High Frequency mode

<-- - -->

(c) O C O Bending Mode

|||
V

ATOMIC WEIGHT: Is the measurement of mass (common). "Is the rate of vibration." (Dalton)

ATOMIZATION: "The mechanical subdivision of a bulk liquid. Other terms are also applied to this process, although the terminology is not standardized. Spraying usually implies the production of coarse drops (100-1000u). Sprinkling suggests very coarse drops (greater than 1000u). Misting is often applied to the production of fine drops (10-100u), and nebulizing to the production of very fine drops (under 10u), usually used in inhalation aerosol therapy. Atomization may be used to subdivide meltable solids, such as certain metals." (3)

ATOMIZE: Process of changing a liquid to minute particles or a fine spray. (128)

ATOMOLES: "Atomoles are elementary units of matter uniform in size and weight, and exist in solid, liquid, gaseous, and isolated forms." (Keely)

ATOMOLINI: "Atomolini are ultimate units of atomoles, and when in a liquid state are the media for the transmission of gravism. The illimitable divisibility and aggregation of matter is a logical sequence." (Keely)

ATOMS: "Atoms are multiple combinations of atomoles, and they also exist in solid, liquid, gaseous, and isolated forms." (Keely)

ATTACK: The relative speed for a wave to reach maximum potential. See **DECAY**

ATTACK: Beginning of a sound. (69)

ATTACK: 1) A vigorous entry of voices or instru-

ments at a leading point. 2) A courageous rendering. (125)

ATTENDANT KEYS: Relative keys, keys of affinity. Attendant keys in a scale are the relative minor or major, the dominant and subdominant, and their relative minors or majors. (125) See **AFFINITY; RELATIVE KEYS**

ATTENUATION: When amplitude is changed by combining two or more waves or cycles of different amplitudes. See **LAW OF SUPERPOSITION**.

ATTENUATION: The input-to-output reduction imposed by the filter upon an input signal. See **DECIBELS, SIGNAL ATTENUATION**

ATTENUATION FLOOR: The maximum attenuation a filter can apply at a specific frequency, bounded by electrical noise, parasitics and other non-ideal filter characteristics.

ATTENUATOR: Controls amount of signal passing through it. (69)

ATTITUDE ANGLE, STEADY-STATE: The included angle between the direction of steady-state load on a rotator (such as gravity) through the centerline of the bearing and a line connecting the geometric center-point of the bearing and the centerline of the shaft. (100)

ATTRACTION: "Attraction is the mutual approach of aggregates caused by concentrated waves of harmonic energy, tending to move in line of least resistance, by becoming the center of one series of concentric waves instead of two or more series." (Keely)

This power of the neutral center manifests itself in different degrees and in different ways, on the different planes of substance. MacVicar says "The law operates between two poles - assimilation and dissimilation - and by analysis and synthesis simultaneously."

There are several forms of attraction for the neutral center. Any metallic mass can be so impregnated with certain vibrations that it will assume the mental quality of attraction as well as that of repulsion. There is sympathetic negative attraction, which is manifested along radial lines of attracting force. This state can be induced by vibrating a sphere mass with the proper frequencies, which will cause all its component molecules to contribute their properties and powers to the mass-neutral center, with attendant phenomena. This sympathetic negative attraction is not the resultant of electrical sympathization but includes the full triune flow, of which the dominant or "celestial associative" is the leader.

Again, "That force which holds the planets in their orbits is the sympathetic outreach of negative attraction."

Another form of attraction is the magnetic flow. Magnetism has no outreach, as has sympathetic negative attraction. Magnetism is highly electrical, in fact, is born of electricity, whereas sympathetic negative attraction is not electrical. However, negative attraction displays a sympathetic outreach for magnetism. Sympathetic negative attraction reaches from planet to planet, but magnetism does not, for magnetism is static. Sympathetic negative attraction is born of the celestial and impregnates every mass in space, linking itself to all electrical and magnetic conditions and all spatial masses in turn are subservient to the celestial outreach. All the magnet's in the world no matter how differentiated could not induce rotation, but polar negative attraction induces rotation.

Both attraction and repulsion are exhibited by the action of the dual magnetic force. However, like or unlike magnetic poles become attractive when their frequency ratios become $33 \frac{1}{3}$ of one against 100 of the other, simply by sympathetic resonant vibration.

It was Keely's expectation that he would eventually be able, through use of his "infinite 9ths" a series of these intervals ranging up into the inaudible, and his 27 groups of depolar discs, to establish sympathetic affinity with pure polar negative attraction minus magnetism - a perfected vibratory circuit for producing commercial power. (11)

ATTRACTION: "The attraction increases that as gives an impulse, that that becomes the aid, the stimuli, for an impulse to create." (364-6) (2). See **NEGATIVE ATTRACTION, ATOMIC THEORY, INTRODUCTORY IMPULSE**

ATTRACTION-PROPULSION: "Is the difference between receptive and propulsive vibrations. They can be right or left receptive, or right or left propulsive. The positive vibrations are the radiating; the negative are the ones that are attracted toward the neutral center." (1) See **POSITIVE, NEGATIVE, GRAVITY, SYMPATHETIC OUTREACH, LAWS OF BEING, ATOMIC THEORY**

ATTRACTIVE DIFFERENTIATION: See **ELECTRICITY**

ATTRACTIVE INFINITY: See **MOLECULAR DISSOCIATION, LAWS OF BEING**

ATTRACTIVE SYMPATHIES: Read attractive characteristics and manifestations mentioned in **ANTI-POLAR & POLAR, GRAVITATION, GRAVITY, ATTRACTION-PROPULSION, LAWS OF BEING**

AUDIBLE FREQUENCY RANGE: [Acoustics] The range of sound frequencies normally heard by the human ear. The audible range spans from 20 to 20,000 Hz, but for most engineering investigations only frequencies between about 40 to 11,000 Hz are considered. (85)

AUDION: An audion is a three electrode tube amplifier consisting of an anode, cathode and controlling

electrode. Invented by Robert DeForest an audion was originally conceived to amplify sound a thousand-fold. See **RESONANT AMPLIFICATION**

AUDIO RANGE: Range of pitches you can hear. Roughly 20-20,000 Hz. (69)

AUDITORY NERVE: See **EAR**

AUFERIONS: Wire strings. (125)

AUGMENTED INTERVAL: See **INTERVAL**

AULOS: (Gr.) The most important wind instrument of the Greeks. The aulos was sometimes double, the two being called dextra and sinistra, and sometimes male and female. Though generally rendered flute, there is much reason for supposing that it was a reed instrument, or, at least, that the term, used generally, included instruments of the oboe family. The fact that the two tubes were often of different lengths (impares) has been explained by saying that they were tuned in different modes. But it is far more like the argheel, and that the longer tube gave out a drone. The double flute was not unknown to the ancient Egyptians and Assyrians but they were divergent or perhaps separate from each other. (125) See **ARGHEOL**

AURA: See **FORCE-MENTAL, SYMPATHETIC OUTREACH, LAWS OF BEING**

AURA CHART: "Yes, we have the information which has been indicated through this channel respecting aura charts.

As we have given, an aura chart is the attempt to interpret the material experiences of individuals in their journey through the earth; indicating, pictorially, as to that place in the earth of the individual activity, and - upon either the right or left - the sources from which the entity came into activity in the earthly or material consciousness. About same is symbolized, in the signs of the zodiac, as to that portion of body which was stressed through that particular period of activity.

By color certain activities are also symbolized, - for instance, black indicates the whole combination of all. For, to material interpretation, white is the absence of color, black is the combination of them all.

The dark blue indicates awakening; purple, healing; white, purity; gold, attaining. All of these and their varied shades indicate the activity; this applying to the stars as well as the sun or moon.

The sun indicates strength and life, while the moon indicates change - and in one direction indicating the singleness of that activity through an individual experience, - the variations being indicated by the variations in color.

Star, - the white, purity; the five-pointed, the whole senses of man indicated as attained to activity - the

colors showing the variation; the forms of six, seven or eight pointed indicating the attainments, - as do the seven stars in a figure indicate the attaining to the seven particular centers in the body.

As for the whole chart, - the interpretation is more up to the artist - as to its beauty.

The study of the meaning of Aries, Saggitarius, Pisces, Libra, or any or all of such phases, would indicate the activity of the individual. For, remember, it is body manifestation, - some the feet, some the head, some the thigh, some the groin, some the bowels, some the breast, - some one and some another, see? these indicating the **ACTIVITY** of the individual."

Q-1: Please consider the drawing of the Temple Beautiful, which I hold in my hand, as interpreted by the artist from information given through this channel, and give such suggestions and corrections as may be necessary to help her to draw such when the aura chart calls for same.

A-1: This is very good. The figure, or the obelisk upon which the light is put, should be more in the shape of a six-sided figure than merely a spire. It is not the attempt, in the building of the Temple Beautiful, to indicate a spire but as a source of light through which that activity in the Temple aided the individuals as there was the activity or passivity through the periods of cleansing or purification of those necessary influences, of lack of influences, in the individual entity.

For, as has been indicated, the characteristics, or that attained by an individual, are indicated by the sign under which the entity enters an appearance. (This as a side note: Remember, those indicated in the charts that are accepted by most astrologers are some ten days behind. Thus we find some variations in the information indicated for individuals through these channels.)

Q-2: Is the size of the paper, the quality and colors correct for the aura charts that she has painted?

A-2: Whether you make the paper 2" wide or 2' wide, or 4', - that is to be the choice of the artist!

Q-3: In the aura chart [307-20] given March 15, 1942, for [307] a headdress as a band, on which V's were depicted, for the Atlantean period of the entity, - what do the V's mean?

A-3: Still means the same old thing as it has ever meant - **VICTORY!** There it meant the victory over self.

Q-4: Are the aura charts the same as the plaques of the Egyptian period which [993] and [294] each saw in a vision of some years ago, or what is the connection?

A-4: No. One is a life seal. One was of the plaques

made for the individuals to be indicated. As has been given through these channels, oft individuals are given life seals. These vary quite a bit from even the figures in an aura chart. And at times they conform. But one is made for that as a study by the individual of those things wherein it failed or developed, and are to be as lessons - and that is why it has been given. This may become a helpful influence to the individual; while a plaque is usually as the reminder of some individual fact or act to be attained or discarded, and it is indicated in the information given respecting such. On the other hand, the aura chart - to those who would study same (for little comes of itself) - is for the individual until it has fully attained. Who has attained?

Then, study same oft, - analyzing them as to the significance, as to that given as the warning. For as He gave, he that would be forewarned would not allow his house to be broken up. Whose house? What house?

Thy body, thy mind, thy soul!

Q-5: How can the aura charts be made of the greater help in the present to the individual, either by study in groups or by lectures?

A-5: You've forgotten what we've just said! Read what has just been given! We are through." (5746-1) **See ASTRUM; ASTRAL LIGHT**

AUTOGONY: Spontaneous generation, "self-birth". (121)

AUTOMATIC CONTROLS: Valve action reached through self-operated self-actuated means, not requiring manual adjustment. (128)

AUTOMATIC DEFROST: System of removing ice and frost from evaporators automatically. (128)

AUTOMATIC EXPANSION VALVE: (AEV) Pressure-controlled valve which reduces high-pressure liquid refrigerant to low-pressure liquid refrigerant. (128)

AUTOMATIC ICE CUBE MAKER: Refrigerating mechanism designed to automatically produce ice cubes in quantity. (128)

AUTOTRANSFORMER: Transformer in which both and secondary coils have turns in common. Step-up or step-down of voltage is accomplished by taps on common windings. (128)

AUXILIARY SCALE: The scales of relative or attendant keys. (125) **See AFFINITY; ATTENDANT KEYS; RELATIVE KEYS**

AVERAGE LEVEL: Takes the time history of the vibration into account but there is no useful relationship between the average level and any physical quantity. (70)

AVERAGE ROOM ABSORPTION COEFFICIENT (a): [Acoustics] Total room absorption in Sabins or metric Sabins, divided by total room surface area in consistent units of square feet or square meters. (85)

AVERAGE TORQUE: The amplitude of the moment (force couple) applied to a rotor in order to sustain acceleration or load requirements. Usually measured in lb. ft. or lb. in. (100)

AVITCHI: An Eastern term. A state of ideal spiritual wickedness; a subjective condition; the antitype of Devachan or Anyodei. (131)

AXIAL: In the same direction as the shaft centerline. (100)

AXIAL POSITION: The average position, or change in position, of a rotor in the axial direction with respect to some fixed reference. Typically, the reference is the thrust bearing support structure or other casing member close to the thrust bearing. The measurement is made with a proximity probe observing the shaft axially where a known probe gap distance/voltage represents a known position of the thrust collar with respect to the thrust bearing clearance. The probe may observe the thrust collar directly, or some other integral axial shaft surface, if such surface is close to the thrust bearing. Also, the measurement of the position or change in position. Also called thrust position. See **DIFFERENTIAL EXPANSION**. (100)

AYIN: The 16th Hebrew letter, Ayin (O), has 2 distinct meanings - the Eye and a fountain. In its highest connotation it stands for a symbol of the All Seeing Eye and for interior perception of truth, pure intuitive discernment of reality. In its secondary signification it refers emblematically to the outflowing of truth from some hidden realm of consciousness as water proceeds from some hidden spring when expressing itself in the constant flowing of a fountain. Ayin stands for the Cyclopean Eye. Historical associations have connected this letter with En-gedi, the "Goat's Fountain," which is about 300 stadia from Jerusalem, a place often mentioned in the Bible as the scene of important struggles, notably the strife between Saul and David (*vide* I Samuel XXIV, 1-4). According to Kabbalistic symbologists, Saul and David are respectively impersonations of a lower and a higher state in spiritual evolution, and as the one rises the other falls. Alchemists in their peculiar terminology refer to the same conflict when they speak of the perpetual struggle between the mystical Sulphur and Mercury, our rational and sensuous elements. (72)

AZEM: [Chemistry] Ancient alloy of gold and silver. (88) See **ELECTRUM**

AZEOTROPE: Having constant maximum and minimum boiling points. (128)

AZEOTROPIC MIXTURE: Example of azeotropic mixture: refrigerant R-502 is a mixture consisting of 48.8 percent refrigerant R-22 and 51.2 percent R-115.

The refrigerants do not combine chemically, yet azeotropic mixture provides refrigerant characteristics desired. (128)

AZOR: This word which occurs in the Book of Psalms and elsewhere, is variously rendered according to the view which is taken of its association with nebel. In Psalms xxxiii., 2, "Sing unto him with a nebel and azor" some drop the "and" and understand azor as qualifying nebel, making the compound word to signify a "ten-stringed nebel" (psalterium decem chordarum). Whether the azor was a distinct instrument, or not, it is impossible to say, although Engel, Fetis, and some other authors have so considered it, and have ventured to assign to it a definite number of strings. (125)

AZOTH: The creative principle in Nature; the universal panacea or spiritual life-giving air. It represents the Astral Light in its aspect as the vehicle of the universal essence of life; in its lowest aspect the electrifying power of the atmosphere - Ozone, Oxygen, etc. (131) See **ASTRAL LIGHT; OZONE; OXYGEN; LIFE FORCE; NOUS**

B

B: 1) the name of the note above Proslambanos, in the greater perfect system of the Greeks. The first note of the lowest Tetrachord (Hypaton). 2) The third note of the grave hexachord of the Guidonian system, in which it is B mi. 3) The seventh note of the normal scale C, the note Si, in Tonic Sol-fa system Te. 4) The major scale having five sharps in its signature. 5) The note B flat in Germany, where B natural is known as H, whence the possibility of making the letters B, A, C, H, into a fugue subject, as has been done by Bach, Schumann, Liszt, and others. 6) In old solmizations this note was called a Mi.

There is no authentic church-mode commencing on this note, owing to the imperfection of its fifth when unraised by the signature. (125)

BACKGROUND NOISE: [ACOUSTICS] The sound pressure levels in a given environment from all sources excluding a specific sound source being investigated or measured. (85)

BACK PRESSURE: Pressure in low side of refrigerating systems; also suction pressure or low-side pressure.

BACK SEATING: Fluid opening/closing such as a gauge opening; to seat the joint where the valve stem goes through the valve body. (128)

BAFFLE: Plate or vane used to direct or control movement of fluid or air within confined space. (128)

BAFFLE: Baffle is an older term, though still used, for any loudspeaker housing. The main job of the baffle, or enclosure, is to keep the sound waves radiated by the rear of the loudspeaker cone from canceling the sound waves projected from the front. Since such cancellation occurs only at the lower frequencies, an unbaffled speaker invariably sounds bass-shy. For optimum performance, the enclosure must be acoustically matched to the loudspeaker it houses. (103)

BALANCE: Balance refers to the relative loudness of the two speakers used in stereo listening. Balance can be set at several points in a component system (FM-tuner outputs or power-amplifier inputs), but final balance is adjusted by means of the balance control on the amplifier and makes both speakers sound

equally loud when heard from the listener's location. (103) See **EQUILIBRIUM; HARMONY**

BALANCE-OF-PLANT MACHINERY: That group of rotating machinery which is not critical to any part of the overall plant process. Many of these machines operate in tandem or paired installations. (100)

BALANCE RESONANCE SPEED(S): A shaft rotative speed(s) (or speed regions) which equals a natural resonance frequency(ies) of the rotor system. When a rotor accelerates or decelerates through this speed region(s), the observed vibration characteristics are (1) a peak in the 1X vibration amplitude and (2) a change in the vibration phase angle. (100)

BALANCED CONDITION: A condition where the rotor rotational axis which coincides with the mass centerline (principal inertia axis) approaches the rotor rotational axis, thus reducing the lateral vibration of the rotor due to unbalanced inertia forces on the bearings, at once-per-revolution frequency. (100)

BALANCING: A procedure for adjusting the radial mass distribution of a rotor so that the mass centerline (principal inertia axis) approaches the rotor rotational axis, thus reducing the lateral vibration of the rotor due to unbalanced inertia forces on the bearings, at once-per-revolution frequency. (100)

BALL CHECK VALVE: Valve assembly (ball) which permits flow of fluid in one direction only. (128)

BALL SPEED (BALL TRAIN ROTATION RATE): For a rolling element bearing, the ball (or roller) train or cage rotation rate may be expressed as:

$$\frac{\text{RPM}}{2} \frac{d \cos \theta}{D} (1 - \frac{d \cos \theta}{D})$$

where RPM, d, D, θ , and r have been defined under "rolling element passage frequency." (100)

BAND: A part, a volume, anything sewn or connected together. (125)

BAND-PASS FILTER: A filter which has a single transmission band extending from a finite lower cut-off frequency greater than zero to a finite upper cut-off frequency. The cutoff frequencies are defined as those points on either side of the center frequency where the amplitude is attenuated by 3dB. At the center frequency, the signal amplitude is not attenuated. (100)

BAND-PASS FILTER: Passes one frequency band. (69)

BAND-REJECT FILTER: Rejects one frequency band. (69)

BAND-REJECT FILTER: Also known as band stop and notch, this type of filter rejects signal frequencies within a specified band, while passing out-of-band signal frequencies in a manner opposite to the bandpass filter.

BAND REJECT FILTER: See NOTCH FILTER. (100)

BANDWIDTH: The spacing between frequencies at which a band-pass filter attenuates the signal by 3dB. Normally expressed in terms of frequency for constant bandwidth filters and as percent of center frequency for constant percentage (constant Q) filters. Also, the range of frequencies over which a given device is designed to operate within specific limits. (100)

BAR: Unit of pressure. One bar equals .9869 atmospheres. (128)

BARBITON: An ancient Greek instrument said to have been invented by Anacreon; it was in the form of a lyre, and had seven strings. The name was applied to instruments of the violin class in the 16th and 17th centuries. (125)

BAROMETER: Instrument for measuring atmospheric pressure. It may be calibrated in pounds per square inch, in inches of mercury in a column, or in millimeters. (128)

BARYCENTER: When the system consists of only two particles, the center of mass is called the barycenter. See THREE REVOLVING BODIES, NEUTRAL NEGATIVE CENTER, MOLECULAR DISSOCIATION, LAWS OF BEING

BARYON: Any hadron that contains one proton in its final set of decay products. (116)

BASS BOOM: Bass boom refers to an unwanted bass resonance in a loudspeaker system. The effect is like that of speaking into a barrel; the resonance masks the natural tone color of the voice. Similarly, a speaker system whose resonances are too pronounced, or are at the wrong frequencies, falsifies the true character of sound, creating a hollow, thumpy bass that blurs the clarity of the music. Jukeboxes

and poorly designed console phonographs are notorious for boomy bass. (103)

BATH: Liquid solution used for cleaning, plating, or maintaining a specified temperature. (128)

BATTERY: Electricity-producing cells which use interaction of metals and chemical to create electrical current flow. (128)

BAUDELLOT COOLER: Heat exchanger in which water flows by gravity over the outside of the tubes or plates. (128)

BEAMING: [ACOUSTICS] The phenomenon of sound being emitted within a comparatively small solid angle. This characteristic becomes more acute as the frequency increases. (85)

BEARING: Low friction device for supporting and aligning a moving part. (128)

BEARINGS: Those few notes which a tuner accurately tunes or lays down before proceeding to adjust the whole compass of the instrument. (125)

BEAT: The peculiar "throbbing" heard when sounds not quite identical in pitch are sounded together. (125) See ACOUSTICS § 14, 15

BEATS: "Coincident action of two intermittently tuned tones of slightly different frequency, the resultant polarity thereof being determined by the third or Dominant frequency, stream or flow. Beats are those tones or vibrations which "move one within another." Only through beats can one note be the ROOT of another...a Beat is the third point of the Triangle. Beats are either negative, negative-negative, negative-positive or positive, positive-positive, positive-negative vibrations - this polarity is determined when the Beat tone is either a SUMMATION or a DIFFERENCE tone. Beats are harsh when they exceed 33 per second - they become inaudible above 132 beats per second." See ACOUSTICS § 17, 18; DIFFERENCE TONES, ROOT, KEYNOTE, LAW OF SUPERPOSITION, SUMMATION TONES, LAW OF TRIANGLE, HARMONIC & INHARMONIC, OVERTONE, MAGNETOACOUSTIC RESONANCE, POWER OF HARMONICS

BEER'S LAW: Absorptivity of a substance is a constant with respect to changes in concentration. Also known as Beer-Lambert Law. (5)

BELL: The lower termination of any tubular musical instrument which by the outward turning of the rim assumes the form of a bell. (125)

BELL: 1) Musical instruments of percussion consisting of a series of metal basins or cups, the outline of which has from time to time been modified. The materials of which bells are usually made are copper and tin, the proportions varying in several countries and even among manufacturers. 2) The tuning is effected by means of a lathe and some simple machin-

ery. If the bell requires sharpening, the diameter is lessened in proportion to its substance, if it is too sharp, the sound-bow is thinned by the same means; but, as a rule, bells are now so accurately cast, that little if any tuning is necessary after the bell leaves the mould. It is stated in "Knight's Encyclopaedia", 1854), that the German bell-founders made the various dimensions of the bell to bear certain ratios to each other. The thickest part where the hammer strikes is called the "Sound Bow". If this thickest be called one, then the diameter of the mouth equals 15, the diameter of the top or shoulder $7\frac{1}{2}$, the height equals 12, and the weight of the clapper $\frac{1}{40}$ of the weight of the bell.

Denison recommends that the sound bow of the three or four larger bells of a peal should be of the thickness of a thirteenth of the diameter, and that the smaller bells may gradually increase in thickness up to the twelfth in a peal of six, the eleventh in a peal of eight, and to the tenth in a peal of ten or twelve, greater thickness impeding the freedom of the sound. The relative diameters of a peal of eight tunable bells should be according to the following proportion: 60, $53\frac{1}{2}$, 48, 45, 40, 36, 32, 30. The relative weights being generally in the proportion: 100, 70.23, 51.2, 42.2, 29.63, 21.6, 15.18, 12.5. (125)

BELL VIBRATIONS: See ACOUSTICS § 23; RESONATING RINGS

BELLOWS: Corrugated cylindrical container which moves as pressures change, or provides a seal during movement of parts. (128)

BELLOWS SEAL: Method of sealing the valve stem. The ends of the sealing material are fastened to the bonnet and to the stem. Seal expands and contracts with the stem level. (128)

BELT: A rubber-like, continuous loop placed between two or more pulleys to transfer rotary motion. (128)

BENDING SPRING: Coil spring which is placed on inside or outside of tubing to keep it from collapsing while bending it. (128)

BERILLISTICA ARTS: The art of divining by means of seeing in crystals, magic mirror, flowing water, looking into cups, into stones, etc. All of which methods are calculated to render the mind passive, and thereby to enable it to receive the impressions that the Astral Light may make upon the mental sphere of the individual, by detracting the attention from external and sensual things, the inner man is made conscious and receptive for its subjective impressions. (131) See BERYLLUS

BERYLLUS: A magic mirror or crystal in whose Astral aura apparitions may be seen by the clairvoyant. (131) See BERILLISTICA ARTS

BERNOULLI'S THEOREM: In a stream of liquid,

the sum of elevation head, pressure head, and velocity remains constant along any line of flow, provided no work is done by or upon liquid on course of its flow; decreases in proportion to energy lost in flow. (128)

BESSEL FILTER: A filter transfer function that approximates a constant time delay. Excellent low-overshoot fast-setting pulse response and only moderate out-of-band frequency response rolloff rates characterize this design.

BEST STRAIGHT LINE: Best straight line is defined as the line midway between the two parallel straight lines closest together and enclosing all output versus pressure values. (20)

BATE DECAY: The process by which a neutron decays into a proton, an electron, and a neutrino. If the process occurs when the neutron is inside a nucleus, we speak of nuclear beta decay. (116)

BETA PARTICLES: Same as electron. See ALPHA PARTICLE, ELECTRON

BETH: The 2nd Hebrew letter, Beth (B), means radically a house or home and is said to refer allegorically to that inner chamber or closet into which a Master invites his disciples to enter for private prayer. This is none other than the interior sanctuary of human nature, the veritable "heart" which must be kept with all possible diligence, because out of it proceed all the issues of life. Heart and ark have the same meaning in the Kabbalah; this explains the extreme reverence shown to the Holy Ark whenever it is referred to in the Hebrew Scriptures. Beth is also regarded as the primal mother. Aleph being the father; it refers, moreover, to acquisition. (72)

BIMETAL STRIP: Temperature regulating or indicating device which works on principle that two dissimilar metals with unequal expansion rates, welded together, will bend as temperatures change. (128)

BIOCENTRICITY: Biocentricity is a concept of polarity. Obviously, however, as far as the physical plane is concerned, we have to have certain generic concepts behind this too, which we call biological factors or genetics. But in the pure spiritual concepts, polarities merely mean that here is a factional relationship with God. We have two planes, we may call them sexes if we wish but we have two planes - two poles - between which is built what might be called a dynamically composed ball of energy which contains all of the forms of individual expression. Biocentricity stems from the celestial dimensions as a unified force which divides itself and it returns unto itself that way. (117)

BIOGENY: The science of the origin of life. (121)

BIOGENETIC: Belonging to biogeny. (121)

BIOLUMINESCENCE: The bioluminescent pro-

cess of creating light is much more efficient than the sources produced by man. A common household light bulb has an efficiency that is very nearly the opposite of that produced by many animals. The efficiency of a 100-W tungsten light bulb is approximately 10 percent, that is, 10 percent of the electrical energy is converted into useful light. A firefly on the other hand can attain efficiencies of about 88 percent.

Bioluminescence has attracted scientists since 1667 when Robert Boyle showed that the light emitted by bacteria and fungus extinguishes when the organisms are deprived of oxygen. It wasn't until about 200 years later that the luminescent process began to be understood. In 1887 Raphael Dubois demonstrated that the bioluminescent process required the existence of a specific compound called luciferin, which interacts with the enzyme luciferase and O_2 to produce light.

The chemiluminescence process of bioluminescence is a two-step process fueled with luciferin, a Latin word meaning light-bearing. It is combined with an energy-supplying compound ATP (adenosine triphosphate). This compound is found in the cells that are vital for muscle movement in all living creatures, including man. In the process, luciferin oxidizes in reaction to luciferase to produce light. The process is extremely efficient, having been estimated to have a quantum efficiency of 88 percent relative to the consumption of luciferin.

The most common bioluminescent colors are white, blue and blue-green, yellow-green (565 nm) green (548 nm) also orange (594 nm) and red. Most fireflies have an emission peak near 562 nm (yellow-green). All emit near this wavelength when the acid-alkaline balance is neutral. The emission peak will shift to longer wavelengths - as long as 614 nm - if the balance is more acidic (i.e., below pH of 7.5), in the presence of denaturants, such as urea, in the presence of heavy metals such as Zn^{2+} , Cd^{2+} or Hg^{2+} , or if the air temperature is above 20°C. (120) **See also LUMINIFEROUS; LIGHT; ETHER; LUMINOSITY; SONOLUMINESCENCE.**

BIONOMY: The science of the laws of life. (121)

BIONTIC: Relating to the development of the individual. (121)

BIOPASM: Protoplasm as the material of organisms. (121)

BIQUADRATIC FILTER: A filter transfer function which contains complete quadratic equations in both the numerator and denominator, and provides the basis for implementing highpass, lowpass and single frequency notch characteristics, as well as band-reject realizations.

BISDIAPASON: The interval of a double octave, or fifteenth. (125)

BLADE PASSING FREQUENCY: A potential vibration frequency on any blade machine (turbine, axial compressor, fan, propeller, *etc.*). It equals the number of blades (on a disk or stage) times shaft rotational frequency. (100)

BLASTÆADES: Certain primitive multi-cellular organisms. (121)

BLAST FREEZER: Low-temperature evaporator which uses a fan to force air rapidly over the evaporator surface. (128)

BLASTODERM: The cellular covering of the early embryo. (121)

BLASTOMERE: The cells into which the stem-cell divides. (121)

BLASTOSHERE: The interior of the early embryo. (121)

BLASTULA: **See BLASTOSPHERE.**

BLEED OUT: [NDT] **See LIQUID PENETRANT.**

BLEEDING: Slowly reducing the pressure of liquid or gas from a system or cylinder by slightly opening a valve. (128)

BLEED VALVE: Valve with small opening inside which permits a minimum fluid flow when valve is closed. (128)

BLOCH OSCILLATIONS: "Seem to be undetectable in natural occurring solids. It relies on the fact that a high electric field tilts the bands in a semiconductor. The slope of the tilt is e (the charge of an electron) times the voltage applied to the crystal divided by the length of the crystal; thus the slope increases with increasing voltage." see Scientific American 11/83 page 146. **See GRAVITATION DIFFERENTIATION, ACTIVE PRINCIPLE, FORCE-RADIAL, ATOMIC ENERGY RADIATION ANGLE**

BLUE: Blue has always been the color of the spirit, the symbol of contemplation, prayer, and heaven. The sky is blue because gas molecules in the air cause light rays from the sun to be scattered. This is the scientific explanation but, as I have mentioned before, blue is said to be the true color of the sun, and it is also the color of the planet Jupiter, which is the ruler of great thoughts and high-mindedness.

Almost any kind of blue is good, but the deeper shades are the best. Pale blue indicates little depth, but a struggle toward maturity. The person may not be talented, but he tries. He will have many heartaches and many headaches, but he will keep going in the right direction. The middle blue, or aqua, belongs to a person who will work harder and get more done than the fellow with the light blue, though there may be little difference between them in talent. Those with the deep blue have found their work and are

immersed in it. They are apt to be moody and are almost always unusual persons, but they have a mission and they steadfastly go about fulfilling it. They are spiritual-minded for the most part, and their life is dedicated to an unselfish cause, such as science, art, or social service. I have seen many Sisters of Mercy with this dark blue, and many writers and singers also.

The musical note of blue is sol (G), and in the early church the color was assigned to the highest attainments of the soul. (73)

BLUE: [Color Therapy] Use blue to alleviate: All throat troubles, laryngitis, sore-throat, hoarseness, teething, fever, cholera, measles, apoplexy, hysteria, palpitation, spasms, acute rheumatism, vomiting, purging, diarrhea, jaundice, inflamed bowels, inflamed eyes, stings, itches, toothache, headaches, nervous disorders, insomnia, painful menstruation, shock, *etc.* (87)

BODE PLOT: Also known various as frequency response and amplitude response. A graph which displays the ratio of output to input in decibels (dB) versus the input frequency (usually) in Hertz: $\text{dB} = \log(V_{\text{out}}/V_{\text{in}})$.

BODE PLOT: Cartesian graphic representation of the 1X rotor response vector where rotor speed is plotted on the abscissa (X axis) versus phase angle and 1X vibration amplitude on the ordinate (Y axis). Sometimes referred to as an imbalance response plot. (100)

BODE'S LAW: Says write down first 0, then 3, and keep doubling the previous number: 6, 12, 24, 48 *etc.* Now add 4 to each number to get the series 4, 7, 10, 16, 28 and so on. Then divide each number by 10. The result .4, .7, 1.0, *etc.* give the approximate radii of the planetary orbits in astronomical units.

Planet	Distance	Distance
Bode's Law	Actual	Mean
Mercury	.4	.39
Venus	.7	.72
Earth	1.0	1.0
Mars	1.6	1.52
Asteroids	2.8	----
Jupiter	5.2	5.2
Saturn	10.0	9.54
Uranus	19.6	19.2
Neptune	38.8	30.6
Pluto	77.2	39.4

BODY: The resonance box of a string instrument. That part of a wind instrument which remains after he removal of mouth-piece, crooks and bell. (125)

BOILER: Closed container in which a liquid may be heated and vaporized. (128)

BOILER, HIGH PRESSURE: Boiler furnishing

steam at pressures of 15 pounds per square inch gauge or higher (205 kPa). (128)

BOILER HORSEPOWER: Term now seldom used, meaning equivalent to a heating capacity of 33,475 Btu/hr. (9804 watts). (128)

BOILER, HOT WATER AND LOW-PRESSURE STEAM: A boiler furnishing hot water at pressures not more than 30 pounds per square inch gauge (308 kPa) or steam at pressures not more than 15 pounds per square inch gauge (205 kPa). (128)

BOILING POINT: Boiling temperature of a liquid under pressure of 14.7 psia (101.3 kPa). (128)

BOILING TEMPERATURE: Temperature at which a fluid changes from a liquid to a gas. (128)

BOMISQUE: (small altar), rectangular parallelepiped having three unequal sides. (81)

BONDING: See PLASTIC WELDING. (102)

BOND MASS NUMBER: The bond mass number is an integer number less than or equal to the mass number of a bonded atom; it represents the (whole number) portion of neutrons and protons controlling a chemical bond. (5)

BOND MASS NUMBER-BOND SPECTRAL ENERGY PRODUCT: The bond mass number-bond spectral energy product or spectral bond product (SBPR) is the product of the two named cofactors. (5)

BOND SPECTRAL ENERGY: The bond spectral energy is a portion of the emission line energy of a bonded atom, which functions as a cofactor with an associated bond mass number. (5) See SPECTRAL ENERGY

BOOSTER: An amplitude transformer that increases the input amplitude of vibration. (102)

BOOSTER: Common term applied to the use of a compressor when used as the first stage in the cascade refrigerating system. (128)

BOOTSTRAP: A theory of elementary particles in which logical consistency is the ultimate requirement. (116)

BORE: Inside diameter of a cylinder. (128)

BOSS: A raised portion in the work piece, usually of the same material as the work piece. (102)

BOTTOM QUARK: One of the new quarks whose existence is shown by the discovery of the upsilon quark. (116)

BOURDON TUBE: Thin-walled tube of elastic metal flattened and bent into circular shape, which

tends to straighten as pressure inside is increased. Used in pressure gauges. (128)

BOW: A shaft condition such that the geometric shaft centerline is not straight. Usually the centerline is bent in a single direction due to gravity sag, thermal warpage, *etc.*, however, the bow may be three dimensional (corkscrew). Shaft bow can be detected by measuring the shaft relative displacement at rotor slow roll speed. (100)

BOW: An instrument of wood and horse-hair, employed to set the strings of the violin, *etc.*, in vibration. The bow, originally curved, as its name implies, has been subject to many changes of shape from time to time, from a large curve to an almost flat form. (125)

BOWING: The art of managing the bow, so as not only to bring out the best tone the instrument is capable of, but also so to phrase the passages played that the best possible character may be imparted to the music. By varying the system of bowing, a simple musical sentence may be changed in its character, almost indefinitely. (125)

BOYLE'S LAW: Law of physics: volume of a gas varies as pressure varies, if temperature remains the same. Example: If absolute pressure is doubled on quantity of gas, volume is reduced one half. If volume becomes doubled, gas has its pressure reduced by half. (128)

BRAGG REFLECTION: "Free electrons within the tilted bands of superlattice materials, undergoing the BLOCH oscillations, are reflected at each end of the mini-band." *see Scientific American* 11/1983 page 147.

BRAIN: See ETHER, DIFFERENTIATION, FORCE-MENTAL, FORCE-MIND

BRAZING: Method of joining metals with nonferrous filler (without iron) using heat between 800°F (427°C) and melting point of base metals. (128)

BREAKER STRIP: Strip of wood or plastic used to cover joint between outside case and inside liner of refrigerator. (128)

BREATH, SOUL BIRTH: "Almost immediately with the intake of the breath from the surrounding influence..." (314-1) (2)

BREECHING: Space in hot water or steam boilers between the end of the tubing and the jacket. (128)

BRIDGE: A piece of wood which, on instruments having a resonance-box, performs the double duty of raising the strings above the belly, and of terminating at one end their vibrating portion. In instruments played with the bow, the bridge is arched, in order to allow the bow to impinge upon any one string without touching others. In instruments, such as the guitar and pianoforte, its upper edge runs parallel to the

belly. In violins, the material and adjustment of the bridge are of great importance. Some instruments require a bridge made of course-grained wood, others of close-grained. It stands on two legs; that on the right hand should rest on the belly at a short distance behind the sound post. The legs should lie flat on the surface of the belly, in order that the vibrations of the strings should be duly transferred to the resonance-box. The tone of an instrument is largely influenced by the position of the bridge, and only great experience and nice handling can discover where it is best set up. (125)

BRINE: Water saturated with a chemical such as salt. (128)

BRITISH THERMAL UNIT: (Btu) Quantity of heat required to raise temperature of one pound of water one degree Fahrenheit. (128)

BROAD BAND NOISE: [Acoustics] Spectrum consisting of a large number of frequency components, none of which is individually dominant. (85)

BRONTIUM: A contrivance for imitating thunder, used in the Greek theater. Sheets of copper were laid out in the hyposcenum over which were rolled bladders filled with pebbles. (125)

BROWN'S GAS: A process which develops a "gas" from ordinary water invented by Yull Brown of Australia. The water is converted into a completely safe compressed stoichiometric hydrogen and oxygen mixture. The flame of this gas under the right lighting conditions, normally almost transparently colorless, can be seen to possess a small blue cone, as it emits from a torch, with a longer, pale red-blue extension. Within its overall sheath are several distinct regions called "mantles". "The most unusual property of the flame is that it is not formed as a set of explosions, as are ordinary flames, but as a set of implosions. Consequently, all classical theory about combustion products, highest temperature regions, and other specifics are up for revision. It is in the central blue cone of the flame, as opposed to its extension, that the novel combustion is sustained. This blue cone region separates the inner sustained vacuum from the continuously forming implosion products. The flame, upon application to an element or compound of elements, increases its temperature due to an *interactive combustion property* which is one of the unique characteristics of Brown's Gas. There is no theoretical limit to the flame as applied to materials as the local environment of the combustion will determine the extent of incremental calorific energy supplied and/or released. The temperature of the flame while in contact with only the surrounding air was measured to be 264 to 269° F (129 to 137° C). When the flame was applied to the face of an ordinary building brick the temperature was measured at 3100° F. When the flame was applied to a tungsten wire the temperature was measured at nearly 6000° C. "1979

The ratio 1,860:1 refers to the fact that when the gas

is electrically sparked, it immediately returns to water. If the amount of gas sparked, and thus imploded could fill 1,860 units, then the amount of water produced by its implosion would then only fill one unit. The resulting space instantly becomes filled with a very high and particularly clean vacuum.

"There is no other method capable of producing such a gas. Brown's Gas is a new product and there is no literature describing its properties which are sufficiently different from a combined molecular hydrogen and oxygen gas mixture, in 2:1 proportion, to be significant in industrial and commercial applications." Brown, 1979

Gas and its flame have been used in and exhibits characteristics:

- 1) Used in a car the gas combusts and emits water vapor as the only effluent in its exhaust.
- 2) A solid-state refrigeration unit in which temperature could instantly be changed with no freon or other refrigeration chemicals.
- 3) A room heater fueled with the gas will carbonize a strip of paper held near it but not create flames or smoke.
- 4) Used in an acetylene torch it singed hairs from a welder's forearm but didn't burn the skin.
- 5) Flame from this gas can glaze concrete thus rendering it impervious to acids and other corrosives and greatly extending the concrete's useful life span.
- 6) The gas when burned does not explode but implodes. "An intriguing situation arises when a volume of Brown's Gas is detonated because the contraction in that volume which occurs is revolutionary in character. Of an order of 1,860:1, the contraction can be defined as an implosion, as opposed to an explosion." 1979
- 7) When heating water in an iron basin using a torch if applied only to the water barely raises its temperature even after long exposure. The flame applied to the bottom of the basin raises the temperature of the metal so high, and so instantly, that the water boils away almost in the blink of an eye. When directed at a brick under the surface of the water, however, the flame can heat the brick as easily as though the brick was not water covered.
- 8) Steel, after treatment with the flame, is much more impervious to rust and before treatment.
- 9) The flame can fuse plastic to titanium.
- 10) Directing the flame at Cobalt-60 radiation was reduced by 70% in the sample.
- 11) Directing the flame at Americium the radiation was reduced 100%.

Brown's Gas generators are manufactured by Norinco, a Chinese manufacturing concern, in four sized models and can be custom manufactured in any size. (129) See NIGHTSIDE; SUN; NAVAZ; ETHER; WATER; DISSOCIATION OF WATER; MOLECULAR DISSOCIATION; ATOMIC THEORY-KEELY'S; ONE SUBSTANCE; ODIC FORCE

BRUTA: Astral force manifested in animals; second sight in animals; power of animals to discover instinctively poisonous or curative medicines, etc. (131)

BUBBLE: If ether is indeed as dense as Keely mentions it to be then we can say that matter is a bubble in the ether or in other words the ether cavitates into a less denser form of itself — that being material substances. See SPACE, ETHER, CAVITATION, CORPUSCLE, CIRCLE

BUBBLE CHAMBER: A device in which the track of a particle crossing the chamber is marked by a string of bubbles condensing on ionized atoms. (116)

BUGLE: 1) A hunting-horn of a straight or curved form. 2) A copper instrument of the horn quality of tone, but of less compass, furnished with keys. The tone is sweet, powerful and distinct; it has rarely been employed in the orchestra. There are bugle horns in C, B flat, and E flat, each capable of producing its generator and 7 harmonics. The ventil-horn is an improvement upon the bugle. The word bugle, from the Anglo-Saxon *buga*, to bend or curve, was anciently applied to many things of a curved shape, thus, the head of a bishop's crozier was called the bugle, and the crozier itself the bugle-rod. The handle of a kettle, basket handles, and a peculiar sort of elongated glass-bead are each called by the name bugle. Some writers derive the word from *bowgle* or *bougla*, a bull, on the ground that the earliest horns were bull's horns, and that the earliest representations of hunting horns are in shape like bull's horn. (125)

BULB, SENSITIVE: Part of a sealed fluid device which reacts to temperature. Used to measure temperature or to control a mechanism. (128)

BUNKER: Space where ice or cooling element is placed in commercial installations. (128)

BURNER: Device in which burning of fuel takes place. (128)

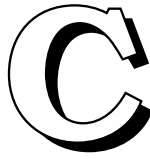
BUTANE: Liquid hydrocarbon (C₄H₁₀) commonly used as fuel for heating purposes. (128)

BUTT JOINT: Two flat contacting surfaces with no built-in alignment. (102)

BUTTERWORTH FILTER: A transfer function which provides a maximally flat amplitude response in the passband and well beyond the corner frequency F_c. F_c approaches an ultimate attenuation rate of 6dB per octave per pole. Recommended where passband

gain - not pulse response - is important.

BYPASS: Passage at one side of, or around, a regular passage. (128)



C: [Music] 1) The note UT in the Guidonian system and in modern French and Italian nomenclature. 2) The letter whose original form was afterwards modified into the C clef. 3) The first note of the Hypo-Eolian mode. The first note of the Ionian mode. 4) The first, or key note of the modern normal scale, so called because if it be desired to write down the scale now used, C is the only note from which the series can start unless sharps or flats be added. 5) A capital letter C signifies the note in the second space of the bass staff (Tenor C). A small c signifies the note one octave above this, middle C. (125) Also root is note F; page 23 of (10)

CABALES: The astral bodies of men who died a premature death – that is to say, who were killed or killed themselves before their natural term of life was over. They may be more or less self-conscious and intelligent according to the circumstances in which they lived and died. They are the earth-bound suffering souls of the dead, wandering in the sphere of the earth's attraction (Kama-loca) until the time arrives when they would have died according to natural law, when the separation of their higher principles from the lower ones takes place. They imagine to perform bodily actions, while in fact they have no physical bodies, but act in their thoughts; but their bodies appear to them as real as ours appear to us. They may under certain necessary conditions communicate with man through "mediums," or directly through a man's own mediumistic organization. (131)

CABALLI: See CABALES

CACOPHONY: Harsh sounding music. (125)

CADENCE: 1) A vocal or instrumental shake or trill, run or division, introduced as an ending, or as a means of return to the first subject. 2) The end of a phrase, formerly called fall, either in melody or harmony. 3) There are four principal forms of cadence in harmony: the whole, or authentic, the half, the interrupted, and the plagal cadence. When the last chord — the major or minor chord of the key note — is preceded by the major chord of the dominant, such a cadence is called whole or perfect. If the last chord is the dominant and is preceded by the chord of the tonic, the cadence is called half or imperfect. When the last chord of the phrase is other than the tonic

chord and is preceded by that of the dominant, the cadence is said to be interrupted, false, or deceptive. The cadence, called plagal, is that in which the chord of the tonic is preceded by the major or minor chord of the subdominant. (125)

C QUARK: The quark whose existence is demonstrated by the discovery of the ψ/J particle. It carries the charm quantum number. (116)

CAGE (RETAINER): A component of rolling element bearings which constrains the relative motion of the rolling elements circumferentially around the bearing. The cage serves to fix the spacing between rolling elements. (100)

CALIBRATION: A test during which known values of the measured variable are applied to the transducer or readout instrument and corresponding output readings are verified or adjusted as necessary. (100)

CALCIUM SULFATE: Chemical compound (CaSO_4) which is used as a drying agent or desiccant in liquid line driers. (128)

CALIBRATE: Position indicators to determine accurate measurements. (128)

CALIBRATION CURVE: A graphical representative of the measured transducer output or instrument readout as compared to a known input signal. See **CALIBRATION**. (100)

CALORIE: Two different calorie units are used by scientists. The calorie used by medical science is a small heat unit. It equals the heat required to raise the temperature of one gram of water one degree Celsius (C). The calorie used by engineering science is a large heat unit. It is equal to the amount of heat required to raise the temperature of one kilogram (2.2 lbs.) of water one degree C. In the SI system it is recommended that the Joule unit of energy be used in place of the calorie. (128)

CALORIMETER: Device used to measure quantities of heat or determine specific heats. (128)

CAM: Mechanical component which is oblong, giving a reciprocating motion when rotated. (128)

CAMPANOLOGY: The knowledge of the con-

struction and use of bells. (125)

CAMPBELL DIAGRAM: A mathematically constructed diagram used in rotating machinery design as a tool for selecting and checking shaft rotative speeds so as to avoid excitation of natural resonance(s) in the system. The X axis represents the various excitation frequencies, *i.e.*, rotative speed, misalignment (2X), oil whirl (40-48% X), blade or vane passing frequencies, gear mesh frequencies, etc. The Y axis represents the lateral and torsional resonance frequencies. The term is sometimes used incorrectly to describe a CAMPBELL DIAGRAM plot of machine vibration frequency (X axis) versus vibration amplitude (Y axis) at various shaft rotative speeds. The accepted terms for the latter type of data presentation are Cascade plot and Waterfall plot. (100)

CANAL RAY: Discovered in 1886, the flow of positive ions from anode to cathode in an evacuated tube. Same as **EDISON EFFECT** (qv).

CANON: A rule — a term applied to the measurement of the ratios of intervals by means of the monochord, hence the system of Pythagoras was called the *canon of Pythagoras*; that of Euclid, the *canon of Euclid*. Hence, too, the science of calculating musical intervals is called *canonik*. *Sectio canonis* (Lat.), a division of a string, or monochord, formed by a moveable bridge or frets. (125)

CANONICI: A name given to followers of the Pythagorean system of music, as opposed to Musici, the followers of the Aristoxenian system. (125) See **MUSICI**

CANTINO: The smallest string upon the violin. The E string. (125)

CAPACITANCE: (C) Property of a nonconductor (condenser or capacitor) that permits storage of electrical energy in an electrostatic field. (128)

CAPACITIVE REACTANCE: The opposition or resistance to an alternating current as a result of capacitance; expressed in ohms. (128)

CAPACITOR: Type of electrical storage device used in starting and/or running circuits on many electric motors. (128)

CAPACITOR-START MOTOR: Motor which has a capacitor in the starting circuit. (128)

CAPACITY: Refrigeration rating system. Usually measured in Btu per hour or watts (metric). (128)

CAPISTRUM: (Lat.) A muzzle. A sort of bandage wound round the head and face of the ancient trumpeters, to protect the cheeks while playing their instruments, on account of the unusual exertion necessary for the proper production of tone. (125)

CAPTURE RATIO: Capture ratio measures an FM

tuner's ability to sort out two stations operating on the same frequency. A tuner with a poor capture ratio will pick up both stations simultaneously, making it impossible to listen to either. A tuner with a good capture ratio will "capture" the stronger station and reject the weaker one. Capture ratio is expressed numerically; the lower the figure, the better the capture ratio. Don't confuse capture ratio with selectivity. Selectivity refers to the tuner's ability to separate adjacent stations on the dial. Capture ratio refers to the separation of stations on the same spot on the dial. (103)

CARBON DIOXIDE: Compound of carbon and oxygen (CO₂) which is sometimes used as a refrigerant. Refrigerant number R-744. (128)

CARBON FILTER: Air filter using activated carbon as air cleansing agent. (128)

CARBON MONOXIDE: Colorless, odorless

CARNOT: The inventors and discoverers of the last century were a curious and bold lot. It was during this time period that basic research into the fundamentals of nature were most aggressively pursued. One of the more interesting developments of that period was that of perpetual motion machines. This quest for a costless supply of power was due in part from all the exploratory work being done with the second 'law' of thermodynamics which is not really a law but a generalization of conditions or processes. Basically this generalization says that certain processes cannot be reversed such as a house burning down which cannot have the fire reversed and the house renewed. A reversible process can be water being converted into steam and then renewed back into water.

As early as 1824 a hypothetical process for developing motive power was invented using only reversible cycles. This particular cycle was first used by Sadi Carnot in 1824 as a basis for his celebrated theorem concerning the efficiency of a perfect engine and it is called the *Carnot cycle*. An ideal arrangement in which a working substance could be carried through a Carnot cycle is called a *Carnot engine*.

The Carnot cycle can be used in a variety of forms and the four reversible processes which go to make up the cycle are as follows:

Process 1 is an isothermal process at a low temperature T₂, and during this process an amount of heat H₂ is taken from the working substance (steam).

Process 2 is an adiabatic process during which the temperature is raised from T₁ to T₂.

Process 3 is an isothermal process at high temperature T₁, and during this process an amount of heat H₁ is given to the working substance.

Process 4 is an adiabatic process during which the

temperature drops from T_1 to T_2 , the beginning temperature.

Another way to describe these processes which makes a little more sense is:

Process 1. Compress a gram of working substance (steam) from volume s to volume w and condense all but an infinitesimal residue of the steam to water, taking an amount of heat L from the substance, thus keeping the *temperature constant*. During this process an amount of work equal to $(s-w) \times p$ will be done **ON** the substance.

Process 2. Continue the compression by an infinitesimal amount *without taking heat from the substance*, thus condensing the residue of steam to water and causing temperature and pressure to rise to $T+\Delta T$ and $p+\Delta p$, respectively.

Process 3. Expand the gram of substance from volume w to volume s and vaporize all but an infinitesimal residue of water by giving sufficient heat to the substance to keep the *temperature constant* at $T+\Delta T$. During this process an amount of work equal to $(s-w) \times (p+\Delta p)$ will be done **BY** the substance.

Process 4. Continue the expansion by an infinitesimal amount *without giving heat to the substance*, thus vaporizing the residue of water and causing temperature and pressure to fall to the initial values T and p , respectively.

The second set of processes is called Clapeyron's relation and was first proposed by the French physicist Clapeyron in 1834 and is functionally equivalent to the Carnot cycle.

The Carnot cycle was a curiosity to the courageous scientists of the 1800s. The first use to come of it was done by William Thomson (later Lord Kelvin) as a part of his generalization - the theory of the dissipation of energy. He called his device a 'heat multiplier' in 1852. This device and subsequent work developed into refrigeration and the common heat pump we are familiar with today.

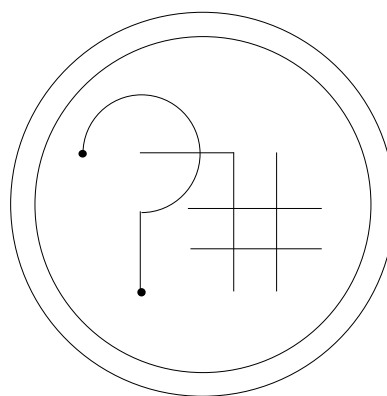
John Keely eventually used these ideas in his work with his Etheric Vapor devices. The Carnot cycle describes a perfect mechanical system using a perfect gas. Keely's etheric vapor supposedly far surpassed known qualities of available gases. He was on the right track because we know the fact that ordinary heat pumps take one unit of energy to run them and then the heat pump puts out from three to four times that same amount of energy in the form of heat.

What? An over-unity device has been laying around for 150 years and no one has done anything with it? People have done work with this concept; Keely and now the Dennis Lee people.

Now, from our ongoing studies of Sympathetic Vibratory Physics, we know that heat is a vibratory

condition. The frequencies of the electromagnetic scale just below those of visible light are called infrared and are primarily responsible for heat generation. So if we approach a heat pump cycle and functions as though they were a vibratory device operating with vibrating media we would be closer to the true nature of the subject than if we stuck with trying to convert heat into motive power. Either method should result in success however.

Heat can and is a manifest characteristic of atomic substances. However heat is not evident in a sub-gaseous, sub-plasma substances. Only the vibrations are evident albeit of a much shorter wave length and higher frequency. So - heat and vibration are one and the same thing.



Chord A flat 1st Octave

The Carnot cycle is a good exemplification of The Law of One. A substance expands and then contracts over and over again. Is this not what a vibration does as it goes from a positive (expansive) phase to its negative (contracting) phase? So herein lies another of Keely's secrets. Sympathetic vibrations between two or more objects will result in resonance. Does not resonance under great amplitude release tremendous forces? Of course it does. Would not a cloud of phonons represent a more perfect gas than the atmospheric gases when considered free of molecular and atomic interferences? Yes again.

So, theoretically, if we used the positive and negative phases of a vibration under the proper mechanical arrangements might we not expect to create a more perfect rendition of the Carnot cycle? This is what Keely proposed and accomplished. His subsequent machines developed much more power than it took to run them just like the modern day perpetual motion device we call a heat pump. The heat pump would be a perpetual motion device except for the fact that only one person to my knowledge ever had enough common sense to extract motive power from a it.

The question arises as to where does this extra en-

ergy come from in a heat pump? There is only so much 'warm' air outside in a snow storm yet the device delivers warm air inside a house. The compressor unit supplies heat in the form of pressure to the gas but only so many BTUs are being expended in this compressing process and much fewer than are measured at the heating element. So where can the extra energy come from? There is only one place – from the molecular and atomic destruction of the working fluid.

From our work with cavitation we know that a sudden release of pressure will cause nucleation and a subsequent release of atomic forms of energy. This atomic energy release is non-ionic and hence completely benign and safe. The working fluid in the heat pump circuit is caused to expand quiet rapidly and we can assume a low level nucleation or cavitation is taking place at that point in the fluidic circuitry. Voila! We have 'free' energy and hence an increase of temperature and pressure which can be used to drive a rotary power take-off device not to mention heating one's home.

Here we have a wide doorway into Keely's workshop. Take all the above combine it with understanding of mechanical acoustical resonators and we can replicate much of Keely's work with æther and resonant devices. Please keep in mind he didn't stop with this relatively low level of technology but went on to develop and work with a much higher level of science based on the negative attractive forces. These negative attractive forces and devices will have to be dealt with in future articles.

So now we know what subjects we need to bone up on and what devices and technology we can use to build any number of designs of free energy devices. We can all study cavitation, heat pumps, Carnot cycle, SVP (vibration physics) and thermodynamics. The question remains: What are you going to do about all this? (107)

CARILLON: A set of bells so arranged as to be played by hand or by machinery. The word has by some authors been connected with *clarine* (Fr.), a little bell, which is probably connected with *clarisonus* (Lat.); The can be no doubt as to the antiquity of thus using small bells. They were probably graduated in size so as to produce a diatonic scale, and were called a Tintinnabulum.125

CARNYX: An ancient Greek trumpet of a shrill tone, known afterwards to the Celts and Gauls. (125)

CARTRIDGE: As the term is usually used, refers to the small device (also called a phono pickup) mounted at the active end of the tone arm. It follows the record groove by means of its stylus (needle) and translates the undulations of the groove into electrical signals. (The term cartridge is also used to describe the plastic-encased tape reels designed for cartridge loading of certain kinds of tape recorders or tape players.) (103)

CASCADE PLOT: A plot used to observe the changes in vibration response/amplitude and frequency as a function of either rotor speed or time. This plot consists of a series of vibration frequency spectra acquired at various machine rotative speeds. The X axis represents vibration frequency; the Y axis represents vibration amplitude. These XY plots are shown for various rotor speeds incremented along the Y axis. Also called Waterfall Plot. (100)

CASING EXPANSION: A measurement of the axial position of the machine casing relative to a fixed reference, usually the foundation. The measurement is typically made with an **LVDT** installed on the foundation at the opposite end of the machine from the point where the casing is attached to the foundation. Changes in casing axial position can be the result of thermal expansion of the casing during start-up and shutdown. The measurement is usually incorporated as part of a TSI system. (100)

CASTRATO: A male singer with a peculiarity of voice, produced by a natural deprivation (castration) procured in early youth for the purpose of preserving the normal tone. (125)

CATAPLASTIC: Deformed. (121)

CATGUT: The name given to the material of which the strings of many musical instruments are formed; it is made from the intestines of the sheep, and sometimes from those of the horse, but never from those of the cat. (125)

CATENOIDAL HORN: A horn having a cross-sectional area following the equation for a catenoid. (102)

CATHODE RAY: An old term for electron. (116)

CATHODICITY: See **NIGHT-SIDE**

CATLINGS: The smallest sized lute-strings. (125)

CAUER-ELLIPTIC FILTER: Also known as an elliptic or elliptical filter. A transfer function having an extremely rate of attenuation (a very fast rolloff) the corner frequency F_c . Exhibits passband ripple and a renewal of gain beyond the stopband.

CAUSE: "Causes have an inherent momentum which they carry on down to their eventual end, and results consequently must follow; but an original cause is a distinct departure from one grade, classification, state, or condition to another. A cause is the complete transformation of one nature into the nucleus of another." Dr. H. S. Lewis, The Symbolic Prophecy of the Great Pyramid, AMORC Press, San José, CA. See **AETIOLOGY**

CAVITATION: A drop in pressure on a liquid creates pockets or bubbles in the liquid - an increase in pressure causes these bubbles to collapse resulting

in tremendous "local" force which can cause damage to metals. See **NEGATIVE CENTERS, VACUUM, PRIME NEUTRAL CENTERS**

CAVITATION: *Cavitation* is the formation and activity of bubbles (or cavities) in a liquid. Here the word 'formation' refers, in a general way, both to the creation of a new cavity or to the expansion of a pre-existing one to a size where macroscopic effects can be observed. These bubbles may be suspended in the liquid or may be trapped in tiny cracks either in the liquid's boundary surface or in solid particles suspended in the liquid.

The expansion of the minute bubbles may be effected by reducing the ambient pressure by static or dynamic means. The bubbles then become large enough to be visible to the unaided eye. The bubbles may contain gas or vapour or a mixture of both gas and vapour. If the bubbles contain gas, then the expansion may be by diffusion of dissolved gases from the liquid into the bubble, or by pressure reduction, or by temperature rise. If, however, the bubbles contain mainly vapour, reducing the ambient pressure sufficiently at essentially constant temperature causes an 'explosive' vaporization into the cavities which is the phenomenon that is called *cavitation*, whereas raising the temperature sufficiently causes the mainly vapour bubbles to grow continuously producing the effect known as *boiling*. This means that 'explosive' vaporization or boiling do not occur until a threshold is reached.

There are thus four ways of inducing bubble growth:

1. For a gas-filled bubble, by pressure reduction or increase in temperature. This is called *gaseous cavitation*.
2. For a vapour-filled bubble, by pressure reduction. This is called *vaporous cavitation*.
3. For a gas-filled bubble, by diffusion. This is called *degassing* as gas comes out of the liquid.
4. For a vapour-filled bubble, by sufficient temperature rise. This is called *boiling*.

The situation is complicated because the bubble usually contains a mixture of gas and vapour.

Looking at it another way, we may distinguish between four different kinds of cavitation according to how it is produced:

1. *Hydrodynamic cavitation* is produced by pressure variations in a flowing liquid due to the geometry of the system.
2. *Acoustic cavitation* is produced by sound waves in a liquid due to pressure variations.
3. Optic cavitation is produced by photons of high

intensity (laser) light rupturing in a liquid.

4. *Particle cavitation* is produced by any other type of elementary particles, e.g., a proton, rupturing a liquid, as in a bubble chamber.

It has been pointed out that whereas hydrodynamic and acoustic cavitation are brought about by *tension* in the liquid, optic and particle cavitation are achieved by a *local deposition of energy*.

HYDRODYNAMIC CAVITATION: In a flowing system, the liquid velocity varies locally and at the points of highest velocity, low pressures and cavities occur.

Incipient cavitation is the term used to describe the type and stage of cavitation that is just detectable as the cavitation appears.

Desinent cavitation is the term used to describe cavitation just before it disappears.

The conditions which mark the boundary or threshold between no cavitation and detectable cavitation are not always identical. For example, the pressure of disappearance of cavitation has been generally found to be greater, and less variable, than the pressure of appearance.

Three cases of *flow* cavitation arise:

1. *Travelling* cavitation occurs when cavities or bubbles form in the liquid, and travel with the liquid as they expand and subsequently collapse.
2. *Fixed* cavitation occurs when a cavity or pocket attached to the rigid boundary of an immersed body or a flow passage forms, and remains fixed in position in an unsteady state.
3. *Vortex* cavitation occurs in the cores of vortices which form in regions of high shear, and often occurs on the blade tips of ship's propellers - hence the name "tip" cavitation.

ACOUSTIC CAVITATION: In a non-flowing system the ambient pressure can be varied by sending sound waves through the liquid. If the amplitude of the pressure variation is great enough to bring the pressure locally down to, or below, the vapour pressure in the negative parts of the sound cycle traversing the liquid, any minute cavities or bubbles will grow. If the pressure amplitude is increased to produce zero, and then negative, pressures (i.e. tensions) locally in the liquid, the bubble growth is increased. The tiny bubble is thus set into motion, growing and contracting in the sound field. This motion may be of various kinds, usually complicated. Two distinct types of bubble motion are possible: in the first are stable cavities or bubbles that oscillate for many periods of the sound field, whereas in the second are transient cavities that exist for less than one cycle.

Two important characteristics of acoustic cavitation should be mentioned here. The first is that generally it is a non-linear process in that the change in the radius of the bubble is not proportional to the sound pressure. The second is that the high compressibility of the gas bubbles means that much potential energy is obtained from the sound waves when the bubbles expand and that kinetic energy is concentrated when the bubbles collapse. In transient cavitation, this transformation of a low energy density sound wave into a high energy density collapsing bubble occurs because the motion is non-linear. Because it concentrates the energy into very small volumes it can produce very high pressures and temperatures which can erode solids, initiate chemical reactions and produce luminescence.

OPTIC AND PARTICLE CAVITATION: *Optic* cavitation occurs when, say, large pulses of a Q-switched ruby laser are focused on a liquid. Break-down of the liquid occurs and bubbles are formed. The bubbles can then be photographed by a high speed rotating mirror camera.

Particle cavitation is based on the growth of bubbles in a superheated liquid. If a charged particle is sent through the liquid it leaves an ionization trail for a fraction of a second. Some of the energy from these ions goes into a few fast electrons, which can give up about 1000 electron volts of energy in a small volume to produce rapid local heating. If the liquid has been superheated by expansion, boiling will occur along the track which will appear as a line of tiny bubbles. (105)

C CLEF: The clef showing the position of middle C, in which are written the alto, tenor, and (in old music) other parts. (125)

CELESTIAL: Same as "Dominant". The celestial Dominant as opposed to the Terrestrial Harmonic and Enharmonic. See **LAWS OF BEING, POSITIVE, NEGATIVE**

CELESTIAL ETHERIC RADIATION: See **PLANETARY ORBITS**

CELESTIAL MIND FLOW: See **MOLECULES, TRIPLE FLOW**

CELESTIAL MIND FORCE: Celestial mind force as associated with **TERRESTRIAL BRAIN MATTER** - page 303 of (1) See **FORCE-MIND, ATOMIC THEORY-KEELY'S**

CELEUSMA: (Gk.) The word or sing-song of the *fugle*-man or leader, by which oarsmen were encouraged to row rhythmically, and by which, to this day, sailors pull uniformly and simultaneously at a rope. (125)

CELL: "A cell is a unity of both negative and positive qualities vibrating to make a manifestation." (Lewis)

CELTIC SCALE: See **PENTATONIC SCALE;**

SCALE

CENOBITIC: Living in communities. (121)

CENOBIUM: A colony or community of cells. (121)

CENOGENESIS: "New-birth", the embryonic development of the individual. (121)

CENOGENETIC: Pertaining to cenogenesis. (121)

CENTER FREQUENCY, f_0 : Can be expressed as the geometric mean (the square root of the product) of the upper and lower corner frequencies of a pass-band, band-reject, or band elimination (notch) filter.

CENTER FREQUENCY: For band-pass filters, the arithmetic center of a constant bandwidth filter or the geometric center (midpoint on algorithmic scale) of a constant filter. (100)

CENTER LINE: [Mechanical] A line scribed, or otherwise marked off, upon a piece of work as a basis from which to obtain other dimensions, equally divided or symmetrical on both sides. A center line may, of course, be either rectilinear or curved. Dimensions are almost invariably taken from center lines, seldom from edges or outer faces. (84)

CENTER OF COMPRESSION: [mechanical] The line where is located the resultant of the compressive forces in the lower section of a beam. (84)

CENTER OF GRAVITY: [mechanical] The center of gravity of a body is that point about which it will be balanced though placed in any position, hence it is the center of parallel pressures. It may be determined experimentally by suspending the body in different successive positions and hanging a plumb line against the face. The common point of the numerous intersections of the plumb line will correspond with the center of gravity. In regular figures or solids the center of gravity corresponds with their geometrical center. The common center of gravity of two bodies is in a point which divides the distance between their individual centers of gravity in the inverse ratio of their weights. The common center of gravity of more than two bodies combined in one system is found by first obtaining the common center of any two of them, and then obtaining the common center of those two with the third, and so on till all are included. (84)

CENTER OF GYRATION: [Mechanical] That point in a revolving body in which its momentum is concentrated. (84)

CENTER OF MOMENTS: [Mechanical] That point in a rigid body about which the moments or forces is concentrated. (84)

CENTER OF MOTION: [Mechanical] The center around which wheels or levers turn. A center of motion may be a fixed center or a movable center. (84)

CENTER OF OSCILLATION: [Mechanical] That point in the axis of a vibrating body in which, if the whole matter were concentrated, the body would continue to vibrate in the same time. It lies in the same axis as the center of gravity, but is necessarily situated farther from the point of suspension. (84)

CENTER OF PERCUSSION: [Mechanical] That point in a body revolving about an axis at which, if it struck an immovable obstacle, all its motion would be destroyed. (84)

CENTER OF TENSION: [Mechanical] The line where is located the resultant of the tensile forces in the upper section of a beam.(84)

CENTER OF VELOCITY: A point on a pendulum two-thirds of one third the length of the string, *i.e.*, suspension from which point giving the highest rate of vibration. (8)

CENTERLINE POSITION: See **RADIAL POSITION.** (100)

CENTRAL FORCES: [Mechanical] A body revolving around its axis has a tendency to fly off from the center - this is its centrifugal force. The force which prevents it from thus flying off is called the centripetal force. These are central forces, and are, of course, equal and opposite. (84)

CENTRALIZATION: "Gravity may be considered a negative force, for it tends to balance the positive forces. Gravitational forces are vibratory forces and might be defined as the centralization of vibratory forces ready to be changed into power by non-activity."(195-70) (2) See **GRAVITY, NEUTRAL NEGATIVE AGGREGATION, NEGATIVE, FORCE-ATOMIC, FORCE-CREATED, LAWS OF BEING, LAW OF ASSIMILATION**

CENTRALIZATION: "The umbilicus center being that region from which the vibratory forces of the system reach through the activity of the spermatic cords, as come to that of the centralization in the central nerve system and change the vibratory forces in such conditions, see?" (1800-16) 2

CENTRIFUGAL FORCE: See **FORCE, CENTRIFUGAL**

CEREBRAL CENTERS: See **MOLECULAR DISSOCIATION**

CERENKOV COUNTER: A device that identifies particles passing through it by observing a flash of light generated in a manner similar to a sonic boom. (116)

CHANGES: The altered melodies produced by varying the sounds of a peal of bells. (125) See **BELL**

CHANNEL: A transducer and the instrumentation hardware required to display its output signal. (100)

CHANNEL: Channel is the term used to indicate one of the two separate signal and sound paths employed in stereo, hence the expressions "left channel" and "right channel." (103)

CHANT: A short musical composition to which the Canticles and the prose version of the Psalms are sung, either in unison or in four-part harmony. There are two kinds of chants in common use — the Anglican and the Gregorian. 1) A Gregorian chant consists of five parts: the intonation; the first reciting note or dominant; the mediation; the second reciting note or dominant; the ending. 2) An Anglican chant is of two sorts, single and double. A single chant is in two trains, the first of three, and the second of four bars in length. (125)

CHAOMANTIA: Divination by aërial visions; clairvoyance; second sight. (131)

CHARACTERISTIC RESPONSE: Defines both the frequency partitioning and the mathematical origin specified for a given filter design; examples include a **LOWPASS BUTTERWORTH** and a **HIGH-PASS CAUER-ELLIPTIC** filter.

CHARGE: In the present electromagnetics theory, charge and charged mass are falsely made identical. Actually, on a charged particle, the "charge" is the flux of virtual particles on the "bare particle" of observable mass. The charged particle is thus a "system" of true massless charge coupled to a bare chargeless mass. The observable "mass" is static, three-dimensional, and totally spatial. "Charge" is dynamic, four-dimensional or more, virtual and spatiotemporal. Further, the charge and observable mass can be decoupled, contrary to present theory. Decoupled charge - that is, the absence of mass - is simply what we presently refer to as "vacuum." Vacuum, spacetime, and massless charge are all identical. Rigorously, we should utilize any of these three as an "ether," as suggested for vacuum by Einstein himself (see Max Born, *Einstein's Theory of Relativity*, revised edition, Dover Publications, New York, 1965, p. 224). And all three of them are identically anergy - not energy, but more fundamental components of energy. (48)

CHARGE CONJUGATION: The mathematical operation that turns a particle into its antiparticle. (116)

CHARTS: (#1) "With symbols defining the relative simple and compound sympathetic association between the different orders of etheric chords as associated with molecular, atomic and inter-etheric to produce dispersion under the progressive orders of vibration, both positive and negative, as also the different combined orders of radiation to induce luminosity." (quoted from chart #1)

CHATZOZERAH: The chatzozerah is generally thought to have been a straight trumpet, with a bell or "pavilion" as it is termed. Moses received specific di-

rections as to making them. "Make thee two trumpets of silver; of a whole piece shalt thou make them: that thou mayest use them for the calling of the assembly, and for the journeying of the camps." (125)

CHELYS: 1) The lyre of Mercury, supposed to have been formed by strings stretched across a tortoise-shell. 2) In the 16th and 17th centuries a bass-viol and division-viol were each called chelys. (125)

CHEMICOTROPISM: See **EROTIC CHEMICOTROPISM**. (121)

CHEMILUMINESCENCE: The chemiluminescence process of bioluminescence is a two-step process fueled with luciferin. See **BIOLUMINESCENCE; LUMINIFEROUS ETHER; LUCIFERIN; SONOLUMINESCENCE**.

CHERIO: "Quint-essence". The essence or fifth principle of a thing; that which constitutes its essential qualities, freed of all impurities and non-essentials. (131) See **ETHER; MATTER**

CHIME: 1) To play a tune on bells, either by machinery or by hand, by means of hammers, or swinging the clappers, the bell remaining unmoved. It is opposed to *ringing* in which the bells are raised, that is, swung round. 2) A carillon. (125) See **BELL; CARILLON**

CHLADNI PLATES: See **ACOUSTICS § 24; HARMONICS, RATES OF**

CHORD: A combination of musical sounds, consonant or dissonant. (125) See **HARMONY**

CHORD: A string. (125)

CHORD: Three or more tones sounded together harmoniously.

CHORD: "The chords will be set in progressive sympathy from the first octave to the fortieth..." (1) See **OCTAVE**

CHORD: Chords are composed of three streams or flows or notes; Dominant, Harmonic, Enharmonic. By changing any one the equilibrium is disturbed, this results in motion or activity. See **HARMONIC ATTRACTION CHORD, ATOMIC TRIPLETS, TRIPLE FLOWS, LAWS OF BEING, ORDERS OF VIBRATIONS**

CHORD CENTER: "The difference in the condition of the sympathetic nerve centers, and the variations in the chord aggregation of the masses, as established in the man or woman at birth, constitutes the molecular condition of the individual. The molecular state of animals, vegetables, and minerals depends upon the aggregation of their chord centers." pg 222 of (1) See **MASS, LAW OF INDIVIDUALIZATION**

CHORD OF LIFE: "These as they make for the raising of that from within of the Creative Forces, as

it arises along that which is set within the inner man as that cord (chord) of life that once severed may separate, does separate, that balance between the mind, the body, the soul; these three, as accorded within the human forces, are the activities that were carried on by thy self in movement of body in its every motion that made for the uplifting up, the intoning in of self within; that there might come, as it were, the sound as of many waters; or as the morning stars in their circuit about the earth may sing with the glorious coming of the light into the experience of man to raise same to his at-oneness and his attunement with those beauties of the coming of the sons of men into the earth that God in His Oneness of Purpose may bring those activities with the sons of God as an at-onement in their purposes in the earth. The glorifying of Him in the dealings and associations with the fellow man, and these find their attunement in each chord as it rings one with another in all the music that may be heard from every sound that follows in eei-u-u-ummmm in its forms, through that attunement along the pineal to the source of light within the self to make for the emotions of glorifying alone." (2) (275-43)

"For the experience becomes rather as a very delicate instrument of music upon which the chords of life (which is God) are played." (1436-2)(2)

CHORD OF MASS: "Keely's discoveries embrace the manner or way of obtaining the keynote, or "chord of mass," of mineral, vegetable, and animal substances; therefore, the construction of instruments, or machines, by which this law can be utilized in mechanics, in arts, and in restoration of equilibrium in disease, is only a question of the full understanding of the operation of this law." Chapter 7 (2)

"The experiment illustrating "chord of mass" sympathy was repeated using a glass chamber, forty inches in height, filled with water, standing on a slab of glass. Three metal spheres, weighing about six ounces each, rested on the glass floor of the chamber. The chord of mass of these three spheres was B flat first octave; E flat second octave, and B flat third octave. Upon sounding the note B flat on the sympathetic transmitter, the sphere having that chord of mass rose slowly to the top of the chamber; the positive end of the wire having been attached, which connected the covered jar with the transmitter. The same result followed the sound of the note in sympathy with the chord of mass of the other spheres, all of which descended as gently as they rose, upon changing positive to the negative." (Keely)

"The breaking up of cyclones will open a field for future research, if any way can be discovered for obtaining the chord of mass of the cyclone. To differentiate the chord of its thirds would destroy it;" Chapter 9 (2) See **SYMPATHETIC NEUTRAL AFFINITY, HARMONIES OF TONES AND COLORS, HARMONIC ATTRACTIVE CHORD, MOLECULAR DISSOCIATION, LAWS OF BEING**

CHORDA CHARACTERISTICA: A chord of the

7th in which a leading note appears. (125)

CHORDÆ ESSENTIALES: The tonic and its 3rd and 5th. The key-chord. (125)

CHORDOMETER: A gauge for measuring the thickness of strings. (125)

CHORDULA: The stage of development at which the spinal column appears. (121)

CHORION: A portion of the womb to which the embryo attaches. (121)

CHRIST CONSCIOUSNESS: [Religion] Q-18: Should the Christ Consciousness be described as the awareness within each soul, imprinted in pattern on the mind and waiting to be awakened by the will, of the soul's oneness with God?

A-18: Correct. That's the idea exactly! (5749-19) (2)

CHROMA: (color or complexion). The name of one of the modifications of the Greek musical scale. The principal chromatic scale of the Greeks, its chief characteristic is the omission of the 4th and 7th. (125)

CHROMATIC: That which includes notes not belonging to a diatonic scale. (125)

CHROMATIC CHORD: A chromatic chord is that which contains a note or notes foreign to diatonic progression. (125)

CHROMATIC HARMONY: Chromatic harmony is that which is made up of chromatic chords. (125)

CHROMATIC INTERVAL: A chromatic interval is that which is augmented or diminished. (125)

CHROMATIC MODULATION: Chromatic modulation is a passing into an extreme key, by means of chromatic harmony. (125)

CHROMATIC SCALE: A chromatic scale is one which consists of a succession of semitones. (125)

CHROMATIC: A name given to the semitonic intervals. (8)

CHROMATIC SCALE: Consists of semitones, otherwise in diatonic progression. (11)

CIRCLE: "In the circle, as indicated, comes power." (195-52) (2)

"For it rises in its emanations and descends also. Hence the cycle, or circle, or arc, that is as a description of all influences in the experience of man." (699-1) (2)

"Curved lines, not straight lines, lie at the foundation of all growth, magnitude, extension and area in our world. The universe, our world included, is built

and moves upon curved lines, and nothing else." (12)

"The circle and the equilateral triangle are opposite to one another in all the elements of their construction." (12) See **GEOMETRY, MATTER, OCTAVE, SPHERE, CORPUSCLE, SYMPATHETIC NEGATIVE INTERFERENCE**

CIRCULAR CANON: A canon so constructed that it closes in the key one semitone above that in which it commences. As, at each repeat, it begins, not at the original pitch, but at the pitch as which it closed, it is evident that twelve repetitions would take it through all the known keys. (125)

CIRCULUS: A circle. One of the time signatures of early music. (125)

CLAMPING PRESSURE: The pressure exerted by the horn on the work-piece. (102)

CLANG: 1) Timbre. Quality of tone. 2) The peculiar "ringing" noise or din produced by the clash of metals, or the blast of loud wind instruments. (125)

CLANG: Tones sounded together not necessarily harmoniously. See pages 145-147 of (6) See (2) on the **GREAT PYRAMID**, See **CHORD, BEATS**

CLAPEYRON: Process 1. Compress a gram of working substance (steam) from volume s to volume w and condense all but an infinitesimal residue of the steam to water, taking an amount of heat L from the substance, thus keeping the *temperature constant*. During this process an amount of work equal to $(s-w) \times p$ will be done **ON** the substance.

Process 2. Continue the compression by an infinitesimal amount *without taking heat from the substance*, thus condensing the residue of steam to water and causing temperature and pressure to rise to $T+\Delta T$ and $p+\Delta p$, respectively.

Process 3. Expand the gram of substance from volume w to volume s and vaporize all but an infinitesimal residue of water by giving sufficient heat to the substance to keep the *temperature constant* at $T+\Delta T$. During this process an amount of work equal to $(s-w) \times (p+\Delta p)$ will be done **BY** the substance.

Process 4. Continue the expansion by an infinitesimal amount *without giving heat to the substance*, thus vaporizing the residue of water and causing temperature and pressure to fall to the initial values T and p , respectively. (107)

CLAVICYLINDER: An instrument in the form of tubes or cylinders of glass, invented by Chladni. There was another instrument by the same name made of plates of glass of graduated lengths, the tone of which was produced by hammers set in motion by a key board. (125)

CLEF: The sign placed at the commencement of a

staff or stave, showing the absolute pitch, the lines without it showing only the *relative* distances of sounds. (125)

CLISSUS: The hidden specific power contained in all things; the life-force which in vegetables mounts from the roots into the trunk, leaves, flowers, and seeds, causing the latter to produce a new organism. (131) See **LIFE FORCE**

CLOSE HARMONY: Harmony produced by drawing the parts which form it closely together. (125)

CLOUD CHAMBER: See **WILSON CLOUD CHAMBER; BUBBLE CHAMBER.**

C-MESSAGE NOISE MEASUREMENT FILTERS: C-Message Weighting and C-Message Notch filters provide the overall frequency response characteristic specified by Bell System Technical Reference 41009 for telephone message circuit noise measurement.

COELOUS: Clothing the visceral cavity. (121)

COHESION: "Cohesion is electromagnetic negative attraction." See (1) page 302; also (6) page 179. Cohesion increases as molecular motion decreases. Also called molecular magnetism. See **ACCELERATING DISSOCIATION, MOLECULAR MOTION, MAGNETISM**

COHESION: "Cohesion is **SYMPATHETIC NEGATIVE ATTRACTION**. It is the negative, vibratory assimilation, or aggregation, of the molecules, acting according to the density or compactness of the molecular groupings on their structures. The differing character of the molecular densities, or molecular range of motion, represents differing powers of attraction. The lower the range of motions on the molecular vibrations of these structures, the greater is the attractive force that holds them together; and vice versa." pg 272(1)

This is also a form of attraction. Keely states cohesion is sympathetic negative attraction, its degree corresponding to the character of the molecular density. The differing powers of attraction represent differing molecular ranges of motion; the less the molecular vibratory range, the greater the cohesive force and vice versa. Elsewhere he states: "Cohesion is electromagnetic sympathetic attraction." He classed *molecular cohesion* as the dominant order of the electric stream, in other words, the resultant from the polar current of the individual molecules, and says that the negative attractive property of the molecules, causing their combination in crystalline aggregates, is simply another phase of cohesion. "If the sympathetic negative polar stream was cut off from the earth the individual molecular neutral centers would float away into space like a swarm of bees." The solidarity of matter is, then, caused by the polar stream, which acts as the medium of attraction. The juxtaposition of unit-matter causes the ethereal atmosphere

to become confluent and this polar stream flows through this ethereal atmosphere. The combination of all the molecules in the earth-mass causes a certain degree of confluence of all their ethereal atmospheres and this confluence constitutes the dynasphere of the earth, with the polar stream flowing through this dynasphere. "If a disc of proper proportions of silver, gold and platinum were used with the Trexar in connection with a "negative focalizer" (an accessory used in his magnetic engine, which he also calls his "polar radiator") the alloyed disk would exhibit high induced cohesion by adhering to this focalizer with such affinity as to become inseparable from it, notwithstanding any force which might be mechanically applied to pry them apart." (11) See **MOLECULAR MOTION, VAN DER WAAL, NEUTRAL NEGATIVE ATTRACTION, GRAVITATION DIFFERENTIATION**

COINCIDENT ACTION: "Differentiation of mass, *i.e.*, discordant conditions, produce negatization to coincident action." (1). Refers to "synchronization of activity" or "synchronicity" as it is called today. See **SUMMATION TONES, DIFFERENCE TONES, LAW OF SUPER-POSITION, BEATS, LAWS OF BEING**

COINCIDENT CHORD: See **SYMPATHETIC TRANSMISSION, CHORD, HARMONIZATION**

COLD: See **RADIATION-CELESTIAL-SYMPATHETIC**

COLD AIR: Cold air is negatively charged as opposed to the sun. See **POSITIVE, TEMPERATURE**

COLD TRAP: [Astronomy] A round flat disk with a hole in its center. A spatial filter. The disk is generally cooled with liquid nitrogen to absorb heat while light passes through the center hole for observation.

COLD WATER STANDS: An arrangement of piping and brackets which are installed on a machine foundation at various locations for the purpose of hot alignment measurements. Proximity probes observing exposed shaft areas or targets on the machine casing are attached to the brackets which (through circulation of water) provide a thermally stable reference for the alinement measurement. (100)

COLOPHONY: The gum used for making the hair of bows rough, so as to set the strings freely into vibration. (125)

COLOR: The property of quarks that allow them to be arranged in ways that seem to violate the Pauli principle. (116)

COLOR: "Each body, each activity, each soul-entity vibrates better to this, that or other color... Colors are naturally the spiritualization of tone or sound..." (2) 288-38. See **SOUND-COLOR, SPECTROSCOPY**

"Colors, to be sure, will often affect the body." (299-1)(2)

"In those things that pertain to correlation of the spiritual or soul forces of the entity with its activities in colors, and inharmonious relationships: the tonal numbers are in F and C, while the colors should be purple -- which denote the royalty of the associations and make for an influence in the vibrations about the entity. And this, with violet, should be about the body when there is any disorder in the vibrations in the body; for the effect these have upon the relationships between the physical, mental and soul-developing forces ...would give strength to the activities in relationship with the body." (324-1) (2)

"Colors will also find an influence ... especially those not too severe, but the violet, ultra-violet, shades of green, of mode (mauve?) and pink. Though the others may make for a rigor oft in the entity, the delicate shades -- or those which may be termed the spiritual -- will influence the entity. When illness were to come about, soft music and the lighter shades or tones will quiet, where medicine would fail ... (may have stage or politics for vocation). In these fields the entity will gain the most; but the developing will come for the soul, for the spiritual portion, through music ... awakenings through color and song, and especially dirge..." (773-1) (2)

"Never have things mauve about the body, nor much purple. Rather the blue and pink, delicate shades; and shades of white and green. These will make for a much more even temperament and bring environs of greater strength." (1958-1) (2)

"By color certain activities are also symbolized, - for instance, black indicates the whole combination of all. For, to material interpretation, white is the absence of color, black is the combination of them all. The dark blue indicates awakening; purple, healing; white, purity; gold, attaining. All of these and their varied shades indicate the activity; this applying to the stars as well as the sun or moon. The sun indicates strength and life, while the moon indicates change - and in one direction indicating the singleness of that activity through an individual experience, - the variations being indicated by the variations in color. Star, - the white, purity; the five-pointed, the whole senses of man indicated as attained to activity - the colors showing the variation; the forms of six, seven or eight pointed indicating the attainments, - as do the seven stars in a figure indicate the attaining to the seven particular centers in the body." (5746-1)(2)

[2533] "You have more violet in your aura than anyone in the room. Violet always indicates the seeker, the searcher for something. You have more of than gray, blue, opal, white or pink. A great deal of pink or coral in an individual's aura indicates material-mindedness." (83)

MAE ROBERTS: "You have a great deal of the shades of blue, some violet, and a little pink. So you are very definite in what you think, and in the things

you do. You know where you are going, or think you know." (83)

[641] "You have a great deal of blue, a great deal of gray - because you easily become discouraged at times. You go very much up and down; you will fly off the handle or fly on the handle just about as easy." (83)

[1709] "You have a great deal of rose, and it becomes a very pretty aura. You judge most things by the material results that you get. I don't mean that you haven't any spirituality, but there is more of rose in your aura than the other colors. It changes, as rose would - or in coral - the changes sort of dash in and out. You smear it over, and then you streak it white and smear it over; then there's a streak of blue and smear it over. That's the way you work." (83)

[369] "You have a great deal of violet, pink and white. The white means purity, always. Yours runs up and down, so you are rather temperamental. Everything to you must be very definite, must be very sure, with a basis that is sound." (83)

[1012] "You have some blue and some gray; quite a bit of purple, but your purple goes in great rolls. You have periods in which you go after a thing and you know where you are going, and then you'll have periods when you doubt whether you are going any where or not. Then there will come gray shadows, with rose." (83)

"We will find that colors influence the entity a great deal more, even, than musical forces in their tone, or the color in music. Drab colors and certain greens have an effect upon the entity that is almost such as to bring illness in the physical body; while purples or violets or shades of tan bring an exultant influence -- tending to bring building influences to the entity." (482-124?) (2) See AURA CHART

COLOR CHART:

color planet affliction	musical interpretation
Red	Do
Mars	Force
Nervousness	
Vigor	Egotism
	Energy
Orange	Re
Sun	Thoughtfulness
Laziness	
Consideration	Repression
Yellow	Mi
Mercury	Health
Timidity	
Well-being	Weakness of
	Friendliness
Will	
Green	Fa
Saturn	Healing
Helpful	Mixed with Yellow -
	Deceit
Blue	Sol
Jupiter	Spiritual
Struggle	

Artistic	Melancholy			
Indigo	La	Venus	Seeking Religious	Selfless Heart & Stomach Trouble
Violet	Ti	Moon	Seeking Religious	Heart & Stomach Trouble

(73)

COLOR ON THE GROWTH OF ANIMALS, INFLUENCE OF: "That the different colors of the spectrum have an influence on vegetation has long been known. Plants grown under green glass soon die; under red glass they live a long time, but become pale and slender. Mr. Yung, of the University of Geneva, has placed the eggs of frogs and fishes in similar conditions, and found that violet light quickens their development; and blue, yellow, and light also, but in a lesser degree. Tadpoles, on the contrary, die sooner in colored light than in white light. As regards frogs, Mr. Yung has ascertained that their development is not stopped by darkness, as some observers have supposed, but that the process is much slower than in the light." (71)

COLOR: Colour. A term variously employed in medieval treatises on music to represent: a repetition of a sound in part music; purity of tone; a movement of the voice from the part; an alteration of rhythm by different voices; a discord purposely introduced for the sake of variety. (125)

COMBINATION TONES: See **RESULTANT TONES**

COMMA: The small interval between a major and a minor tone, that is whose ratio is 8:9 and one whose ratio is 9:10. The ratio of a comma is therefore 80:81. A Pythagorean comma is the difference between the note produced by taking 7 octaves upwards and 12 fifths. (125) See **KOMMA**; **TEMPERAMENT**; **INTERVAL**

COMMA: The ratio of 80:81 - not an interval, but a fraction of an interval. (8) See **KOMMA**; **TEMPERAMENT**

COMMON CHORD: A note accompanied by its major and minor 3rd and perfect 5th. (125)

COMMUTATING FILTER: A clocked, switched-capacitance digital filter that uses periodic signal sampling techniques to synthesize discrete approximations of all the classic analog filters.

COMPASS: The whole range of sounds capable of being produced by a voice or instrument. (125)

COMPATIBILITY: The relationship between plastics. (102)

COMPENSATION: See **RUNOUT COMPENSATION**. (100)

COMPLEMENT: The interval which must be added to any other interval, so that the whole shall be equal to an octave; the complement of a 3rd is a 6th; that of a 4th, a 5th; of a 5th, a 4th; and so on. It will be seen

that the intervals are always considered as overlapping. (125)

COMPLIANCE: Compliance describes the amount of force that must be applied to the stylus of a phono cartridge to deflect the stylus a given distance. Compliance is expressed numerically - for example, 15×10^{-6} cm/dyne. This means that if 1 dyne (a basic unit of force) is applied to the stylus, it will be deflected one 15-millionth of a centimeter. When comparing cartridge specifications, make the first number - the one before the multiplication sign - your basis for comparison. The higher the number, the greater the compliance. Higher-compliance cartridges can be used only in precision tone arms. (103)

COMPONENTS: Components are the basic units of a sound system: turntable, tuner, amplifier, and speakers. The term is sometimes used to distinguish high-fidelity from low-grade sound equipment. (103)

COMPOUND: For Keely's definition, See **ELEMENT**.

COMPOUND CHORDS: "The system of arranging introductory etheric impulses by compound chords, set by differential harmonies, is one that the world of science has never recognized, simply because the struggles of physicists combating with the solution of the conditions governing the fourth order of matter have been in a direction thoroughly antagonistic to the right one. It is true that luminosity has been induced by chemical antagonism; and, to my mind, this ought to have been a stepping-stone toward a more perfect condition than was accepted by them; but, independent of what might not, be an aid toward its analysis, the bare truth remains that the conditions were isolated, robbed of their most vital essentials, by not having the medium of etheric vibration associated with them..." (Keely)

COMPOUND INTERETHERIC: "The compound interetheric or seventh subdivision actuates sympathetic polarization to produce action and sympathetic depolarization to neutralize it, in the body as well as in matter. Polar and depolar differentiation result in motion. The compound interetheric is the soul of matter, from which all forms of matter receive their introductory impulse." (11)

COMPOUND INTERETHERIC - SEVENTH SUBDIVISION OF MATTER: This is the ultimate plane of matter which Keely's subdivisions reached through his system of vibratory disintegration. It is the neutral center itself. This infinitely small particle, so minute that no mechanical means at man's command will ever be able to measure its dimension, is the foundation of the physical Universe we see all about us. The one compound interetheric point or neutral center of the earth controls all the earth's motions of rotation and revolution, and attracts the sympathetic flows that give us light and heat. The neutral center probably has the essentials of mass in the highest degree, since affinity for this neutral center

on the part of the other subdivisions gives rise to the various phenomena of mass which we can sense. The degree of mass is dependent on the affinity of the component particles for the neutral center, and the greater this affinity, the greater the mass. The vibratory condition of the neutral center, however, is not known. It is very likely that it transcends anything we will ever be able to sense in any form of matter recognized by means of our senses, since it displays affinity for all vibrations, dividing them into harmonic ratios. Itself unmoved, it moves all things. Rotation about itself as an axis is caused by the exercise of its inherent controlling tendency on matter. The key to its action may possibly consist in the periodic assimilation and radiation (or repulsion) of its exterior. Or it may act through the mysterious friction or differentiation between the incoming celestial streams and the outgoing radiant streams from itself - "solar tensions against terrestrial condensations." At any rate, this neutral center certainly has intense affinity for radial lines of force and very likely has also affinity or attraction for the nuclei of planes arising from these same lines of force as each causes rotation. Keely stated his belief that even more tenuous subdivisions than the seventh, the neutral center, would ultimately be discovered. But suppose we go beyond the neutral center, and by some means unknown, uncover its causation? That field of causation is within, and we arrive only at a new center of force, only proving that by our first analysis we had not arrived at the real center at all. In other words, this neutral center is absolutely defined by the atomic theory - THAT SMALLEST PARTICLE OF MATTER - indivisible, indestructible. Such is the neutral center. (11)

COMPOUND INTERVALS: Intervals greater than an octave, as opposed to simple intervals which are less than an octave. (125)

COMPOUND VIBRATIONS: "The rate of vibration of the rod as a whole is to the rate corresponding to its first division nearly as the square of 2 is to the square of 5, or as 4:25. From the first division onward the rates of vibration are approximately proportional to the squares of the series of odd numbers 3, 5, 7, 9, 11, etc. Supposing the vibrations corresponding to this and to its successive divisions would be expressed approximately by the following series of numbers:

36, 225, 625, 1225, 2025, etc.

Page 162 of (6) for illustration. See **HARMONICS, LAWS OF BEING**

COMPOUND VIBRATORY NEGATIVE MEDIUM: A medium composed of several negative (terrestrial) elements. See **ETHER, LAWS OF BEING**

CONCENTRATION: Quantity of a substance contained in a unit quantity of sample. SI units: kg/m³, mol/m³. (5)

CONCHA: A trumpet in the conventional form of a shell fish; Triton's horn; a conch. (125)

CONCORD: See **HARMONY**

CONCORDANCE: If concordance is established, even between unlike states - gases with liquids, liquids with solids, solids with gases - the structural conditions can be entirely adverse. The neutral center set up by sympathetic negative attraction always controls the entire volume of its sphere, be that volume homogeneous or complex. Certain orders of vibration can equate all differential mass antagonism. (11)

CONCORDANT ATTRACTIVE STREAM: The same as **GRAVITY** (qv).

CONDENSATION: See **DISINTEGRATION, GRAVITY, GRAVITATION, NEGATIVE AGGREGATION**

CONDENSATION OF MATTER THROUGH VIBRATORY INDUCTION: Under the influence of the focalizing chord, the sixth of the mass chord, all gases condense to masses of much less extension. In producing vacuums, Keely merely caused concentration of the gases, etc., within his sphere, the varying degrees of vacuums produced being caused by the relative tenuity of the matter contained, the greater the activity, the more marvelous the properties and the greater the degree of condensation temporarily possible through the focalizing induction. The varying degrees of concentration, of course, caused varying vacuums. (11)

CONSERVATION LAWS: Any observed regularity in nature which indicates that a particular quantity (electrical charge, for example) is the same before and after a reaction. (116)

CONSONANCE: A sound which is stable and which does not have the urgency to resolve is called a consonance. This term refers to chords as well as to intervals. The consonant intervals are: all perfect intervals (except the perfect fourth in certain instances) and the major and minor thirds and sixths. They are divided into two groups, the perfect and imperfect consonances, their placement being determined by their degree of stability. The perfect consonances are the perfect unisons, octaves, fifths, and fourths (the fourth is considered a perfect consonance only when there is a third or perfect fifth below it). The imperfect consonances are the major and minor thirds and sixths. (13) See **HARMONY**

CONSONANT: Concordant. (125)

CONSONANT INTERVAL: See **INTERVAL**

CONSORT: 1) The sounds produced by the union of instrumental tone. 2) To sound together, to form agreeable sounds by combination. 3) To form a concord. (125)

CONSTANT BANDWIDTH FILTER: A band-pass filter having a fixed frequency bandwidth regardless of the center frequency. (100)

CONSTANT PERCENTAGE FILTER: A band-pass filter whose bandwidth is a fixed percentage of the center frequency. Also, constant Q filter. (100)

CONTINUITY: Unbroken sequence. (8)

CONTOURED HORN: A horn whose frontal surface is machined to conform to the workpiece surface engaged. (102)

CONTRA: Against. In compound words this signifies an octave below. (125)

CONTRARY MOTION: Melodies or chords preceding in opposite directions. (125)

CONVERTER: An electro-mechanical assembly in a protective housing. (102)

COORDINATES: A set of points used to locate a point along a line or in space. (75)

COPRIME: Two or more integers are coprime when they have no common factor other than unity. (14)

CORNER FREQUENCY: Also known as cutoff and 3dB break frequency. The frequency at which the passband/stopband amplitude response of a filter decreases/increases by 3dB from a reference passband/stop-band value.

CORNET: A modern brass instrument of the trumpet family, but having valves or pistons by means of which a complete chromatic scale can be produced. (125)

CORPORA SUPERCOELESTIA: Forms that can only be seen by the highest spiritual perception; they are not ordinary astral forms, but the refined and intelligent elements of the same. (131)

CORPUSCLE: "In the absence of any disruptive influence, surface tension acts to pull a liquid into spherical form, that is, a form with minimum surface energy." (3) Editor's note: Keely would say the centralization of the negative attraction holds the molecular volume to the least possible aggregated volume. See **LUMINIFEROUS ETHER, SOUND, ETHER CORPUSCLES, PITCH, ATOMIC THEORY-KEELY'S**

CORPUSCLE: See **PROTOPLASM, CIRCLE, MATTER, SPHERE, SPACE, SYMPATHETIC OUT-REACH**

CORPUSCULAR ACTIVITY: "Corpuscular activity represents the out-flow of the ether from the luminiferous toward neutral centers of aggregation, revealing the connective link between mind and matter." (11)

CORPUSCULAR ASSOCIATION: See **MOLECULAR ASSOCIATION**

CORPUSCULAR MATTER: Force and energy is accumulated and held latent in interstitial space by corpuscular aggregation, otherwise the progressive disintegration of water could not induce increased volume and pressure. The sympathetic latent power is held in interstitial corpuscular aggregation by the incalculable velocity of the molecular etheric capsule and the atomic etheric capsule, which rotate at billions of times per second. "Corpuscular activity represents the outflow of the ether from the luminiferous toward neutral centers of aggregation, revealing the connecting link between mind and matter. This luminosity has no thermal accompaniment, yet all thermal conditions evolve from etheric vibration." The mighty forces latent in corpuscular matter are held in oscillating vortex action by this latent power exchanging sympathetically with the celestial radiating stream - the inflow attracted by receptiveness and the outflow impelled by expressiveness - giving light, heat, magnetism, electricity, each in its different order, by positive radiation. (11)

CORPUS INVISIBLE: The invisible body; the animal soul (Kama-rupa); the medium between material forms and the spiritual principle; a substantial, ethereal, but under ordinary circumstances invisible thing; the lower astral form. (131) See **ASTRUM; ASTRAL BODY; SOUL; AURA**

CORTEX: Uppermost, grey layer in the brain. (121)

CORTI'S ORGAN: See **EAR**

COSMIC: "The COSMIC is this supreme intelligence in which are actually incorporated all the forces, all the realities which are manifested to us in the many phenomena which make up our experiences. The COSMIC, then, is the unity of all reality. It is at the same time the material and physical world, and what men have come to designate as SPIRITUAL." (15) See **POTENTIAL COSMIC**

COSMIC RAY: "Rays are produced by the force of 'electrostatic repulsion'; they consist of powerfully changed positive particles which come to us from the sun and other suns in the universe. He (Tesla) determined, 'after experimentation, that the sun is charged 'with an electric potential of approximately 216 billion volts, while the electric charge stored in the sun amounted to approximately 50,000,000,000,000,000,000 electrostatic units.' Owing to its immense charge, the sun imparts to minute positively electrified particles prodigious velocities, which are governed only by the ratio between the quantity of free electricity carried by the particles and their mass, some attaining a speed exceeding fifty times that of light." (Tesla)

COSMIC RAYS: Cosmic rays can cause fission as can alpha rays.

COSMIC RAYS: Energetic particles (primarily protons) that are created in stars and enter the earth's atmosphere. (116)

COSMOGONY: The science of the formation of the world. (121)

COSMOLOGICAL THEOREMS: The comprehensive view from the highest point of a monistic interpretation of nature:

1. The universe, or the cosmos, is eternal, infinite, and illimitable.
2. Its substance, with its two attributes (matter and energy), fills infinite space, and is in eternal motion.
3. This motion runs on through infinite time as an unbroken development, with a periodic change from life to death, from evolution to devolution.
4. The innumerable bodies which are scattered about the space-filling ether all obey the same "law of substance"; while the rotating masses slowly move towards their destruction and dissolution in one part of space, others are springing into new life and development in other quarters of the universe.
5. Our sun is one of these unnumbered perishable bodies, and our earth is one of the countless transitory planets that encircle them.
6. Our earth has gone through a long process of cooling, before water, in liquid form (the first condition of organic life), could settle thereon.
7. The ensuing biogenetic process, the slow development and transformation of countless organic forms, must have taken many millions of years - considerably more than a hundred.
8. Among the different kinds of animals which arose in the later stages of the biogenetic process on earth the vertebrates have far outstripped all other competitors in the evolutionary race.
9. The most important branch of the vertebrates, the mammals, were developed later (during the triassic period) from the lower amphibia and the reptilia.
10. The most perfect and most highly-developed branch of the class of mammalia is the order of primates, which first put in an appearance, by development from the lowest prochoriata, at the beginning of the Tertiary period - at least three million years ago.
11. The youngest and most perfect twig of the branch of primates is man, who sprang from a series of man-like apes towards the end of the Tertiary period.
12. Consequently, the so-called "history of the world" - that is, the brief period of a few thousand years,

which measures the duration of civilization - is an evanescently short episode in the long course of organic evolution, just as this, in turn, is merely a small portion of the history of our planetary system; and as our mother-earth is a mere speck in the sunbeam in the illimitable universe, so man himself is but a tiny grain of protoplasm in the perishable framework of organic nature. (121)

COULOMB: The quantity of electricity which passes any point in an electric circuit in 1 second when the current is maintained constant at 1 ampere. The coulomb is the unit of electric charge in the mksa system.

COUNTERPOINT: The term "counterpoint" in its broadest sense may be defined as "the art of adding one or more parts to a given melody"; in its more limited sense, as, "the art of harmonizing a theme by adding parts which shall be in themselves melodious". (125)

COUPLER: See **HORN**. (102)

COUPLING: The surface contact between two components. (102)

COUPLING BAR: A nodal mounted resonant section. (102)

COVERED STRINGS: Strings of silk, wire or gut, covered with a fine wire by means of a machine, by a process technically termed string-spinning. Covered strings are used for pianofortes, violins, violoncellos, guitars, etc. the wire covering, by adding weights and strength to the string, makes it slower of vibration, while, on the other hand, it is more elastic than an uncovered string of the same diameter. (125)

CO-VIBRATION: See **RESONANCE**.

CRANIOTA: Animals with skulls. (121)

CREATION: See **FORCES-ATOMIC**, **ATOMIC THEORY**, **E**

CREATIVE FORCES: "For, only that which is creative or constructive in its nature draws, impels, attracts, or calls upon the influences from without that are of the creative nature." (2) (2156-1) See **FORCE-ONE**

CREST FACTOR: Defines the ratio of the peak value of a signal to the RMS value. As the vibration becomes more impulsive, or more random, the crest factor increases. This simple relationship is easily calculated with a simple vibration meter equipped with RMS and peak facilities. When making wide-band measurements on a machine's bearing housing, an increase in a single vibration component caused by a faulty bearing may be undetectable in the RMS measurement, but might be indicated by an increase in the crest factor. Hence by monitoring the growth of the crest factor, it is possible to predict a break-

down or element fault. Another example of the utility of crest factors can be found in structural testing techniques. The crest factor of the input signal to the structure can reveal important information about the excitation. If the crest factor is very high, as can be the case with hammer excitation, the structure may be driven into non-linear dynamic behavior. A high crest factor also indicates that the input may not contain sufficient energy to obtain a good signal-to-noise ratio. On the other hand, a high crest factor is an indication that the input has a wide frequency range. (70)

CREST FACTOR (DEFECT RATIO): For a signal waveform, the ratio of peak amplitude of the signal to the RMS (root mean square) amplitude of the same signal. In the analysis of signals from rolling element bearings, defect ratio is a term which has been applied as a general indicator of the overall condition of the bearing. (100)

CRITICAL MACHINERY: That group of rotating equipment which is absolutely necessary to a major part of the plant process. When critical machinery is not operating, that part of the process is not operating. Machines in this category are usually unspared and are typically monitored continuously. (100)

CRITICAL SPEEDS: In general, any rotor speed which is associated with high vibration amplitudes. Often, a rotor speed which corresponds to a natural frequency of the system. In the case of synchronous vibration caused by unbalance, it is more accurately called balance resonance. (100)

CRITICAL SPEED MAP: An XY diagram used in rotating machinery design as a tool to evaluate the effect of changes in bearings, supports, and pedestal designs on system natural resonance frequencies. The X axis represents bearing stiffness, and the Y axis represents shaft rotative frequency. (100)

CROOKS: Short tubes either straight or curved, adapted for insertion between the mouthpiece and the body of the horn, trumpet, or cornet, for the purpose of altering the key. (125)

CROSS AXIS SENSITIVITY: The ratio of change in the signal output of a seismic transducer to an incremental change in a given stimulus along any axis perpendicular to the sensitive axis. (100)

CROSSOVER NETWORKS: Crossover networks are used in speakers to separate the treble from the bass in order to feed high-frequency tones to the tweeter and low-frequency tones to the woofer. The simplest type of crossover is a high-pass filter, which merely keeps the bass notes out of the tweeter, thus preventing tweeter damage. A more complex crossover, consisting of one or more coils and capacitors, also keeps the highs from entering the woofer, where they may be distorted. The frequency above and below which the frequencies are routed to the woofer and the tweeter is called the *crossover point*. A well designed crossover network must be matched to the

characteristics of the speakers so that a smooth transition will occur at the crossover point. For speaker systems with a separate mid-range speaker, a more elaborate three-way crossover network is used to divide the total frequency range into three portions - bass, mid-range, and treble - each going to its appropriate speaker. (103)

CROSS TALK: Interference or noise in a given transmitting or recording transducer or channel which has its origin in another transducer or channel. When using proximity probes, cross talk can occur when the tips of two (or more) probes are too close together. This results in the interaction of the probes' electromagnetic fields. The effect is a noise signal component on each of the transducers' output signals. The frequency of the noise component is the difference (beat frequency) of the two Proximitors oscillator frequencies. (100)

CROSSTALK: Crosstalk is a term originated by telephone technicians to describe interference, between two phone calls on adjacent wires. When applied to audio, crosstalk means that some left-channel signal is leaking into the right channel, or *vice versa*, thereby reducing stereo separation. Commingling of the left and right signals is not wholly avoidable, and is practically unnoticeable if the intruding signal is at least 25 db lower in volume than the signal rightfully belonging to the channel. Crosstalk is most often stated in terms of stereo separation. A separation of at least -25 db (the higher the negative figure, the better) in the specifications of a cartridge, amplifier, or tuner therefore signifies that there will be no audible crosstalk between the channels. (103)

CROTALUM: A rattle, or clapper, used sometimes to mark the rhythm of dancing, in the worship of Cybele. They were generally made of wood, having a loose piece hinged about midway, so that, when shaken in the hand a clattering noise was produced. Instruments of this kind were in use among the ancient Egyptians. (125)

CRYSTAL: [CRYSTAL] A homogeneous solid made up of an element, chemical compound or isomorphous mixture throughout which the atoms or molecules are arranged in a regular repeating pattern. (4)

CRYSTAL CURRENT: [ELECTR] The actual alternating current flowing through a crystal unit. (4)

CRYSTAL DETECTOR: "When an alternating voltage is applied to the combination, it tends to make current flow from the cat whisker to the crystal during the first half cycle. The resistance which the crystal and contact offer to current flow in this direction is low, so the current is able to flow through easily. On the next half cycle, the voltage is reversed and tends to send current in the opposite direction. The detector contact offers a very high resistance to current flow in this direction, so very little current is allowed through. The action is repeated for each cycle.

It is the difference in strength of these two currents which determine how well or how poorly the crystal operates a detector. A good crystal will almost entirely eliminate the flow of current in one direction." (16)

CRYSTAL DIFFRACTION: [SOLID STATE] Diffraction by a crystal of beams of x-rays, neutrons, or electrons whose wavelengths (or deBroglie wavelengths) are comparable with the interatomic spacing of the crystal. (4)

CRYSTAL FIELD THEORY: [PHYS CHEM] The theory which assumes that the ligands of a coordination compound are the sources of negative charge which perturb the energy levels of the central metal ion and thus subject the metal ion to an electric field analogous to that within an ionic crystalline lattice. (4)

CRYSTAL HARMONIC GENERATOR: [ELECTR] A type of crystal controlled oscillator which produces an output rich in harmonics (overtones or multiples) of its fundamental frequency. (4)

CRYSTAL LATTICE: A lattice from which the structure of a crystal may be obtained by associating with every lattice point an assembly of atoms identical in composition, arrangement, and orientation. (4)

CRYSTALLINE ANISOTROPY: [SOLID STATE] The tendency of crystals to have different properties in different directions; for example, a ferromagnet will spontaneously magnetize along certain crystallographic axes. (4)

CRYSTALLINE DOUBLE REFRACTION: [OPTICS] The splitting which a wavefront experiences when a wave disturbance propagates through an anisotropic crystal. (4)

CRYSTALLINE FIELD: [SOLID STATE] The internal electric field in a solid due to localized charges, especially ions, inside. (4)

CRYSTALLOMAGNETIC: [SOL STA] Pertaining to magnetic properties of crystals. (4)

CULTUR-KAMPF: The struggle with the Church of Rome in Germany in the eighteen seventies. (121)

CURRENT: Herein confined to a part of the triune streams, as "a current is part of every stream of water." *etc.* See **LAWS OF BEING**

CUTOFF FREQUENCY: Used when describing the characteristics of high-pass or low-pass filters to indicate the specific frequency beyond which the filter is supposed to attenuate all frequencies. (69)

CYCLE: One complete sequence of values of a periodic quantity. (100)

CYCLES: "To be sure, there are those cycles when

there will be periods the body will not feel so well. For, those tendencies still arise for the body to respond to old disorders. But keep close to those applications suggested." (2791-2) (2)

CYCLOTRON: A device that accelerates protons to high energies. (116)

"...have ye not heard how that constantly there is the change, and that the body has in a seven-year cycle reproduced itself entirely? No need for anyone, then, to have ANY disturbance over that length of period, if - by common sense - there would be the care taken. But if your mind holds to it, and you've stumped your toe, it will stay stumped! If you've got a bad condition in your gizzard, or liver, you'll keep it - if you think so! But the body - the physical, the mental and spiritual - will remove same, if ye LET it and not hold to the disturbance! (257-249) (2)

CYLINDER EXPANSION: See **CASING EXPANSION.** (100)

CYLINDRICAL ROLLER BEARING: A rolling element bearing which has cylindrical shapes for both races and all rolling elements. In this way, there can be limited, free axial movement of the shaft relative to the bearing housing. This bearing is useful at high speeds, and in a double row configuration it will provide maximum radial rigidity. (100)

CYMBALS: Musical instruments of percussion, consisting of two metal basins, which are set in vibration by being clashed together. The shape of the cymbals varies, from that of the actual form of a cup or basin to an almost flat plate. A pair of ancient Egyptian cymbals are in existence; they are about five inches in diameter, and are made of a mixture of copper and silver, and in outline are identical with those now used by modern Egyptians. (125)

CYMATICS: The technology of the effects of applied sound to the human body from a therapeutic approach. Developed by Dr. Peter Manners and having its roots in radionics and sound. Man has long known that sound has the power to order and re-order physical matter to hold or create form. The conception of "form" in organically active nature must not be limited merely to that of the body's spatial outline. This was explained in Ruskin's definition of the spiritual principle active to plant-formation as "the power that catches out of chaos, charcoal, water, lime, and what not, and fastens them down into a given form."

Besides the external order of matter revealed in space form, there exists also an inner qualitative order expressed in a body's chemical composition. Upon this chemical order is based all that we encounter as color, smell, taste, etc., of substance, as well as its nourishing, healing or harmful properties. Accordingly, all these parts of an organism both in plant kingdoms and within the higher organisms have a certain inner material order, apart from their characteristic space form and structure. The one is never present without

the other and are in some way causally connected. We have therefore deduced that sound is the formative power of shape and form in space.

Now let us look at chemistry which activates the shape and form. We must be aware that by the word chemistry in this connection we mean something much more far reaching than the chemical reactions which we can bring about by the reciprocal affinity of physical substances however complicated these may be. Where the forces of sound and chemical action take possession of matter form within it will produce form of a different kind.

A harmonic frequency computation corresponding to the natural harmonic of the structure can be transmitted by means of the application into both the meridian point and the affected area. This will result in a feeling of relaxation in the area and easing of pain. It is therefore possible to administer even into highly inflamed areas or damaged or bruised conditions. Fractures etc. can all be effectively treated giving ease and comfort, and at the same time stimulating the healing and regenerative condition of the structure and organ.

CYTULA: The stem-cell or embryonic cell. (121)

D

D: 1) The first note of the Phrygian, afterwards called Dorian, Mode.

2) The second note of the normal scale.

3) The scale having two sharps in its signature.

4) The name given to a string tuned to D, *e.g.*, the third string of the violin, the second of the viola and of the violoncello.

5) The name of a clef in old mensurable music. (125)

DADOUCHIA: Dadououchos (from torch, to have), procession with flaming torches: During the ceremonies of initiation to the mysteries. (81)

DALETH: The 4th Hebrew letter, Daleth (D), means a door or gateway. An early form of this letter was a triangle, the shape of a tent-door, which form is preserved in Greek in the shape of the letter Delta. As we study the accounts in various Sacred Writings of buildings said to have been constructed under Divine direction, according to the various Bibles of the world, we find that each of them had but a single door; this fact is regarded by Kabbalists as a matter of profound significance, and Occultists of many schools say that it refers definitely to a sole method of initiation into the Greater Mysteries. Daleth is mystically connected with the soul of the universe. On a purely physical plane it denotes the womb or matrix throughout nature; it also is associated with ideas of strength and grandeur. (72)

DALITZ PLOT: [Particle Physics] Pictorial representation in high-energy nuclear physics for data on the distribution of certain three-particle configurations. Many elementary particle decay processes and high-energy nuclear reactions lead to final states consisting of three particles (which may be denoted by a, b, c, with mass values m^a , m^b , m^c). Well-known examples are provided by the K-meson decay process. (3) See **PI MESON**, **ATOMIC TRIPLETS**

DAMENISATION: The syllables da, me, ni, po, tu, la, be, which Graun employed for the notes of the scale in his vocal exercises. (125) See **SOLMIZATION**

DAMP: 1) On instruments played by plucking the strings, as the harp, guitar, etc., to check the vibrations by placing the hand lightly on the strings. 2) To apply mechanical dampers. (125)

DAMPING: Loss of energy of a vibrator, usually through friction. (75)

DAMPING: As applied to a loudspeaker, describes its ability to come to a complete stop the instant the electrical signal that is being fed into it ceases. In a system with poor damping, the speaker cone will continue to vibrate for a moment after the input signal has ended. This "hangover" blurs musical details. Amplifiers also have a "damping factor," which helps control the speaker. A high amplifier damping factor, usually above 10, is satisfactory for most speaker systems, although some speakers operate best with amplifiers that have lower or higher damping factors. Clarity in the reproduction of complex orchestral passages - particularly those involving heavy percussion - is an indication of good damping characteristics, since good damping contributes to a speaker's transient response. (103)

DAY: Mean sidereal day 23 hr. 56 min. 4.091 sec. Mean solar day 24 hr. 3 min. 56 sec.

DEADBAND: See **HYSTERESIS**. (100)

DECADE: A 10:1 increase or decrease of a range or value, *i.e.*, the ranges from 10 Hz to 100 Hz and 100 Hz to 10 Hz are each a frequency decade.

DECAY: The decrease from maximum charge (potential) of a wave crest. See **ATTACK**

DECAY: Initial fading of sound (after attack). (69)

DECEPTIVE CADENCE: See **CADENCE**

DECIBEL: The logarithmic ratio of the output voltage (V_{out}) to the input voltage (V_{in}) expressed as: $dB = 20 \log (V_{out}/V_{in})$, and may designate either network gain or attenuation.

DECIBEL: abbreviated "db" is the standard measure of loudness. It is a relative measurement, used to compare two different loudness levels. For instance, if a loudspeaker is "5 db down at 40 cycles" (usually written "-5 db"), the sound it produces at a frequency of 40 cycles per second is 5 db softer than the sound it produces at a standard reference frequency - usually 1000 Hz. The smallest readily apparent loudness difference in music is 3 db, though sharp-eared lis-

teners may discern differences as small as 1 db. (103)

DECIBELS: [ACOUSTICS] Ten times the logarithm (to the base ten) of the ratio of two mean square values of sound pressure, voltage, or current. The abbreviation for "decibels" is dB. (85)

DECIMA: A 10th, an interval of a 10th. (125)

DEBYE CONTINUUM: Debye supposed that, in spite of its periodic nature, the crystal lattice can be represented by a continuum. By assuming suitable boundary conditions, he was able to show that there can only be certain modes of vibration for a given body; the situation is much the same as that which limits the number of stationary waveforms that are possible in a string that is stretched between two fixed points. The total number of possible modes in a continuum is really infinite but Debye considered only the $3N$ modes of lowest frequency, N being the number of atoms, since this leads to agreement with the classical expression for the specific heat at high temperatures. (Dulong and Petit's law). (122)

DEFICIENT NUMBER: A number, the sum of whose fractional parts is less than the number itself. (81)

DEFLASHING: The removal of excess material at the part line of the molded part. (102)

DEGATING: The separation of a part from a molded runner assembly. (102)

DEGREE OF A SCALE: A step in the tone-ladder; it may consist of a semitone, a tone, or (in the minor scale) of an augmented tone. (125)

DELAY: The time required for a signal to travel from the input to the output of the filter. Unequal delays for different frequency components can lead to signal distortion similar to that caused by unequal phase shifts.

DENSITY: See **COHESION, MASS, GRAVITY, NEGATIVE ATTRACTION, LAWS OF BEING**

DEPOLAR: Discretely, refers to a single phase vibration or vibratory flow of one phase only, either positive or negative. See **POLAR**

DERIVATIVE: 1) The actual or supposed root or generator, from the harmonics of which a chord is derived. 2) A chord derived from another, that is, in an inverted state. An inversion. (125) See **GENERATOR; INVERSION**

DERSES: An occult exhalation of the earth, by means of which plants are enabled to grow. Carbonic acid gases, etc., as its vehicles. (131)

DESCANT: The addition of a part or parts to a tenor or subject. This art, the forerunner of modern counterpoint and harmony, grew out of the still earlier art

of diaphony or the organum. The real difference between diaphony and descant seems to have been that the former was rarely, if ever, more complicated than *note against note*, whereas descant made use of the various proportionate values of notes. (125) See **DIAPHONY; ORGANUM**

DESCENDING: Passing from a higher degree of pitch to a lower. (125)

DETECTION: Demodulation.

DETECTOR: See **TRANSDUCER**. (100)

DETERMINISM: The system which rejects the liberty of the will. (121)

DETONATION: False intonation. (125)

DETONATORS: The vibrational frequency of the element heat ruptures the associated elements in gunpowder, dissociating them with explosive violence. The heat, a vibrational element, simply acts as a detonator, its vibrational frequency through sympathetic action, increasing the oscillation frequency of the constituent elements in the powder, thereby causing chemical attraction to supersede cohesion, and the result of the combinational effects is the resultant explosion.

Dynamite requires the vibrational frequency of a detonator, as is also true of fulminate of mercury and nitroglycerine, nitrogen iodide, *etc.*, and their increasing sensitiveness to jars or blows is in the order above given. The last one, nitrogen iodide, is the most sensitive explosive known. The jar of a fly's tread as it walks over the dry crystals is sufficient to detonate it. Nitroglycerine will burn in open air when pure without explosion, but if water is present or if it is jarred, it will detonate instantly. Gun cotton will burn in open air without explosion, but if an electric spark from an alternator, or from a coil, which brings the vibrational frequency of heat and electricity into play, only comes into contact with the gun cotton it will detonate violently. Trinitrotoluol can be placed on an anvil and hit with a heavy hammer without exploding. It can stand these jars, but let it come into contact with exploding fulminate of mercury or a detonator of equal violence, and the blow struck on the Trinitrotoluol is sufficient to explode it with terrific energy. All explosives work with a detonating agent, and detonation occurs through the medium of a vibrational element.

Keely's dissociative vibrations are simply the detonators of matter, which resolve the molecules into their constituent ether. The wonderful energy he liberated is simply the latent energy in matter, and if utilized will make the most wonderful, inexhaustible power that has ever been known. (11)

DETERMINATION: The ascertainment of the quantity or concentration of a specific substance in a sample. See **ANALYSIS**. (5)

DEUTERIUM: [CHEM] The isotope of the element hydrogen with one neutron and one proton in the nucleus; atomic weight 2.0144. Designated D, d, H₂, or 2H. (4) See **HEAVY WATER**

DEUTERON: [NUC PHYS] The nucleus of a deuterium atom, consisting of a neutron and a proton. Designated d. Also known as deutron. (4)

DEUTON: See **DEUTERON**

DEVACHAN: An Eastern term. A subjective state of happiness of the higher principles of the soul after the death of the body. It corresponds to the idea of Heaven, where each individual monad lives in a world which it has created by its own thoughts, and where the products of its own spiritual ideation appear substantial and objective to it. (131) See **ANYO-DEI**

DEVELOPMENT: The elaboration of a given theme the rules of art. (125)

DIAGRAM: Table, or model giving a general survey of all the sounds of a system. (81)

DIAMAGNET: [Electromagnetism] A substance which is diamagnetic, such as alkali and alkaline earth metals, the halogens, and the noble gases. (4)

DIAMAGNETIC: [Electromagnetism] Having a magnetic permeability less than 1; materials with this property are repelled by a magnet and tend to position themselves at right angles to magnetic lines of force. (4) See **PARAMAGNETIC**

DIAMAGNETIC FARADAY EFFECT: [Optics] Faraday effect at frequencies near an absorption line which split due to the splitting of the upper level only. (4) See **PARAMAGNETIC FARADAY EFFECT**

DIAMAGNETISM: [Electromagnetism] The property of a material which is repelled by magnets. (4)

The diamagnetic receding movement in the metal silver when brought close to the poles of a magnet operated by alternating current, is caused by "interatomic bombardment" of some 800,000 "corpuseular percussions" per second, or, expressed more exactly, by "intersympathetic vibrations" (non-operative on molecular, intermolecular or atomic sympathy, but penetrating within these to the interatom) or "interatomic bombardment". (11)

DIAPASON: 1) An octave. 2) The name given in this country to the most important foundation stops of an organ, termed in other countries more properly *Principal*. 3) Fixed pitch; *normal diapason*, a recognized standard of pitch. (125) See **PITCH**

DIAPENTE: The interval of a 5th. (125)

DIAPHONIC: The same as the Dominant current.

DIASCHISMA: An approximate half of a limma. (125)

DIATEMA: An interval. (125)

DIATONIC: 1) One of the three genera of music among the Greeks, the other two being the chromatic and enharmonic. 2) The modern major and minor scales. 3) Chords, intervals, and melodic progressions, etc., belonging to one key-scale. (125)

DIATONIC CHORD: A diatonic chord is one having no note chromatically altered. (125)

DIATONIC INTERVAL: A diatonic interval is one formed of two notes of a diatonic scale unaltered by accidentals. (125)

DIATONIC MELODY: A diatonic melody is one not including notes belonging to more than one scale. (125)

DIATONIC MODULATION: A diatonic modulation is one by which a key is changed to another closely related to it. (125)

DIATONIC SCALE: The scale of eight tones, the 8th being the octave of the first. Other scales are major scale and minor scale, which are also classed as diatonic. (11)

DIATONIC NINTHS: On the diatonic ninths, atomic vibration reaches 900,000,000. On the Dominant Etheric Sixths, 8,100,000,000. On the Inter-etheric ninths, 24,300,000,000 all of which can be demonstrated by sound colors. See **RATES OF VIBRATIONS, CHARTS, LAWS OF BEING**

DIAPHONY: Diaphony signified in Greek music discordant sounds or dissonance, as opposed to symphony consonance. But the terms came afterwards to be applied to those first attempts at the harmonic combination of voices, and polyphony, which may be looked upon as the first life-pulse of modern harmony. It is indeed strange that the term diaphony should have been selected for these early efforts, for, crude and painful as they are to our ears, they gave undoubted pleasure to those who first listened to the; moreover, diaphony was well known to signify dissonance, intervals being divided into symphonic and diaphonic, the former including 4ths, 5ths, and octaves (and their compounds); the latter 2nds, 3rds, 6ths, and 7ths. The earliest forms of diaphony were of four kinds: when the organum was added to the "principia" or subject *throughout* at the interval 1) of an octave, 2) of a fifth, 3) of a fourth, 4) at an octave above *and* below. (125)

DIELECTRIC BIOCOSMIC RADIATION: Discovered by Oscar Brunler circa 1940. The atom's neutron radiates not an electromagnetic but a dielectric biocosmic radiation. He contends that the wave length of the radiating energy emitted from the neutrons depends on the kinetic energy, *i.e.*, their mass and velocity. (90)

DIESIS: The smallest interval in each type: consequently a quarter-tone in the enharmonic type and a half-tone in the other two (the diatonic and the chromatic). (81)

DIESIS: Originally the name of a semitone, called afterwards a limma. In later writings, applied to a third or quarter of a tone in the enharmonic and chromatic scales. The modern enharmonic diesis is the interval represented by 125:128; that is, the difference between three true major thirds and one octave. (125) See **SEMITONE**

DIFFERENCE TONES: "Were discovered by Sorge in 1745 and again independently by Tartini in 1754. By sounding two tones a fifth apart, the tone an octave below the lower note is resonated. It is in general true that when any two or more pure tones which are sounded simultaneously happen to be harmonics of the same fundamental note, then the ear adds this fundamental note and many of its harmonics, of its own accord - a result of tremendous importance in all branches of pure and applied acoustics. If the pure tones are all the odd-numbered harmonics of a fundamental note, then the ear of its own accord adds all the even harmonics. If the two pure tones differ only slightly in frequency, (see **ACCELERATING DISSOCIATION**) then their "difference tone" has the same frequency as the BEATS, so that as the two original tones approximate to one another, their difference tone degenerates into beats, while their **SUMMATION TONE** approaches to their second harmonic. Difference tones are usually concordant, summation tones discordant, with the tones that produce them; these being the **KEY NOTE** or **ROOT**. These two tones are always present simultaneously in all tones, the Difference tones being louder and therefore Dominant of the two. Difference tones can be used to create unlimited Physics depth of tones, ultimately appearing as beats when the two original tones are brought more nearer coincidence. Difference tones are positive and **DOMINANT**, summation tones are Negative." (6) See **ACOUSTICS § 17, 18; BEAT, COINCIDENCE, RESONANCE, KEYNOTE, LAW OF SUPERPOSITION, See especially RESULTANT TONES, LAW OF THE TRIANGLE, ETC.**

DIFFERENTIAL EXPANSION: The measurement of the axial position of the rotor with respect to the machine casing at the opposite end of the machine from the thrust bearing. Changes in axial rotor position relative to the casing axial clearances on this end of the machine can be the result of thermal expansion during start-up and shutdown. The measurement is typically made with a proximity probe transducer mounted to the machine casing. The measurement is usually incorporated as part of a TSI system. (100)

DIFFERENTIATION: "The normal brain is like a harp of many strings strung to perfect harmony. The transmitting conditions being perfect, are ready, at any impulse, to induce pure sympathetic assimilation. The different strings represent the different ventricles and convolutions. The differentiations of any one

from its true setting is fatal, to a certain degree, to the harmony of the whole combination. If the sympathetic condition of any physical organism carries a positive flow of 80 per cent on its whole combination, and a negative one of 20 per cent, it is the medium of perfect assimilation to one of the same ratio, if it is distributed under the same conditions to the mass of the other. If two masses of metal, of any shape whatever, are brought under perfect assimilation, to one another, their union, when brought into contact, will be instant.

"If we live in a sympathetic field we become sympathetic, and a tendency from the abnormal to the normal presents itself by an evolution of a purely sympathetic flow towards its attractive centers. It is only under these conditions that differentiation can be broken up, and a pure equation established. The only condition under which equation can never be established is when a differential disaster has taken place, of $66 \frac{2}{3}$ against the 100 pure, taking the full volume as one. If this $66 \frac{2}{3}$ or even 100 exists in one organ alone, and the surrounding ones are normal, then a condition can be easily brought about to establish the concordant harmony or equation to that organ. It is as rare to find a negative condition of $66 \frac{2}{3}$ against the volume of the whole mass, as it is to find a coincident between differentiation; or, more plainly, between two individuals under a state of negative influence. Under this new system, it is as possible to induce negations alike as it is to induce positives alike. Pure sympathetic concordants are as antagonistic to negative discordants as the negative is to the positive; but the vast volume the sympathetic holds over the non-sympathetic, in ethereal space, makes it at once the ruling medium and readjuster of all opposing conditions if properly brought to bear upon them." Chapter 7 of (1). See **NEGATIVE CENTER, DISCORDANT CONDITIONS, DISCORDANCE, MOLECULAR MOTION, HARMONY, NEGATIZATION, SYMPATHETIC TRANSMISSION**

DIFFERENTIATION OF MASS: "Discordant conditions, produce negatization to coincident action." (1) See **MOLECULAR DIFFERENTIATION**

DIFFERENTIATION OF CHORDS: "The breaking up of a cyclone will open a field for future research, if any way can be discovered for obtaining the chord of mass of the cyclone. To differentiate the chord of its thirds would destroy it;" Chapter 9 of (1). See **FORCE-WIND**

DIFFERENTIATOR: An electronic circuit that performs mathematical differentiation. It converts a displacement signal to a velocity signal or converts a velocity signal to an acceleration signal. (100)

DIFFUSE FIELD: [Acoustics] An environment in which the sound pressure level is the same at all locations and the flow of sound energy is equally probable in all directions. (85)

DIMENSIONS: "Learn the lesson of the interpreting of the dimensions of the earth, or that the three-

dimensions in the mind may be seven, and in spirit eleven and twelve and twenty-two." (5149-1) (2). See **FOURTH DIMENSION, SPACE**.

DIMINISHED: Made less. 1) Diminished intervals are those made less than minor; G# to F \natural is a diminished 7th, because G to F being a minor 7th, G# to F contains one semitone less than the minor interval. 2) A diminished triad is the chord consisting of two thirds on the subtonic, *e.g.*, B, D, F, in the key of C. (125)

DIPOLE: Any object or system that is oppositely charged at two points or poles, such as a magnet or a polar molecule. The properties of a dipole are determined by its dipole moment, that is, the product of one of the charges by their separation directed along an axis through the centers of charge.

An electric dipole consists of two electric charges of equal magnitude but opposite polarity, separated by a short distance (d); or more generally, a localized distribution of positive and negative electricity without net charge whose mean positions of positive and negative charge do not coincide.

Molecular dipoles which exist in the absence of an applied field are called permanent dipoles, while those produced by the action of a field are called induced dipoles.

The term magnetic dipole originally referred to the fact that a magnet has two poles and, because of these two poles, experiences a torque in a magnetic field if its axis is not along a magnetic flux line of the field. It is now generalized to include electric circuits which, because of the current, also experience torques in magnetic fields. (3)

DIRAC COVARIANTS: [QUANT MECH] Quantities which behave as a scalar, a pseudoscalar, a vector, an axial vector, or a second-rank tensor under Lorentz transformations, and whose elements consist of basis elements of the Dirac gamma algebra multiplied by the Dirac wave function on the right and its adjoint on the left. (4)

DIRAC DELTA FUNCTION: See **DELTA FUNCTION**. (4)

DIRAC ELECTRON THEORY: See **DIRAC THEORY**. (4)

DIRAC EQUATION: [QUANT MECH] A relativistic wave equation for an electron in an electromagnetic field, in which the wave function has four components corresponding to four internal states specified by a two-valued spin coordinate and an energy coordinate which can have a positive or negative value. (4)

DIRAC FIELDS: [QUANT MECH] Operators, arising in the second quantization of the Dirac theory, which correspond to the Dirac wave functions in the original theory. (4)

DIRAC GAMMA ALGEBRA: [QUANT MECH] An algebra whose basis consists of 16 linearly independent 4x4 matrices constructed from products of the four basic Dirac matrices. (4)

DIRAC h: See **H-BAR**. (4)

DIRAC MATRIX: [QUANT MECH] Any one of four matrices, designated γ_u ($u = 1, 2, 3, 4$), each having four rows and four columns and satisfying $\gamma_v \gamma_u + \gamma_u \gamma_v = O_{uv}$, where O_{uv} is the Kronecker delta function, which matrices operate on the four-component wave function in the Dirac equation. Also known as gamma matrix. (4)

DIRAC MOMENT: [QUANT MECH] Magnetic moment of the electron according to the Dirac theory, equal to $eh/2mc$, where e and m are the charge and mass of the positron respectively, h is Planck's constant divided by 2π , and c is the speed of light. (4)

DIRAC MONOPOLE: [QUANT MECH] A magnetic monopole whose magnetic charge is an integral multiple of $hc/2e$, where h is Planck's constant divided by 2π , c is the speed of light, and e is the charge of the electron. (4)

DIRAC PARTICLE: [PART PHYS] A particle behaving according to the Dirac theory, which describes the behavior of electrons and muons except for radiative corrections, and is envisaged as describing a central core of a hadron or spin $1/2\hbar$ which remains when the effects of nuclear forces are removed. (4)

DIRAC QUANTIZATION: [QUANT MECH] The condition, arising from conservation of angular momentum, that for any electric charge q and magnetic monopole with magnetic charge m , one has $2qm = nhc$, where n is an integer, h is Planck's constant divided by 2π , and c is the speed of light (gaussian units). (4)

DIRAC SPINOR: See **SPINOR**. (4)

DIRAC THEORY: [QUANT MECH] Theory of the electron based on the Dirac equation, which accounts for its spin angular momentum and gives its magnetic moment and its behavior in an electromagnetic field (except for higher-order corrections). Also known as Dirac electron theory. (4)

DIRAC WAVE FUNCTION: [QUANT MECH] A function appropriate for describing a spin $1/2$ particle and antiparticle; it is a column matrix with four entries, each of which is a function of the space time coordinates; the four components form two first-rank Lorentz spinors. (4)

DIRECTIVITY INDEX (DI): [ACOUSTICS] The difference between sound pressure level in any given direction in the acoustic far field and the average sound pressure level in that field. (85)

DISCORD: A chord which when struck or sung requires to be resolved into a concord. (125) See **HARMONY**

DISCORD: No such thing as discord exists in the molecule. Discordance results from chords producing differentiation and may be equated by the proper chord of harmony. Every gaseous molecule is a resonator to any and all vibrations, whether concordant or discordant. That which we term discord exists in sound itself, not in matter. (11)

DISCORD BY ADDITION: See **NINTH, Chord of Suspension**

DISCORD BY RETARDATION: See **NINTH, Chord of Suspension**

DISCORD OF SUSPENSION: SEE **NINTH, Chord of Suspension.**

DISCORDANCE: "I find in my researches, as to the condition of molecules under vibration, that discordance cannot exist in the molecule proper; and that it is the highest and most perfect structural condition that exists; providing that all the progressive orders are the same. Discordance in any mass is the result of differentiated groups, induced by antagonistic chords, and the flight or motions of such, when intensified by sound, are very tortuous and zigzag; but when free of this differentiation are in straight lines. Tortuous lines denote discord, or pain; straight lines denote harmony, or pleasure. Any differentiated mass can be brought to a condition of harmony, or equation, by proper media, and an equated sympathy produced." (1) See **DIFFERENTIATION, MASS, HARMONY, CHORD**

DISCORDANT CONDITIONS: "Differentiation of mass, produce negatization to coincident action. By changing the balance of the triune polar flows, one differentiates the mass chord and disrupts any possibility of harmonious or "coincident action". The mass is the result of a combination of these flows." (1) See **MASS, NEGATIVE ATTRACTION**

DISDIAPASON: An interval of two octaves; a 15th. (125)

DISINTEGRATION: "Much more may be given as respecting space, or of the forces as are active through space in the various forms of condensation and disintegration, or throwing out and coming in, and that take a part in the activity of the forces as are called gravitation; yet - as is demonstrated here in the race about which the active forces of the gravitating of the motor in its activity creating in itself the very forces as will build up those properties as create energy in both disintegrating and integrating in its activity." (195-57) (2).

"The positive vibrations are the radiating or propulsive, the negative vibrations are the ones that are attracted towards the neutral center. The action of the

magnetic flow is dual in its evolutions, both attractive and propulsive. The sound vibrations of themselves have no power whatever to induce dissociation, even in its lowest form. Certain differential, dual, triple and quadruple chords give introductory impulses which excite an action on molecular masses, liquid and gaseous, that increase their range of molecular motion and put them in that receptive state for sympathetic vibratory interchange which favors molecular disintegration, then, as I have shown, the diatonic enharmonic is brought into play, which further increases the molecular range of motion beyond fifty percent of their diameters, when molecular separation takes place, giving the tenuous substance that is necessary to induce progressive subdivision. This molecular gaseous substance, during its evolution, assumes a condition of high rotation in the sphere or tube in which it has been generated, and becomes itself the medium, with the proper excitors, for further progressive dissociation. The excitors include an illuminated revolving prism, condenser, and colored lenses, with a capped glass tube strong enough to carry a pressure of at least one thousand pounds per square inch. To one of these caps a sectional wire of platinum and silver is attached; the other cap is attached to the tube so screwed to the chamber as to allow it to lead to the neutral center of said chamber. See **SYMPATHETIC OUTREACH, NEGATIVE ATTRACTION, GRAVITY, GRAVITATION, ACTIVE PRINCIPLE, FIRST CAUSE, FORCE-GASEOUS, STABILIZATION, MOLECULAR DISSOCIATION**

DISINTEGRATION, ATOMS: See **FORCE, GASEOUS; DISSOCIATION**

DISINTEGRATION OF MATTER, THREE SYSTEMS: "The system of arranging introductory etheric impulses by compound chords set by differential harmonies is one that the world of science has never recognized. Beyond disintegration lies dispersion, and it is as easy to disperse as to disintegrate."

His first system requires introductory mediums of differential gravities - air as one, and water as the other, to disturb equilibrium and liberate the etheric vapor. This subdivision only reaches the interatomic position and the "atomic and molecular leads" were submerged in the Generator he then used. He could not go beyond the atomic with his instrument and could not dispense with water until the Liberator was invented. In his first system he did not reach full maximum line of vibration. His first system embraced Generator, Engine and Gun.

His second system he considered complete as far as liberation of the ether is concerned but was not perfected so as to assure safety to the operator. His sundry devices for indicating and governing the vibratory etheric circuit also left much to be desired.

His third system embraced aerial and submarine navigation. He was then completing an experimental sphere intended to test the combination of the positive and negative in rotary action. (11)

DISINTEGRATION, MINERAL: "I have been repeatedly urged to repeat my disintegrations of quartz rock, but it has been utterly out of my power to do so. The mechanical device with which I conducted those experiments was destroyed at the time of the proceedings against me. Its graduation occupied over four years, after which it was operated successfully. It has been originally constructed as an instrument for overcoming gravity, a perfect, graduated scale of that device was accurately registered, a copy of which I kept, I have since built three successive disintegrators set up from that scale, but they did not operate. This peculiar feature remained a paradox to me until I had solved the conditions governing the chords of multiple masses, when this problem ceased to be paradoxical in its character. As I have said, there are no two compound aggregated forms of visible matter that are, or ever can be, so duplicated as to show pure, sympathetic concordance one to the other. Hence the necessity of my system of graduation, and of a compound device that will enable anyone to correct the variations that exist in compound molecular structures, or in other words to graduate such, so as to bring them to a successful operation." (Keely)

DISINTEGRATION OF WATER: See **WATER, AQUEOUS DISINTEGRATION, MOLECULAR DISSOCIATION**

DISK, VIBRATING: See **ATOM, DETERMINATION OF SIZE.**

DISPERSED HARMONY: Harmony in which the notes composing the chord are at wide intervals (in time) from each other. (125)

DISPERSION: "Beyond disintegration lies dispersion, and Keely can just as easily disperse the atoms of matter as disintegrate its molecules. Disperse them into what? Well, - into ether, apparently; into the hypothetical substratum which modern scientist (1892) have postulated, and about whose nature they know absolutely nothing but what they invent themselves, but which to Keely is not hypothesis, but a fact as real as his own shoes; and which ether, indeed, seems to be 'the protoplasm of all things.'" Chapter 8 of (1) See **ETHER, WATER, CHORD MASS**

DISPLACEMENT: The change in distance or position of an object. Displacement is typically a peak-to-peak measurement of the observed motion, and usually carries the units of mils or micrometers. Eddy current proximity probes measure displacement directly. Signal integration of a velocity signal is necessary to obtain displacement. An acceleration signal requires double integration to yield a displacement measurement. Integration of velocity and/or acceleration gives the dynamic component of the displacement only, *i.e.*, no shaft position information is available. (100)

DISSOCIATION OF WATER: See **WATER, MOLECULAR DISSOCIATION, ATOMIC THEORY-KEELY'S**

DISSONANCE: Discord. (125) See **DISCORD; HARMONY**

DISSONANCE: Dissonance between similar tones varies in intensity from 33 beats per second (maximum). The points of least dissonance are the places where the numbers expressing the **RATIO** of the two rates of vibration are **SMALL WHOLE NUMBERS**. Beats cause dissonance.

A sound which is unstable, more active, and which needs to resolve to a consonant interval is called dissonance. The dissonant intervals are as follows: the augmented and diminished intervals, the major and minor seconds and sevenths, and the perfect fourth, when not supported by a third or a perfect fifth below it. (13). See **RATIOS, BEATS, DIFFERENCE TONES, RESULTANT TONES, SUMMATION TONES, DIFFERENTIATION, TRIPLE CURRENTS, HARMONY**

DISTORTION: Distortion, in playback, is any change in the recorded sound that takes place in the playback system. At its worst, distortion can make a violin sound like a trolley car screeching around a curve. More frequently, however, distortion is quite subtle and barely perceptible at first. But in prolonged and attentive listening it causes a sense of discomfort known as listener fatigue. In recent years, improvements in audio design have reduced distortion in quality components to such a low level that it does not obtrude upon the listener even after many hours of concentrated listening. Distortion exists in two principal forms: harmonic distortion, which falsifies tonal nuances, and intermodulation distortion (usually called IM), which results from the interaction of various frequencies within the playback components and produces a harsh, grainy sound. Precise numerical statement in the manufacturer's specifications of both these types of distortion is a hallmark of trustworthy sound equipment. In high-fidelity components, distortion is usually expressed as a percentage of the total sound at a certain level of output power. High-quality amplifiers should have less than 2 percent IM and harmonic distortion when operating at full-rated output. (103)

DISTURBANCE OF EQUILIBRIUM: "Disturbance of equilibrium, like gravity, is inherent, an eternal existing force." It is possible these two phases, gravity and disturbance of equilibrium, are simply the two opposite poles of matter, the physical Universe, the positive and negative poles of matter, controlled by the third and controlling principle, the Universal Will.

"Unstable equilibrium, like gravity, is a condition born in each neutral center at the time of birth, and thus designed by the Architect as the connective link between the "dispersing positive" and the "attractive negative." The action inducing this "link" I call "sympathetic planetary oscillation."

"The enharmonic portion of the electric current carries the power of propulsion that induces disturbance of negative equilibrium."

In his experiments of aqueous disintegration disturbance of equilibrium was brought about by using mediums of differential gravity in the disintegrator, air as one, water as the other. (11)

DISTURBANCE OF MAGNETIC NEEDLE: Science will in time classify the important modifications of the one force in nature as sympathetic streams, each stream composed of triple flows. Keely maintains that the static condition which the magnetic needle assumes when undisturbed by any extraneous force outside of its own sympathetic one, proves conclusively that the power of the dominant third, of the triple combination of the magnetic terrestrial envelope, is the controlling one of this sympathetic triplet, and the one towards which all the others coordinate. All the dominant conditions of nature represent the focal centers towards which like surrounding ones become sympathetically subservient. The rapid rotation of the magnetic needle of a compass shown in his experiments rests entirely on the alternating of the dominant alone, effected by a triple condition of vibration that is antagonistic to its harmonious flow as associated with its other attendants. A rapid change of polarity is induced and rapid rotation necessarily follows.

"The human ear cannot detect the triple chord of any vibration, or sounding note but every sound that is induced of any range, high or low, is governed by the same laws, as regards triple action of such that govern every sympathetic flow in Nature. Were it not for these triple vibratory conditions, change of polarity could never be effected, and consequently there could be no rotation. Thus the compounding of the triple triple, to produce the effect would give a vibration in multiplication reaching the ninth, in order to induce subservience, the enumeration which it would be folly to undertake, as the result would be a string of figures a mile in length to denote it.

When the proper impulse is given to induce the rotation with pure alternating corpuscular action, the condition of action become perpetual in their character, lasting long enough from that one impulse to wear out any machine denoting such action, and on the sympathetic stream eternally perpetual. The action of the neutral or focalizing centers represents molecular focalization and redistribution, not having any magnetism associated with them, but when the radiating arms of their centers are submitted to the triple compound vibratory force, representing their mass thirds, they become magnetic and consequently cease their rotation. Their rotation is induced by submitting them to three different orders of vibration, simultaneously giving the majority to the harmonic third.

DITONE: An interval of two major tones. This interval exceeds the major third, which consists of a major and minor tone, and is discordant. (125)

DITONE: The interval of two undivided tones. (81)

DIVERGENCE: [ACOUSTICS] The spreading of sound waves which, in a free field, causes sound pressure levels in the far field of a source to decrease with increasing distance from the source. (85)

DIVERTELLUM: The matrix of the elements, from which the latter generated. For instance, each metal has its elementary matrix in which it grows. Mines of gold, silver, etc., become exhausted, and after centuries (or millennia) they may be found to yield again a rich supply; in the same way the soil of a country having become infertile from exhaustion, will after a time of rest, become fertile again. In both cases a decomposition and a development of lower elements into higher ones takes place. (131)

DIVINATION: The act of foreseeing future events by means of the soul's own light; prophecy. (131)

DIVINITIES: A term expressing the first three manifested forms of the elements (solids, liquids, and gases).

DO: The first of the syllables used for the solfeggio of the scale. The note c, to which it is applied, was originally called UT [Artenian syllables], and is still called so in France. (125) See **SOLMIZATION**

DOCIDE: Rectangular parallelopiped - (from Greek parallelepipedos = Having parallel sides or two parallel planes) having two equal sides and a larger third side. (81)

DOMINANT: 1) The fifth degree of the scale. 2) The reciting note of Gregorian chants. (125) See **HARMONY**

DOMINANT: "All the dominant conditions of nature represent the focal centers towards which like surrounding ones become sympathetically subservient." pg 179 of (1)

DOMINANT CURRENT: "Magnetism is of the atomic order? and not molecular? then it is not electrical in nature; so what then is the influence in an electromagnetic? The Dominant current of the electrical stream." (1)

"The Dominant (of the Electrical Stream) creates or governs Magnetism on the Atomic Order of Vibration (High Vibratory)." (1) See **DOMINANT; ATOMIC STREAM; MAGNETISM; ELECTRICITY**

DOMINANT CURRENT: The third point of the triangle or triple flow, establishes the polarity of the chord or flow; also called Diaphonic. See **ELECTRICAL STREAM, MAGNETISM, ANTI-POLAR & POLAR, TRIPLE FLOWS, TRIPLE CURRENT, ATOMIC VIBRATION, NEUTRAL CENTER, RULING MEDIUM, MIND, LAWS OF BEING**

DOMINANT ELECTRIC CURRENT: "Keely classes the cohesive force of molecular masses as the dominant order of the electric stream, the molecule

owing its negative attractive quality to the magnetic element." (1) See **MAGNETISM**

"The Dominant current of the electrical stream is the electricity luminous." (1) See **ELECTRICITY**

DOMINANT ETHERIC SIXTHS: 8,100,000,000 cps. See **RATES OF VIBRATION, LAWS OF BEING**

DOUBLE: That which is an octave below the unison in pitch, *e.g.*, double-bass, an instrument whose sounds are an octave below those of the violoncello. (125)

DOUBLE AMPLITUDE (OBSOLETE): The peak-to-peak value of dynamic motion. (100)

DOUBLE GAMUT: See **FRAUNHOFER LINES**.

DOUBLE OCTAVE: The interval of a 15th. (125) See **DISDIAPASON**

DOUBLE-ROOT-CHORD: See **EXTREME SIXTH, CHORD OF THE**

DOUBLE ROW, DEEP GROVE BALL BEARINGS: A rolling element bearing which uses two rows of balls positioned so that the load lines through the balls have an outwardly converging contact angle. This allows larger thrust loads than does the single row design. (100)

DOUBLE ROW, SPHERICAL ROLLER BEARING: Some rolling element bearings which use a spherical cross-section outer race (as does the self-aligning ball bearing) so as to allow angular misalignment. This bearing has a high capacity for radial loads, and also allows high thrust loads in either direction. (100)

DOUBLE SYREN: See **VIBRATION RATIO**. (68)

DOWN BOW: The bow drawn over the strings from the heel or holding part of the bow to the point; the greatest power of tone in the strings is elicited by the down bow. (125) See **BOW**

DRIVING NOTES: Syncopated notes. Notes driven through the ensuing accent. (125) See **SYNCOPATHICAL**

DRONE: 1) The monotonous bass produced from the larger of the three tubes of bag-pipes. 2) The chorus or burden of a song. (125)

DRUID'S CORD: any length divided by 13 equally.

DRUM: An instrument of percussion, of cylindrical form, having disks of vellum or parchment at each end, so made that the disks can be tightened or slackened at pleasure by means of braces acted upon by sliding knots of leather, or by the later application of screws. (125)

DRYADES: See **DURDALES**

D STRING: The third open string on violins, the second on tenors, violoncellos, and three-stringed double basses, the fourth on the guitar. (125)

DUAL PATH: A signal conditioning technique used in vibration monitors whereby a single transducer input is processed through two separate conditioning paths in the monitor; each signal conditioning path has its own engineering units of measurement (*e.g.*, displacement and velocity), optional filtering, alarm set points, and displays. (100)

DUAL PROBE: A transducer set consisting of a proximity probe and velocity transducer installed radially at the same point (usually in a common housing on the machine casing). Four separate measurements are provided by this transducer system, *i.e.*, the proximity probe measures (1) shaft relative radial position within the bearing clearance, and (2) shaft relative dynamic motion to the bearing. The velocity transducer measures (3) machine casing absolute motion. When the velocity signal is integrated to displacement and summed in time to the shaft summation, it represents (4) shaft absolute motion (relative to free space.) (100)

DUAL VOTING: A concept which requires that two independent inputs agree before any action is taken. Typically, this function may be incorporated in a monitor whereby two transducer input signals must both measure an amplitude value which exceeds a set point (usually the Danger set point only) before an actual alarm condition is indicated by the monitor. If only one transducer input indicates a value exceeding the set point, then no alarm is initiated in the monitor. (100)

DUAL TONE MULTI-FREQUENCY (DTMF): A portion of the TOUCH TONE telephone dialing system developed by AT&T, DTMF signalling transports precisely defined and matched tone pair signals over sharply tuned amplitude-guarded channels to achieve highly error immune operation.

DUALISM: The system which admits two ultimate realities. Dualism, in the widest sense, breaks up the universe into two entirely distinct substances - the material world and an immaterial God, who is represented to be its creator, sustainer and ruler. (121) See **MONISM**

DUALITY: Two-ness. (8)

DUALITY, HUMAN: "The Keely Motor secret teaches that the various phenomena of the human constitution cannot be properly comprehended and explained without observing the distinction between the physical and material and the moral and spiritual nature of man. It demonstrates incontrovertibly the separate existence and independent activity of the soul of man, and that the spirit governs the body instead of being governed by the body." (1)

DUAN: (Gaelic) A verse, stanza. (125)

DULCIMER: One of the most ancient musical instruments, used by various nations in almost all parts of the world, and which, in shape and construction, has probably undergone fewer changes than any other instrument. In its earliest and simplest form, it consisted of a flat piece of wood, on which were fastened two converging strips of wood, across which strings were stretched tuned to the national scale. The only improvements since made on this type are the addition of a series of pegs, or pins, to regulate the tension of the strings, and the use of two flat pieces of wood formed into a resonance box, for the body. (125)

DULONG'S LAW: See **DEBYE CONTINUUM**

DURDALES: Substantial but invisible beings, residing in trees (Dryades); elemental spirits of nature. (131)

DWELL TIME: The length of time the gauge pressure is maintained on the workpiece after the cessation of ultrasonic energy. (102)

DYNAMIC DATA: Data which contains information on the dynamic characteristics (frequency, phase angle, waveform) of a vibration signal. Typical dynamic data displays are orbit, time base waveform, spectrum, Bode, polar, cascade. See **TRANSIENT DATA**, **STEADY-STATE DATA**, **STATIC DATA**. (100)

DYNAMIC MOTION: Vibratory motion of a rotor system. (100)

DYNAMIC RANGE: The span of input signal levels a filter can condition with a meaningful degree of resolution; could be expressed as "millivolts to volts" or as a ratio in dB.

DYNAMIC RANGE: Dynamic range refers to the loudness spread (in decibels) between the softest and the loudest parts in a piece of music. Also, the spread between the softest and loudest sounds a system can properly reproduce. (103)

DYNAMIC RESERVOIR: "Therefore, there could be in the solar system a dynamic reservoir or solar storage battery that would correspond to the lungs of a human system." (195-70) (2)

DYNAMIC TORQUE: The instantaneous amplitude of the moment applied to a rotor. Dynamic torque is comprised of the average torque plus torque resulting from the torsional oscillation of the rotor system at the point of measurement. (100)

DYNAMIC TREND PLOT: A plot of dynamic data characteristics versus time. Typical displays are frequency spectrums versus time and amplitude and phase values of frequency components versus time.

(100)

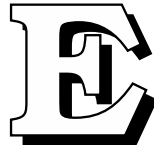
DYNASPHERE: The rotating envelope encapsulating molecular and atomic structures. See **MOLECULE, THREE ROTATING ENVELOPES**

DYNASPHERIC FORCE: See **FORCE, DYNASPHERIC**

DYNE: [MECH] "The unit of force in the centimeter-gram-second system of units, equal to the force which imparts an acceleration of 1 cm/sec² to a 1 gram mass." (4)

DYSTELEOLOGY: The science of those features of organisms which exclude the idea of a plan, the opposite of teleology. (121)

DYSTONIC: False intonation or discord. (125) See **DETONATION**



- E:** 1) The note Hypate in Greek music.
 2) The keynote of the Church mode called Phrygian.
 3) The note Elami in the system of Hexachords.
 4) The E above tenor C, the octave above it being represented by e, the octave below it by EE.
 5) The key having four sharps in its signature. (125)

EAR: The ear is the organ of hearing, in other words, the organ for the appreciation of sound, *i.e.*, of vibrations of the air or water. All that is necessary to form an ear is a nerve-mass capable of appreciating these vibrations. Its simplest actual expression is a sac, filled with fluids, containing "otoliths", an ear, and a stone), and supplied with a nerve, a condition best exemplified in the sub-kingdom of Mollusca, represented familiarly by the oysters, the mussels, snails both terrestrial and aquatic, and the octopus. The "otoliths" are masses of carbonate of lime, as may readily be seen by placing one of them dissected out from any of the above mentioned animals (*e.g.* a snail) on a glass slide, covering it with an object glass with sufficient water to fill the interspace between the two, and adding at the side of the covering glass a drop of any acid (acetic acid, or indeed ordinary vinegar will do very well) while the experimenter observes it through the microscope. Air bubbles — really bubbles of carbonic gas — will be seen to pour out from the otolith, and when these have ceased, that body will have entirely disappeared.

It is true that we are suspicious of a specialized organ of hearing even in such animals as possess no specialized nerve system. This is somewhat apparently of a paradox, for it may be asked, How can an animal without nerves feel at all? and is it not highly improbable that if no nerve system exists, any special sense-organ can be developed? The answer to the first of these objections is very plain: all animals, even those who possess no specialized organs whatever manifest the simple phenomena of sensation; all, even the Infusoria and the Amoeba, of which we hear so much now-a-days, and which are very little more than simple masses of protoplasm, manifest this faculty. Any one who has observed these occupants of almost any drop of water, with a microscope of low power, will have seen enough to convince himself of this. As to the second objection, the fat remains that in some animals which have no undoubted nerves, in some medusa or jelly-fish, we find in the mass forming their body crystals of carbonate of lime,

which substance must intensify the vibrations of the water in which they live, and must, when put into a state of motion as a whole, or into one which affects its particles *inter se*, cause by its relative density greater disturbance of the soft matter in which it lies, than would be the case if it were absent.

But leaving this as somewhat problematical, and taking the hearing organ of molluscs as the type, we shall find this type essentially adhered to in the higher animals in spite of endless complications. Let us propound the bold paradox without fear of contradiction, that a man as well as a snail hears in water, and that the essential parts of his marvelous hearing apparatus are a sac containing fluid in which are otoliths, and round which are distributed the ultimate filaments of a nerve.

The typical physiology, as well as the typical anatomy of hearing, is very simple. These "ear-stones", by the vibrations conducted to them, are made to rattle in this bag containing fluid, and, by beating against its sides, cause more disturbance to the nerve filaments these distributed than would be caused by the same vibrations if they acted directly on the nerve.

The human ear may be divided into three parts — the external, middle and internal ear. The two former have the function of conveying vibrations to the latter which appreciates them.

The external ear consists of two parts, the "pinna", or auricle (1) and the external auditory canal or "meatus" (2).

The pinna is that part which is quite external and which we unscientifically call "the ear", as when we say that a certain person has large or small ears. It is composed almost entirely of cartilage or gristle, and has complicated foldings, to all of which names have been given, but which it is not our business to give here in detail. The general shape is that of an irregular funnel, having its apex in the auditory canal. The only part of which we shall speak particularly is the "helix" or the margin which is folded in. At the upper and posterior part of this is to be found, in many individuals, a small point or process, generally folded in like the rest of the helix, but sometimes projecting outwards. The pinna is furnished with nine muscles, three of which are called extrinsic and move it was a

whole, while the remaining six would, if they contracted, move its parts on one another, and are called intrinsic.

The extrinsic muscles are situated in front, above and behind, and move the pinna therefore forwards, upwards and backwards respectively. These three muscles do not have any function on hearing per se other than to more or less capture and direct outside sounds to the auditory canal.

The external auditory canal is about 1 1/4 inch long; rather less than the external half is formed of cartilage or gristle, the remainder in bone. Its direction is not directly inwards, but slightly forwards also. It is closed at its inner end by the "membrana tympani" or membrane of the drum. The glands which secrete the wax (ceruminous glands) are situated in the cartilaginous part of the canal, and agree in their structure with the sweat glands.

The middle ear or tympanum is separated from the external ear by the membrana tympani which inclines outwards, making an angle of 45° with the floor. It is a cavity which is not shut off from the air, for the "Eustachian Tube" forms a communication between it and the pharynx, the upper part of the cavity of the throat.

In the tympanum are situated three small bones, the Malleus, Incus, and Stapes, the names being derived from their shape. The malleus (hammer) has a round head and a handle and from the base of the head a thin spike of bone, the "processus gracilis" projects. The Incus (anvil) is more like a tooth with two fangs, a long and a short one. The long process carries a knob or tubercle which is originally a separate bone, as it remains in some animals through life. The stapes (stirrup) is just like a stirrup. It is very difficult to understand the arrangement of these little bones from description or even from drawings, a model or actual objects being almost necessary.

The cavity of the tympanum is practically enlarged by communicating with the "Mastoid Cells", air cavities which occupy the mastoid process of the temporal bone, that process of bone which may be felt behind and below the pinna, and is supposed by phrenologists to be the residence of "Pugnacity", though they have never explained the connection between that propensity and the function which these air-cells really discharge, that of increasing the tympanic cavity.

The internal ear or labyrinth is the essential part of the organ. It consists of two parts, a bony cavity enclosed in the thickness of the base of the skull, and a membranous sac within this.

The bony labyrinth may be briefly described as a chamber, the "Vestibule" which sends one prolongation forward (the "cochlea"), three others backwards ("semi-circular canals") and has its outer and inner walls perforated, the outer by the fenestra ovalis, in

which lies the base of the stapes, and by a round hole closed by membrane, and called the fenestra rotunda; the inner by a series of holes in a depression called the "Fovea hemispherica", which transmit branches of the auditory nerve from the internal auditory meatus in which lie the auditory and facial nerves. By these two lateral perforations it communicates with the cavity of the tympanum externally, and with that of the cranium internally. Close behind the "Fovea hemispherica" is a small canal, the "Aqueductus Vestibuli".

The bony semi-circular canals are three tubes bent so as to form about two-thirds of a circle. They are situated at the upper and back part of the vestibule with which they communicate by five openings, one end of the superior having an opening common also to the posterior semi-circular canal. Each tube at one end has an expansion called an "Ampulla". These canals are called from their position, superior, posterior and external. The superior is vertical and transverse, the posterior is vertical and longitudinal, and the external is horizontal. The directions of these canals, or the planes in which they lie, will be best understood by placing a book with the two covers at right angles to one another, upright on end on a table, so that one of the covers faces the reader, the other being at right angles to the side of the table at which he is seated. Then the reader will be on the outer or tympanic side, the side of the cranial cavity. The plane of the table will represent the plane of the external or horizontal canal, the plane of the cover opposite to the reader the posterior, and that at right angles to the side of the table at which he is seated the superior canal, which is also the most anteriorly placed of the three. Thus it will be seen that the planes of these three canals are the three planes of a cube. [With regard to the terms anterior, posterior, external, and internal, it may be necessary to explain that anterior means on the side towards the face; posterior on the side towards the back of the head, and external and internal remote from or near to an antero-posterior axis drawn from the face to the back of the head.]

The cavity of the vestibule is prolonged anteriorly by the cochlea so called from its likeness to the shell of a snail. As a whole, it forms a blunt cone with its apex outwards; this cone is formed by a gradually tapering spiral tube, the first curve having a concavity upwards; it is coiled 2 1/2 times round a central column or "Modiolus" which sends an incomplete portion into the cavity of the tube. This portion is called "Lamina spiralis ossea" and winds in the cavity of the spiral cochlea like the thread of a screw or the staircase in a turret; it is wanting at the apex of the tube.

Otoliths or otoconia (ear-dust) are found in the common sinus or utricle, in the saccule, and in the ampullae of the semicircular canals; and besides them, the ampullae are lined with long, stiff, hair-like filaments, called "fila acustica". They are six-sided crystals of carbonate of lime, with pointed ends, and lie in the walls of these parts of the membranous labyrinth. They are occasionally absent. In these parts

we find pigment cells, which seem in some mysterious manner to be essential to the sensitive parts of nearly all the special-sense organs; for they are present in the olfactory region of the nose, as well as in the globe of the eye, and only in the latter is their function known. It is a well known fact that white cats (cats which have no pigment) are deaf.

Within the canalis membranacea cochlea, and separated from it by a membrane called the "membrana tectoria" lies an assemblage of structures known as the "organ of Corti" after its describer. The essential part of the organ of Corti is a double series of rods, whose bases are separated by some distance, while their upper ends meet at an angle, the continuous series of rods forming a sort of spiral gabled roof, gradually diminishing as it follows the spiral course of the cochlea. The regularity of their arrangement, seen from above, suggests the key-board of a pianoforte. They have been estimated by Kölliker as about 3,000 in number, and are composed of a dense material. The inner series are more closely set and more numerous than the outer, which they overlap. Both series are enlarged at their bases and heads, especially the latter.

Propagation of Sound — In order correctly to understand the sense of hearing we must have acquaintance with the principal laws of acoustics involved. Sound travels through air at about the rate of 1050 ft. a second, in water at about four times this velocity, and in very elastic solid bodies eighteen times as rapidly. In passing from solids to water the velocity is diminished, and from solids to air still more so; the passage from water to air or from air to water, very difficult. Vibrations lose much of their intensity in passing from air to solids. The cases of passage therefore from the medium of least to that of greatest density; i.e., from the air to water, are the cases of greatest difficulty in the transmission of vibration. A dry stretched membrane easily receives and transmits vibrations of the air; and such a membrane placed on the surface of water overcomes in a great degree the difficulty of the passage between air and water. This assistance is enhanced when the membrane is combined with some solid body. Any membrane conducts sounds well when only in water. Sounds, like light, are liable to be reflected whether traveling in water or air.

Certain terms require explanation. Sounds are "communicated" when they are merely conveyed from one sounding body to another, and this can take place in a noise as well as a musical sound. Sounds are "excited" under two circumstances: when a body which is sounding and that to be excited have the same note and the vibration of one produces sympathetic vibration of the other, the bodies are mutually called "reciprocating", while of the vibration of one produces its harmonics in the other, the latter is said, with regard to the exciting body, to be "resonant". According to Helmholtz, "timbre" or "quality" depends on definite combinations or certain secondary sounds or harmonics with a primary or fundamental sound, and

such combinations he calls "sound colours". See **COLOR**

Hearing — Sounds may reach the auditory nerve either through the combination of specialized structures lying between the tympanum and the filaments of that nerve, or through the bones of the skull. In the normal state the latter road is so much less efficacious that it may be disregarded; but when the other route is obstructed or rendered impervious, it then becomes the medium of the communication of sound. That sounds do however reach the auditory nerve in health by this way, anyone may learn by closing his ears and speaking or singing. Under some circumstance the bones of the skull are the better conductors of the two; a tuning fork held between the teeth gives a distinctly audible note long after its vibrations have become inaudible through the air. Sounds are heard under water by this means.

The External Ear — The pinna or auricle is said by some authors to help us to hear by reflecting sound into the meatus and by propagating it through its substance to the bony part of the meatus and thence to the membrana tympani. Reflection can only be helped by the large hollow behind the meatus called the concha, and by the point in front of the meatus called the tragus, the concha reflecting the vibrations on to the tragus, and this reflecting them in turn into the meatus. The other parts of the pinna have been supposed to assist sound by conduction, their various folds having the function, according to this view, of receiving vibrations in various planes perpendicularly and thus most favourably for propagation. Another view regards these folds as instrumental in neutralizing conflicting sound waves, that the principal vibrations may be able to enter the meatus without interruption. All these are mere speculations. An animal with moveable ears, such as a horse, turns his ears to the source of sound, but we have no such power, the extrinsic muscles of our ear are generally quite functionless, and never, in any case, possess this power, the only one which would help us to utilize our pinna. Mr. Toynebee believed the pinna to be quite functionless in man.

The External Meatus is undoubtedly functional in conducting sounds, its closure will instantly prove this. Its curved course proves that the vibrations must reach the tympanum after manifold reflection from its walls and not directly. It serves to conduct vibrations without dispersion to the tympanic membranes. The columns of air which it contains increases the strength of the vibrations which reach it, and by lengthening the tube of the meatus by adding a tube externally, and thus lengthening the column of air, the sounds are much increased in intensity. Its walls must conduct vibration to the membrane of the tympanum, but this function is so inconsiderable that we may practically neglect it.

The Middle Ear or Tympanum — The membrana tympani serves to conduct vibrations received from the external air to the three small bones, the malleus,

incus, and stapes, and thus to the internal ear. It is usually in a state of moderate relaxation, and is made more tense by the action of the tensor tympani muscle, and less tense probably by that of the stapedius and perhaps the laxator tympani. The vibrations which it receives are derived from the air in the external meatus, and perhaps also from the bony ring in which it is set.

The state of moderate relaxation which is usual to it, is the most favourable state for vibrating in sympathy with sounds of a wide range. The membrane vibrates reciprocally as a whole if the sound is in unison with the note to which it is (so to say) tuned by the muscles of the small bones, .e., its fundamental; or in resonance in divisions, (harmonics), if the note sounded is higher than this, one of its harmonics. That it is not always tuned to the very note sounded is obvious, when we consider that this can only be the case when one note only is sounded. It cannot, of course, vibrate reciprocally to a note lower than its fundamental. A membrane has a large power of vibrating sympathetically since its harmonics are very numerous. The effect of increasing the tension of the membrane may be easily tested by closing the nose and mouth and either blowing air out from the lungs or drawing it in. By the former we blow air through the eustachian tube into the cavity of the tympanum, and force the membrane outwards, by the latter we decrease the pressure in the tympanic cavity, and the external air forces the membrane still more inwards than is naturally the case. The result is in either case the same, the sense of hearing is on the whole impaired, though very high sounds are heard better than before. We have stretched the membrane, raised its fundamental note, and diminished its power of vibrating in sympathy with low notes, though we have at the same time increased its range of sympathy upwards. Still it is chiefly improved for *reciprocal* vibrations, for a lax membrane divides itself far more readily into segments which vibrate in sympathy with harmonics, the strength of such vibrations being increased by the number of the segments into which it divides itself. (125)

ECHEION: 1) A hollow vessel, generally of metal used as a drum or gong. 2) Metallic vases so arranged behind the seats of the ancient theater as to reinforce the sound of the actors' voices. An account of them is found in Vitruvius. 3) The resonance box of a lyre. (125)

ECHO: A sound produced by reverberation, an imitation of a sound so produced. (125)

ECTODERM: The outer envelope or skin. (121)

EDELPHUS: One who divines from the elements of the air, earth, water or fire. (131)

EFFECT: The mental impression produced by the performance of music, arising from the genius of the composer in the novel invention of pleasing or striking remedies, or telling harmonies, and the happy fit-

ness of choice of certain passages, vocal or instrumental, in certain understood situations; or the clever interpretation of those passages by the performers. (125)

EIGHTFOLD WAY: A way of grouping the elementary particles that reveals regularities in their properties. (116)

EIGHTH: The interval of an octave. (125)

ELECTRICITY FROM VIBRATION: So far as can be ascertained from his writings, Keely never produced the electric flow by his vibrations. However, he has the following to say regarding its possibility, reasoning from the laws that had already been revealed to him.

"When electrical experts can construct a mechanical device whereby the low frequencies of the enharmonic can be assimilated to the harmonic undulatory by thirds, their dynamos will run without extraneous power. A concordant introductory impulse to the enharmonic (giving it the relation of true thirds to the dominant) would more effectually operate the dynamo than any number of steam engines, allowing the harmonic stream to be the governor. This concordance with the dominant would alter the ruling conditions of the harmonic and enharmonic by only exciting the sympathetic action of the dominant without arousing its destructive effects. Many lives will probably be lost before this mechanical adjustment is obtained. Tesla has left all electrical explorers far behind and has reached ALMOST to the crest of the harmonic wave. However, I do not believe the present methods of handling electricity will be changed for hundreds of years. My failures of the past decade will be redeemed by one position, that is, my control of the polar forces through the polar sympathetic harness I have invented." (11)

ELECTROMAGNETIC ATTRACTION: See COHESION

ELECTROMAGNETIC RADIATION: If the persistency of our vision could be reversed, so as to have the power to follow the track of the molecule's oscillations under a high condition of vibratory acceleration, associated with the assisting power of the finest instruments known at present in scientific research, it would not help us to determine the period of time wherein the sympathetic actions in nature are propagated. Therefore, we cannot with any degree of certainty, establish a foundation whereon observation, so associated, is reliable." (Theoretically explained in Soul of Matter.)

"As far as my researches have gone, I find that there is but one condition approaching reliability, and that is in computing the intermittent periodic disturbances along a nodal vibratory transmitter - the nodes of gold, silver and platina - a fixed number placed at such different distances along its line, as to take up and equalize (by a certain order of vibratory trans-

missions) the chord masses of the nodal interferences between the triple metals of which the nodes are composed, and also the acoustic introductory impulse of whatever chord is set. This will determine the rate of their accelerated molecular oscillation, so induced beyond their normal standard, and give us some definite figures in the computing of vibration, thousands of billions of times more than those of light.

Light is induced by electromagnetic percussion emanating from the ether, and in its action represents the plane of magnetism. In fact, it is the plane of magnetism when under polarization. (Platina wires the thickness of a fine hair associated with each of the nine nodal beads, and concentrated towards a general center of focalization, attaching the other end of the wires to the focal center, will determine, by the magnetic conduction, the number of corpuscular oscillations per second induced by a thought, either positive or negative, in the central centers. These are the only conditions - those of magnetic conduction - whereby the evolution of a thought can be computed in regard to its force under propagation, as against the amount of latent energy set free to act as induced by such thought on the physical organism.) Some scientific theories of the past have taught us that electricity and magnetism are one and the same thing. Sympathetic vibratory philosophy teaches that they are two distinct forces of one of the triune sympathetic family.

"I will try to make comprehensible the computation of the number (even to infinity) of the corpuscular oscillations, induced on the introductory ninths, over their normal standard. The molecules of all visible masses, when not influenced by surrounding acoustic vibratory impulses, move at a rate of 20,000 oscillations per second, one third of their diameters. We have before us one of these masses, either a silver dollar, a pound weight, a horseshoe, or any other metallic medium, which I associate to one of my nodal transmitters, the other end of which is attached to the clustered thirds (or third octave) of my focalizing neutral concentrator. Another transmitter, of gold, silver and platina sections, is attached to the sixth cluster of same disk, the other end of which is connected to resonating sphere on my compound instrument, all of which must be brought to a state of complete rest. Then, a slight tap, with a vulcanite rubber hammer on the Chladni resonating disk, will accelerate the 20,000 molecular oscillations to 180,000 per second, an increase of nine times the normal number. The nine nodes each touching the extreme end, next the mass operated upon, in this arrangement, silver, gold, platina, make up the nine. When I associate the seventh, I start with gold and end with platina, always on the triplets. Silver represents the lowest introductory third, gold the next and platina the highest. If we start with a gold node, the multiplication on oscillation will be nine times nine or 81 times the 20,000 which is 1,620,000 per second. Each node represents one wave length of a certain number of vibrations when shifted along the transmitter, over the section representing its opposite metal. The shifting of the gold one over the silver extreme section will hold the

corpuscular range of the mass velocity at 1,620,000 per second, the introductory chord being set at B third octave. It requires an accelerated oscillation on the molecules of a soft steel mass, at that chord, of a transmissive multiplication of the full nine, in order to induce rotary action on the neutral center, indicator of focalizing disk, which, by computation, means, per second, 156,057,552,198,220,000 corpuscular intermittent oscillations to move the disk 110 revolutions per second. This represents the multiplication on the first nodal dissociator of the ninth. The second transition, on the same would mean this number multiplied by itself, and the residue (product) of each multiplication by itself 81 times progressively. This throws us infinitely far beyond computation leaving us only on the second of the full ninth, towards reaching the sympathetic corpuscular velocity attending the high luminiferous. I have induced rotation up to 123 revolutions per second to accomplish, but even this vibration represents only a minute fraction of the conditions governing the sympathetic vitality which exists in the far luminous centers.

The interposition of hydrogen gas between soap films, of the differential diameters of thirds, illuminated by a solar ray in whose focus a quiescent prism is set posteriorly - the prism to be adjusted at the proper distance and angle to throw the seven colors through the film enclosing the hydrogen in a way that will give the bow and arch of three feet - will register deep down, inaudible tones or sounds, and indicate their different conditions by the dissolving and re-dissolving of certain of the colors of such arch. To conduct such experiments properly necessitates, first, a location as nearly isolated from all extraneous audible sounds as is possible to get, and second, a pedestal of the lowest vibrating material, the base of it set deep in the earth, to arrange the instruments upon, and third, a room of the highest resonating qualities to enclose them. Under such conditions the inaudible sounds emanating from the operator, would have to be neutralized by a negative device to get at the proper conditions while under his manipulation. Thus the hidden inaudible world of sounds could be shown up, as the microscope shows up to the eye the hidden invisible forms of nature.

The conditions of the mechanical requirements necessary to conduct successfully the line of research I am now pursuing, will never be properly appreciated until the beauty of this system is shown up under perfect control for commercial use.

I have spoken elsewhere of the almost infinite difficulties of getting into position, to hold hydrogen gas in suspension between soap film a proper period of time, to conduct these experiments. The setting of the other parts of the apparatus is quite easy in comparison. All wave propagations, electromagnetic or otherwise by being thus refracted can be measured in regard to the time of their propagation all of which are introductorily subservient to the luminiferous ether. The theory put forward by "men of science" in regard to electromagnetic forces shows that they are misled

by the imperfection of their instruments. They are trying to measure the infinite by the finite, necessitating terms of avoidance, to the instantaneous propagation of nature's sympathetic evolutions, of the same nature as the one advanced in the assertion that a force does not exist in the interstitial embrace of all matter.

Maxwell's theory is correct that the plane of polarized light is the plane of magnetic force. The sympathetic vibrations associated with polarized light constitute the pure coincident of the plane of magnetism. Therefore, they both tend to the same path, for both are interatomic, assimilating sympathetically in a given time, to continue the race together, although one precedes the other at the time of experimental evolution. The time is approaching when electromagnetic waves with an outreach of two feet will be produced, having an energy equal to that now shown up on the magnet when it is about to kiss its keeper, and showing a radiating force too stupendous for actual measurement.

I have already shown, to a certain point, the power of this radiation, by breaking a rope that had a resisting strain of over two tons, which was attached to the periphery of a steel disk, twelve inches in diameter, moving at the slow rate of one revolution in two minutes, its molecular structure vitalized with 42,800 vibrations per second. There was no retardation while breaking the rope, and no acceleration when it was broken. This experiment has been repeated scores of times, before scores of visitors.

When the triple introductory impulse is transmitted towards the mass to be sensitized, it subserves the molecular concordant thirds and antagonizes the discordant sixths extending the range of their oscillating paths, and thus induces the highest order of repellant antagonism towards the center of neutral equilibrium.

We will now follow out, in their progressive orders, the conditions necessary to give to these acoustic introductory impulses the power, as transmitted through the proper media, to induce molecular disassociation.

First: If I wish to disturb and bring into action the latent force held in the embrace of any molecular mass, I first find out what the harmonic chord or note of its mass represents, and as no two masses are alike, it would seem to necessitate an infinite number of variations to operate on different masses, but such is not the case. All masses can be subserved to one general condition by the compound mechanical devices which I use for that purpose. We will suppose that the mass to be experimented upon, when chorded, represents B flat. Then, first, the negative radiating focalizing bar on the disk is liberated from its dampening rod, and associated with the magnetic defocalizing one. There are seven ranges of bars in all.

(See symbol representing sympathetic transmissive chord of B flat, third octave on third diatonic.)

The seven assemblings are in this order:

	Dominant 3rd	Electro- Magnetic	Diatonic 6ths	Harmonic Enharmonic	Negative 7ths
I	II	III	IIII	IIII	IIIIII

The second step is to liberate, according to symbolic meaning, second harmonic on sixths, or neutralizing one, and third, enharmonic ninths, which is the one counting from negative sevenths. Now all is in readiness for the transmissive nodal wire, one end of which must be attached to the magnetic dispersing ring, over the negative sevenths cluster, and the other end to the high polar negative attractor. Then, one end of a transmitting wire, of very fine proportions of gold, silver and platina, is connected to the resonating sphere, and the other end to the mass to be experimented upon. I then give to the siren a rotatory impulse of a velocity to indicate the concordant mass attached. If the introductory settings are all right, the neutral center indicator will rotate with high velocity, and a single tap on the Chladni wave-plate is all that is necessary to induce pure evolution.

Either attraction or dispersion can be induced on any mass by setting the instrument to the proper triple introductory positions, towards the mass chords it represents, either positive or negative.

This system of evolution might be expressed as disintegration induced by the intensified oscillations of interatomic electromagnetic waves.

How plainly this principle of harmonic sympathetic evolution indicates the structural condition of the atom as one of wonderfully complex form, as also is the progressive step toward it in the molecular and intermolecular field.

During the effect induced by disintegration of molecular mineral masses there is no molecular collision when forced asunder from their radiating centers of neutrality. Their atomic and interatomic centers seek their media of tenuous affinity in the far borders of the etheric field, leaving all metallic masses, that are associated with them, behind in their virgin form. (11)

Professor Fitzgerald's lecture on electromagnetic radiation shows that scientific men are beginning to realize and that fairly, the truths appertaining to the new philosophy. The professor admits that electricity and magnetism are of differential character and he is right. The progressive subdivision, induced by molecules by different orders of sympathetic vibration, and the resultant conditions evolved on the intermolecule and interatom, by introductory etheric dispersion, prove that the magnetic flow of itself is a triple one, as is also the electric. Again, the professor says that electricity and magnetism would be essentially interchangeable if such a thing existed as magnetic conduction, adding: "It is in this difference that we must look for the difference between electricity and magnetism." Thus you see how plain it is that pro-

gressive scientists are approaching true science. The rotation of the magnetic needle, as produced in my researching experiments, proves conclusively that the interchange spoken of, in Professor Fitzgerald's lecture, is a differentiated vibratory one, in which the dominant and enharmonic forces exchange compliments with each other, in a differential way, thus inducing rotation, in other words polarization and depolarization.

The transmission of sympathetic atomic vibration, through a triple nodal transmitter, induces an interatomic percussion, that results in triple atomic subdivision, not oscillating across the diameter of the atom, but accelerating to an infinite degree the atomic film that surrounds it and at the same time extending the vibratory range of the atom far enough to set free the gaseous atomic element.

Keynote of electromagnetic sympathy, transmissive combinations, thirds, on the subdivision of first octave B flat, diatonic. Sixths, on same subdivision of thirds, octave harmonic, and ninths, on the same subdivision on the sixths, octave enharmonic.

I find that there is no medium in the range of vibratory philosophic research, that is as unerringly exact, towards the center of sympathetic attraction, as the negative attractive influence of a certain triple association of the metallic masses of gold, silver and platina. In fact, they are as accurate indicators of the earth's terrestrial sympathetic envelope, and its triple focalized action towards the earth's neutral center, as the magnet is an indicator of the diversion of the attractive flow of the dominant current of the electric stream. Although much has been written on the subject, the conditions attending the continuous flow of the magnet remains a problem that has never been solved by any other theory. Yet the solution is very simple when harmonic vibratory influence is brought to bear upon it.

The harmonic attractive chord, thirds, induces a nodal interference on that third of the triune combination of the terrestrial envelope, that is immediately associated with this medium of interference, and moves towards the negative pole of the magnet, then flows through it to reassociate with the full triune combination, through the positive, thus:

Dominant
Harmonic
Enharmonic

The triune stream, one current of which is diverted from the Dominant, flowing in at the Negative end of the magnet and out to join the triune terrestrial stream at the Positive end.

The continuous flow of the magnet is merely a diversion of that portion of the terrestrial envelope that electricians have never controlled. This third current, of this triune stream, has never been subdivided and only slightly diverted towards the negative pole of

the magnet, flowing unbrokenly back to associate sympathetically with the full triune combination of the earth's negative neutral force. (Descartes thought that all magnets are traversed by a subtle fluid out at the North Pole, and curving round, in the ether, re-enters at the South Pole, thus completing the circuit). Thus the problem is solved of the continuous and never-ending force of the magnet, in carrying its load without any diminution of its energy. There is no influence, as yet known, that can break up its line of sympathetic flow as associated with the triune combination. Polarization and depolarization, in its action, is nodal negative interference, intermittently excited, inducing differential disturbance of polar sympathetic equilibrium.

The attractive power, evolved by a magnet in sustaining its load, is no evidence that it is molecularly attractive, for under the influence of the dominant current of the electric stream, the range of its molecular mass is not extended, but by the action induced in atomic vibration, the latent, of undisturbed power, that is locked up in its atomic embrace, is put into sympathetic action, and evolves the force that is recognized as magnetic. When its exciter is removed, it returns to atomic recesses to remain perfectly latent, until again brought into action by its proper exciter.

When a steel unmagnetized bar is associated with a magnetized one, the latent force in the unmagnetized one is sympathetically brought into action, associating itself to the magnetic one, without depreciating the power of it one iota. Dissociation and association between the two bars can go on indefinitely with the same result.

The suspension and propelling of an atmospheric navigator of any number of tons weight, can be successfully accomplished by thus exciting the molecular mass of the metal it is constructed of, and the vibratory neutral negative attraction evolved, will bring it into perfect control, commercially, by keeping it in sympathy with the earth's triune polar stream. There is enough of this latent power locked up in the embrace of the iron ore, that is contained in our planet, which, if liberated and applied to proper vibratory machinery, would furnish force enough to run the commercial power of the world, leaving millions of times more to draw upon, as the needs increase. The velocity of the vibration governing the flow of the magnetic stream, comes under the head of the first interatomic, and ranges from 300,000 to 780,000 vibrations per second, the first order above odor permeating the molecules, of the glass plate of the compass (with the same facility that atmospheric air would go through an ordinary sieve through which it passes) to arouse sympathetically in the needle the concordant condition that harmonizes with its own. The course of this sympathetic flow is governed by the full harmonic chord, and consequently moves in straight lines, thus transmitting its sympathy free of molecular interference.

The order of vibration associated with the trans-

mission of odor acts by sympathetic negative interferences, and consequently, moves in circles, with a velocity of 220,000 per second, at least.

If in any way the circle of its rotary diameter could be reduced to that of the corpuscular structure, then a bottle containing an odorous substance though sealed as hermetically as an Edison light-bulb, could no more confine its corpuscles than an open chimney the smoke ascending from the fire burning at its base. (11)

ELECTROMAGNETIC SYMPATHY: "Keynote of electromagnetic sympathy, transmissive combinations, 3rds, on the subdivision of first octave B flat, diatonic, 6ths, on same subdivision of 3rds, octave harmonic; and 9ths, on the same subdivision of 6ths, octave enharmonic." See **MOLECULAR DISSOCIATION**

ELECTROMAGNETISM: See **MAGNETISM** for definition.

ELECTROMECHANICAL CONVERSION: The conversion of electrical energy into mechanical energy and vice-versa. (102)

ELECTRON: The electron can be said to be the quantum of the Dirac field through second quantization of the Dirac equation, which also leads to the prediction of the existence of the positron as another quantum of this field with the same mass but with a charge opposite to that of the electron. (3)

ELECTRON: The small, negatively charged particle that normally circles the nucleus of an atom. (116)

ELECTRON VOLT: (abbreviated eV). The energy acquired by one electron falling through one volt of potential energy. (116)

ELECTRONEGATIVITY: Electronegativity, according to L. Pauling, is "the power of an atom in a molecule to attract electrons to itself." With the concept of electronegativity, a vast number of observations of chemical and physical properties have been either correlated or predicted. Quantitative definitions and scales of electronegativity have been based not on electron distribution itself but on properties which were assumed to reflect electronegativity. The electronegativity of an element depends upon its valence state and thus is not an invariant atomic property. (3) to see chart of elements.

ELECTRONS: "It is as the electron that is Life itself." (294-142) (2)

ELECTRONS: "The number of electrons in an atom determines the nature of the atom, and the vibrations of the electrons in an atom manifests the nature of the atom." (Lewis)

ELECTRONS: "Electrons are of two kinds - those vibrating at an even number and those vibrating at an

uneven number. An even number is positive and odd number is negative." (Lewis)

ELECTRONS: Same as BETA PARTICLES, MATTER.

ELECTROSTATIC POTENTIAL: Electrostatic potential is regarded as a purely 3-dimensional spatial stress. Instead, it is the intensity of a many-dimensional (at least four-dimensional) virtual flux and a stress on all four dimensions of spacetime. This is easily seen, once one recognizes that spacetime is identically massless charge. (It is not "filled" with charge; rather, it is charge!) Just as, in a gas under pressure, the accumulation of additional gas further stresses the gas, the accumulation of charge (spacetime) stresses charge (spacetime). Further, if freed from its attachment to mass, charge can flow exclusively in time, exclusively in space, or in any combination of the two. Tesla waves - which are scalar waves in pure massless charge flux itself - thus can exhibit extraordinary characteristics that ordinary vector waves do not possess. And Tesla waves have extra dimensional degrees of freedom in which to move, as compared to vector waves. Indeed, one way to visualize a Tesla scalar wave is to regard it as a pure oscillation of time itself. (48)

ELECTRUM: [Chemistry] A natural gold-silver alloy of antiquity most notably in ancient Egypt. (88) See **AZEM**

ELECTRUM MAGICUM: A composition of seven metals, compounded according to certain rules and planetary influences; a preparation of great magic power, of which magic rings, mirrors, and many other things may be made.

The electrum magicum is prepared as follows: Take ten parts of pure gold, ten of silver, five of copper, two of tin, two of lead, one part of powdered iron, and five of mercury. All these metals must be pure. Now wait for the hour when the planets Saturn and Mercury come into conjunction, and have all your preparations ready for that occasion; have the fire, the crucible, the mercury and the lead ready, so that there will be no delay when the time of the conjunction arrives, for the work must be done during the moments of the conjunction. As soon as this takes place melt the lead and add the mercury, and let it cool. After this has been done, wait for a conjunction of Jupiter with Saturn and Mercury, melt the compound of lead and mercury in a crucible, and in another crucible the tin, and pour the two metals together at the moment of such conjunction. You must now wait until a conjunction of the sun and either one or both of the above named planets takes place, and then add the gold to the compound after melting it previously. At a time of a conjunction of the moon and the sun, Saturn or Mercury, the silver is added likewise, and at a time of a conjunction of Venus with one of the above named planets the copper is added. Finally, at a time of such a conjunction with Mars, the whole is completed by the addition of the powdered iron. Stir the

fluid mass with a dry rod of witch-hazel, and let it cool. (All the above named conjunctions take place in our solar system in the course of thirteen successive months, but the directions may refer to conjunctions of principles contained in the Microcosm of man.)

Of this electrum magicum you may make a mirror in which you may see the events of the past and the present, absent friends or enemies, and see what they are doing. You may see in it any object you may desire to see, and all the doings of men in daytime or at night. You may see in it anything that has ever been written down, said, or spoken in the past, and also see the person who said it, and the causes that made him say what he did, and you may see in it anything, however secret it may have been kept.

Such mirrors are made of the electrum magicum; they are made of the diameter of about two inches. They are founded at a time when a conjunction of Jupiter and Venus takes place, and moulds made of fine sand are used for that purpose. Grind the mirrors smooth with a grindstone, and polish them with tripoly, and with a piece of wood from a linden tree. All the operations made with the mirror, the grinding, polishing, etc. should take place under favorable planetary aspects, and by selecting the proper hours three different mirrors may be prepared. At a time of a conjunction of two good planets, when at the same time the sun or the moon stands on the 'house of the lord of the hour of your birth,' three mirrors are to be laid together into pure well water, and left to remain there for an hour. They may then be removed from the water, enveloped in a linen cloth, and be preserved for use. (131)

ELEMENTALS: Spirits of nature. Substantial but (for us) invisible beings of an ethereal nature, living in the elements of air, water, earth, or fire. They have no immortal spirits, but they are made of the substance of the soul, and are of various grades of intelligence. Their characters differ widely. They represent in their natures all states of feeling. Some are of a beneficial and others of a malicious nature. (131) See **FORCE-GASEOUS**

ELEMENT: An element of matter is the smallest particle of the ultimate form of matter.

"Thus either present elements are the true elements, or else there is the probability before us of obtaining some more high and general power of nature even than electricity, and which, at the same time, might reveal to us an entirely new grade of elements of matter, now hidden from our view and almost from our suspicion." Faraday

ELEMENTARIES: The astral corpses of the dead; the ethereal counterpart of the once living person, which will sooner or later be decomposed into its astral elements, as the physical body is dissolved into the elements to which it belongs. These elementaries have under normal conditions no consciousness of their own; but they may receive vitality from a me-

diuistic person, and thereby for a few minutes be, so to say, galvanized back into life and (artificial) consciousness, when they may speak and act and apparently remember things as they did during life. They very often take possession of Elementals, and use them as masks to represent deceased persons and to mislead the credulous. The Elementaries of good people have little cohesion and evaporate soon; those of wicked persons may exist a long time, those of suicides, etc., have a life and consciousness of their own as long as the division of principles has not taken place. This division takes place in consequence of the opposite attraction of matter and spirit. After it is accomplished, the astral body will be dissolved into its elements, and the spirit enter into the spiritual state. These are the most dangerous. (131)

ELEMENTS: Elements are defined as simple substances out of which no other two or more essentially differing substances have been obtained. Compounds are bodies out of which two or more essentially differing substances have been obtained. A molecule is the smallest part of a compound or element that is capable of existence in a free state. Atoms are set down, by those who believe in the atomic theory, as the indivisible constituents of molecules. Thus, an element is a substance made up of atoms of the same kind, a compound is a substance made up of atoms of unlike kind.

Over seventy elements are now known. Priestly claimed that all discoveries are made by chance. (11)

The elements, those "simple substances" of science, which they state we can no further subdivide or analyze have withstood the cosmic forces of heat, gravity, magnetism, electricity, *etc.* already existing and preexisting in the elemental state of formation of the earth. These forces cannot reasonably be expected to exercise potency as analyzing agents, when applied in a limited way by man. (11)

ELEMENTS: A term expressing the three forms into which NOUS organizes to express or compose matter (electrons, atoms, and molecules). See **NOUS, LIGHT, MASS**

ELEMENTS, ALCHEMICAL: [Alchemy] Aristotle wrote: "Elements are simple substances of which the universe is composed and one of which cannot be separated into the other." Aristotle held that there is one primary matter and four fundamental qualities: heat and coldness, dryness and wetness. Their combinations are material elements: fire, water, air and earth. According to Aristotle, all bodies are composed of these elements. Aristotle's teaching was the theoretical foundation of alchemy and various natural philosophy schools for many centuries to come. (88)

In the 16th century Paracelsus, a famous physician, mystic and scientist, brought the elements "closer to earth." He suggested that all substances consist of three sources, mercury, salt, and sulphur, which are the carriers of three qualities: volatility, solidity, and

inflammability. (88)

ELEMENTUM: The invisible element or basic principle of all substances that may be either in a solid (earthly), liquid (watery), gaseous (airy), or ethereal (fiery) state. It does not refer to the so-called simple bodies of "elements" in chemistry, but to the invisible basic substances out of which they are formed. (131) See **NOUS, ETHER**

ELEVENTH: The interval of an octave and a fourth. A compound fourth. (125)

EMISSIONS: [NDT] See **ACOUSTIC EMISSION**.

ENERGY DIRECTOR: A projection of plastic material from a part of the workpiece for concentrating the ultrasonic energy along the joint line. (102)

ELLIPSES: Quantum Arithmetic is very specific on elliptical areas. Radii are r^1 and r^2 for the two semi-diameters of an ellipse. And the area of an ellipse is therefore ($r^1=d^2$, and $r^2=d \sqrt{ab}$), $d^3\sqrt{ab}$. (This must be multiplied by π if one insists) In the circle the two radii are equal. The square root of the radius is, then the basic number to be multiplied and not the radius itself. The roots of a circle are $n, 0, n$, in which all " n " are the square root of the radius, and $ab=n^2$. So the area of a circle is $n^4\pi$, instead of $\sqrt{r}2\pi$. (14)

EMISSION LINE BOND ENERGY DIFFERENCE: An emission line bond energy difference is the arithmetic difference between the emission line energies of 2 bonded atoms within a molecule. These differences often show reasonable agreement with "bond energies" as conventionally determined. (5) See **SPECTRAL ENERGY; FRAUNHOFER LINES**

EMISSION LINE ENERGY: An emission line energy (ELE) is the amount of energy which can be gained or lost by 1 gram atom of an element undergoing a specific electronic transition. Emission line energies are expressed as kilocalories per mole of quanta. Their values are always positive numbers. Each is an intrinsic property of an atom. (5) See **SPECTRAL ENERGY; FRAUNHOFER LINES**

EMPHASIS: Accent. (125)

ENERGY: "The kinetic and potential energy of a body is the result of motion and determined by the product of its mass and the square of its velocity. Let the mass be reduced, the energy is diminished by the same properties. If it be reduced to zero, the energy is likewise zero for any finite velocity." (Nikola Tesla)

ENERGY: Energy is a sympathetic condition inherent in all forms of aggregated matter, visible and invisible. It is ever present, in its latent condition, and is aroused by the sympathetic disturbers of its equilibrium. By this conservation it becomes transferable. The sympathetic correlation of will-force in the cerebral convolutionary centers transfers its energy to the physical organism.

Bring a steel rod in contact with a magnet and the latent energy in the rod is brought into action without its becoming impregnated by its magnetic exciter. Energy is an infinite latent force. If it did not exist it could not be generated. Consequently, there would be no energy to lose nor to conserve. The volume of latent energy in the etheric domain never increases nor ever grows less. It will remain the same, as yesterday, today, and forever. (11)

ENERGY: The ability to do work. It comes in many forms (kinetic, potential, and mass) and is conserved. (116)

ENERGY: In a way in which we might understand energy as seeing it on an oscilloscope as a definite change or a distortion of wave form patterns in some wave frequency. That distortion and that frequency appears and reappears as a fundamental part of that wave form until it is changed by external forces.

The fact is that stemming down from these infinitely higher dimensions are great vortexes of energy.

We can actually assume that all energy, in all forms or transmissions, or in dimensions in which we find energy, always has a very definite relationship with harmonic chord structures. It cannot function any other way. Suppose now your radio is attuned; it is a superheterodyne radio. We have a frequency of 600 kilocycles, we have a frequency of 1500 kilocycles, we beat them against each other and regenerate a 900 kilocycle intermediate frequency note which carries the carrier through amplification into rectification.

Consciousness and Superconsciousness not only counteract but regenerate. Take two violins; if they are in tune and we pluck the "A" string of one, it regenerates the music in the other. In other words, in our understanding of energy, we know that energy is always changing. There is no such thing as a solid mass; it is an erroneous misconception. The atoms in this building, the walls in this room are all pulsating substances. They are all masses of energy just as is your body. They all have to be supported internally from other dimensions.

There is a directive force behind all energy and it is an energetic force - this is God. That is the Infinity of God because God, in His relationship to all these forms and expressions of energy, interprets these things through the various frequencies and harmonic structures and the transpositions of energy in the various dimensions. (117)

ENERGY OF AMPLITUDE: See **LAW OF ENERGY OF AMPLITUDE**

ENERGY FROM VIBRATORY INDUCTION: The permanence of form and matter is permitted only by the balanced activity of the three fundamental modes of vibration at the neutral center thereby suspending their activity. The continuity of existence of

all molecules - and therefore of all masses - depends on the molecular neutral center where the fundamental component vibrations are temporarily held in balance. Should we break up the equation of these three modes of vibration, we will evolve latent power into kinetic energy. By influencing this neutral center, certain orders of vibration can break up the balanced equation, divide the components of the molecules and thereby divide the components of the mass into the primordial ether, from which the molecules were originally constructed.

There are certain modes or properties of vibration which can direct the component vibrations of any mass to the neutral center of that mass "neutral attraction," "neutral affinity," "negative attraction," "polar negative attraction," are terms expressing the effect or resultant of certain combinations of these modes or properties of vibratory induction.

Through study of the dominant Keely sought to control the power he evolved, by altering the dominant mode of vibration in the triplicate flows of force. One of his friends said "The vibrations used by Keely, which rupture the molecular and atomic capsules of matter, must remain **THOUGH IN ONE POINT ONLY**, a secret with the discoverer until he has completed his system and successfully demonstrated and patented one invention." Therein is where Keely failed. He was not able to prevent reversions - his machine would not remain in continuous motion. (11)

ENHARMONIC: 1) One of the three genera of Greek music, the other two being the Diatonic and Chromatic. Having intervals less than a semitone, *e.g.*, an enharmonic organ or harmonium is an instrument having more than twelve divisions in the octave, and capable, therefore, of producing two distinct sounds where, on the ordinary instrument, one only exists, as, for instance, G# and A flat, etc. (125)

ENHARMONIC: "in concord"; relating to that genus or scale employing quarter tones; comprising a major third and two quarter tones also the difference between three conjunct major thirds and an octave (ratio of 125:128); relating to the difference in pitch that results from the exact tuning of a diatonic scale and its transposition into another key.

In Greek music the enharmonic genus was the oldest of three ways of subdividing a tetrachord, the other two being the diatonic and the chromatic. In its original form it seems to have consisted simply of a major third with a semitone below, but in quite early times the semitone was divided into two quarter-tones, so that there were four notes in all, instead of three.

The existence of these small intervals, which were in use until Hellenistic times, is evidence of the close association between Greek music and Oriental music.

In modern acoustics the enharmonic diesis is the interval between an octave, *i.e.*, $2/1$; and the three major thirds, *i.e.*, $(5/4)3=125/64$; B# is therefore flatter

than C, and the interval is $(2)/_{64}^{125}/_{125}^{128}$.

On keyboard instruments, however, B# and C are identical, and this has encouraged composers to use harmonic changes which exploit this identity, where D# becomes E flat. Substitution of this kind is known as an enharmonic change. An enharmonic modulation is one which makes use of such a change to facilitate the progress from one key to another. (21)

ENHARMONIC SCALE: An enharmonic scale is one containing intervals less than a semitone. (125)

ENHARMONIC SIXTHS: On the enharmonic sixths, the vibration of the intermolecule is increased to 300,000,000. See **RATES OF VIBRATION, LAWS OF BEING**

ENHARMONIC MODULATION: An enharmonic modulation is a change as to notation, but not as to sound. It is important to notice that an enharmonic modulation is not so termed in strict propriety, because it is only feasible on an ordinary keyed instrument by actually ignoring the existence of intervals smaller than a semitone. (125)

ENHARMONIC THIRD: See **LAWS OF BEING**

ENIGMA: See **SEVEN WORLD ENIGMAS**.

ENNEAD: Group of nine; any of several groups or cycles of nine gods that were considered to be associated in the mythology and religion of ancient Egypt.

ENOPLIUS: Warlike music. Music of the war-dance. (125)

ENTOELECHEIA: The purpose principle in the organism according to Aristotle. (121)

ENTROPHY: The using up (or *involution*) of cosmic energy by conversion into heat. (121)

ENVELOPE: Attack and decay of a sound. (69)

ENVELOPE: Time variation of the amplitude (or energy) of a vibration. (75)

ENVELOPE GENERATOR: Produces transient voltages useful in creating attacks and decays and special effects. (69)

EOLIAN MODE: The fifth of the authentic Gregorian modes. It consists of the natural notes La, Si, Do, Re, Mi, Fa, Sol. (125)

EPIMER: Relationship: relationship in the form of

$$\begin{array}{c} m \\ 1+ \quad - - - \\ m+n \end{array}$$

(81)

EPIGENESIS: The internal development of organs

in the foetus. (121)

EPITHELIUM: The internal skin or lining or organisms. (121)

EPITRITE: Sesquiterian relationship: relationship of 4 to 3, measuring the consonance of the fourth. (81)

EQUALIZATION: Equalization, in a general sense, refers to any deliberately introduced change in frequency response. It is used, for example, during disc recording to boost the treble range and weaken the bass range. During playback, an opposite equalization is applied to restore the original tonal balance. The treble range is emphasized during recording so that when the treble is reduced in playback, the record's surface noise will also be reduced. The bass range is reduced during recording in order to prevent the cutting stylus from overcutting the groove at low frequencies. As the term "equalization" implies, everything comes out "equal" in the end, hopefully with flat overall response between microphone and loudspeaker. Since 1955 all records have been cut for playback with the RIAA (Recording Industry Association of America) equalization curve. Either the playback amplifiers provide equalization in their pre-amplifier stages, or the cartridge itself compensates for the RIAA curve. Tape is equalized both in recording and in playback to compensate for the inherent high and low frequency losses in the recording process. In addition, there are different equalizations for each tape speed on most tape recorders, the correct equalization for each speed is automatically switched in when the speed is set. (103)

EQUIPARTITION THEOREM: Derived from Newtonian laws of mechanics, it states: The total energy contained in the assembly of individual particles exchanging energy among themselves through mutual collisions is shared equally (on the average) by all the particles. see Keely's Laws of Sympathetic Vibration.

EQUISONANS: (Lat.) The name given to the consonance of the unison and octave. (125)

EQUIVOCAL or DOUBTFUL CHORDS: A name given to combinations of sounds which are common to two or more distinct keys, and which, when heard, make the listener doubtful as to the particular key-tonality into which they are about to be resolved. The simplest form of chords of this class is to be found in the so-called diminished triad; B, D, F. The inversions of this chord give, as might be expected, greater scope for varied ns than can be obtained from its original position. The next import doubtful chord is the diminished seventh, but in this case it will be noticed that the numerous resolutions are the result of its possible enharmonic change, whereas, in the diminished triad, no alteration has been made in the notation of the chord. (125)

ERODINIUM: A pictorial or allegorical representa-

tion of some future events; visions and symbolic dreams that may be produced in various ways. There are three classes of dreams from which may arise four more mixed states of dreams. The three pure classes are: 1) Dreams that result from physiological conditions. 2) Dreams that result from psychological conditions and astral influences. 3) Dreams that are caused by spiritual agency. Only the later are worthy of great consideration, although the former may occasionally indicate important changes in the planes to which they belong; for instance, a dream of a nail being driven into the head may predict apoplexy, etc. (131)

ERGONOMY: Sphere of work. (121)

EROTIC CHEMICOTROPISM: The physical property by which the ovum and spermatozoon seek to coalesce. (121)

ERROR: The algebraic difference between the indicated value and the true value of the measured variable. It is often expressed as relative error, *i.e.*, as a percent of the output reading of the transducer. (100)

ERYTHEMAL RAYS: See RAYS, ERYTHEMAL

ESSENTIAL HARMONY: Harmony independent of grace, auxiliary, passing, syncopated, anticipating, or pedal notes. (125)

ESSENTIAL NOTES: Notes belonging to a key-chord. The essential notes of the chord of F major, A, C. (125)

E STRING: See CANTINO

ESSENTIAL MACHINERY: That group of rotating equipment which is critical to part of the plant process. When essential machinery is not operating, the overall plant is not operating to full capacity. Machines in this category can be spared or unspared and are typically monitored continuously. (100)

ETHER: "Ether is an atomolic liquid 986,000 times the density of steel." Keely (9)

Keely announced in 1888 that he had proved the uselessness of building engines to employ the ether as a motive power, which could only be used as a medium for the power which he had discovered, namely a condition of sympathetic vibration associated both positively and negatively with the polar stream.

ETHER: "Keely proved the uselessness of building engines to employ the ether as a motive force." Bloomfield-Moore

S. Zolver Preston, in his Physics of the Ether, says: "A quantity of matter representing a total mass of only one grain, and possessing the normal velocity of the ether particles, that of a wave of light, encloses a state of energy represented by upward of one thou-

sand millions of foot tons. Or the mass of a single grain contains an energy not less than that possessed by a mass of 70,000 tons, moving at the speed of a cannon ball (1200 feet per second); or, otherwise, a quantity of matter, representing a mass of one grain, imbued with the velocity of the ether particles, encloses an amount of energy which, if entirely utilized, would be competent to project a weight of 100 tons to a height of one mile and nine-tenths of a mile." (1)

Dr. MacVicar, in his theories of the bearing of the cosmical law of assimilation on molecular action, says: "During this retreat of matter into ether in single material elements or units of weight, the molecules and masses from which such vaporization into the common vapor of matter is going on, may be expected to be phosphorescent." This surmise Keely has, over and over, demonstrated as a fact, also showing how gravitation operates as a lever, etheric wave motion, concentration under vibratory concussion, and negative vacuous tenuity.

Fichte writes: "The will is the living principle of the world of spirit as motion is of the world of sense." Newton said that this subtle ether interpenetrates all matter and is concealed in their substance, through the strength and activity of which, bodies attract each other and adhere together when brought in contact, annihilating distance, as if objects might touch each other. Through this "life spirit" light also flows, is refracted and reflected and bodies are warmed. Pythagoras viewed this as a divine luminous principle or substance which permeates all things and at the same time contains all things. They called it the astral light. The Germans call it the "Welgeist".

"In Keely's theories all is mechanical in nature. A molecule of steel, a molecule of gas, a molecule of brain matter are all of the one primeval substance - the Ether." Chapter 9 of (1)

If all cosmical action is cyclical, matter, when existing free in the ether, must ultimately tend to dissolve into pure ether again, for, if the law of creation is as a cycle, in which, after development and as its fruit, the last term gives the first, then has he grounds for his conjecture that complication in structure is necessary to the segregation of nervous matter, and the construction of a "myo-neuro-cerebral system" and that ether and matter, after developing a molecular economy, as the mother and nurse of a soul or monad of a higher order than the merely material element, through or by this organism, complete the cycle of the economy of material nature, and eventually touch upon the spiritual world again and contribute to it. This true protoplasm, the ether, Keely claims to liberate by vibratory machinery as the medium of a motive power, which he calls "sympathetic negative attraction."

The ether is the universal agent of energy and only through it are motion and attendant phenomena produced. It may very properly be called the "Soul of Things."

Its sympathetic activity and infinite tenuity give it a frequency so great as to evolve self-luminescence. This same luminescent ether is bound latent in the corpuscular embrace in all aggregated matter until liberated by a "compound vibratory negative medium" - heat, vibration or sympathetic negative attraction. This very property of self-luminescence evidenced by the ether indicates a still greater region beyond.

Hertz conjectured that a knowledge of the structure of the ether would reveal the essence of matter itself together with its inherent properties, weight and inertia. He said, "Soon the question set by modern physics will be 'Are not all things due to conditions of the ether?'" He discovered in 1888 that the ether had been imprisoned and used as a fulcrum for electric attraction and repulsion in every electromagnetic engine, without any scientist even so much as suspecting it before. Pythagoras considered the Ether as a divine luminous principle which pervades and permeates all things. The German mystics called it the "Weltgeist" or "Astral Light." Newton believed that through its activity and strength bodies were caused to attract each other and adhere.

Celestial sympathetic radiation of the "compound interetheric" is the fountain head from which all aggregate matter is formed, the controlling force in all aggregations. If there were no radiation from the great Celestial Center, space would be void.

"The mathematics of vibratory etheric science, both pure and applied, require long and arduous research. It seems to me no man's life is long enough to cover more than the introductory branch. The theory of elliptic functions, the calculus of probabilities, are but pygmies in comparison to a science that requires the utmost tension of the human mind to grasp."

"The luminiferous ether - the compound-interetheric element - in other words, celestial mind force - is the substance of which all visible and invisible things are composed." Keely seems here to speak of the Neutral Center as the Celestial Mind Force. "It is the great sympathetic protoplasmic element - life itself. Its sympathetic outreach is mind flow - or will force - actuating sympathetic polarization to produce action and sympathetic depolarization to neutralize it. Polar and depolar differentiation result in motion. The ether has for its attendants gravity, electricity and magnetism, the triple conditions born of itself. It is the Soul of Matter, from which all forms of motion receive their introductory impulse."

"Corpuscular activity represents the outflow of the ether from the luminiferous toward neutral centers of aggregation revealing the connecting link between mind and matter. This luminosity has no thermal accompaniment, although, paradoxically, all thermal conditions emanate from etheric vibration. The tenuity of the ether accounts for this. It is only when the streams come in contact with crude matter that heat is

evolved from its latent state together with a different order of light, from the luminiferous ether, the sun being the intermediate transmitter."

"Were it not for the intense vortex motion attending the dissociation of water into Hydrogen and Oxygen, the ether could not be held suspended either in the molecular or atomic envelopes. This vortex action is caused by the differential conflict between terrestrial condensation and solar tensions, the outflow and inflow, which also produces light."

The attractive property of the interetheron for streams of coincidence (the nodes of resonant vibrations) is not a magnetic force exercised by itself. The magnet is susceptible to only certain forms of aggregate matter iron for instance and its preparations.

He mentions a frequency which he claims to have produced of 156,057,552,198,220,000 per second in the spherical engine, which in turn caused a neutral indicator to revolve 123 times per second, and stated he believed this to be only a minute fraction of the frequencies governing the "far luminous centers."

"Etheric wave motion" as well as "concentration under vibratory concussion" and "negative vacuous tenuity" he demonstrated in his experiments.

He at last came to the conclusion that it was impossible to use the ether directly in an engine as we now use and control steam and electricity. He therefore turned his attention after this to the use of the ether merely as a medium for "sympathetic vibration associated positively with the polar stream" in his magnetic engine. (11)

ETHER: Q.: Ether may be defined as the combination of a higher plane, leading us to metaphysics, to where every consideration of the atom finally leads one.

A.: This is correct - for, same as the statement of positive and negative forces as relating to gravitation that act upon the individual's DEVELOPMENT, or individual's application as is occupied from within itself. Hence, as is seen, there are (This may be an illustration for this same condition) certain CHARACTERS of disease that accentuates mental forces, or the metaphysical activity of a body. There are others that so DULL the senses as that they become one-sided, or only passive, not positive; yet a NORMAL, perfectly well and normal mind as of being so active as to be considered by others in its activity as of being unbalanced, but only is it considered PECULIAR." (195-70) (2). See **DISPERSION, LEVITATION, PRIME NEUTRAL CENTER, WATER-DISINTEGRATION, UNIVERSAL FLUID, SPACE, LIGHT, FORCE-ATOMIC-HEALING**

ETHER: Eight theses on ether by Ernst Haeckel:

I. Ether fills the whole space, in so far as it is not occupied by ponderable matter, as a continuous substance; it fully occupies the space between the atoms of ponderable matter.

II. Ether has probably no chemical quality, and is not composed of atoms. If it be supposed that it consists of minute homogeneous atoms (for instance, indivisible etheric particles of a uniform size), it must be further supposed that there is something else between these atoms, either "empty space" or a third, completely unknown medium, a purely hypothetical "inter-ether"; the question as to the nature of this brings us back to the original difficulty, and so on *in infinitum*.

III. As the idea of an empty space and an action at a distance is scarcely possible in the present condition of our knowledge (at least, it does not help to clear a monistic view), I postulate for ether a special structure which is not atomistic, like that of ponderable matter, and which may provisionally be called (without further determination) *etheric* or *dynamic* structure.

IV. The consistency of ether is also peculiar, on our hypothesis, and different from that of ponderable matter. It is neither gaseous, as some conceive, nor solid, as others suppose; the best idea of it can be formed by comparison with an extremely attenuated, elastic, and light jelly.

V. Ether may be called imponderable matter in the sense that we have no means of determining its weight experimentally. If it really has weight, as is very probable, it must be so slight as to be far below the capacity of our most delicate balance. Some physicists have attempted to determine its weight by the energy of the light-waves, and have discovered that it is some fifteen trillion times lighter than atmospheric air; on that hypothesis a sphere of ether of the size of our earth would weigh at least two hundred and fifty pounds.

VI. The etheric consistency may probably (in accordance with the pyknotic theory) pass into the gaseous state under certain conditions by progressive condensation, just as a gas may be converted into a fluid, and ultimately into a solid, by lowering its temperature.

VII. Consequently, these three conditions of matter may be arranged (and it is a point of great importance in our monistic cosmogony) in a genetic, continuous order. We may distinguish five stages in it: (1) the etheric, (2) the gaseous, (3) the fluid, (4) the viscous (in the living protoplasm), and (5) the solid state.

VIII. Ether is boundless and immeasurable, like the space it occupies. It is in eternal motion; and this specific movement of ether (it is immaterial whether we conceive it as vibration, strain, condensation, etc.), in reciprocal action with mass-movement (or gravitation), is the ultimate cause of all phenomena. (121)

ETHER: Perhaps the best way to convey some idea of this order of magnitudes to the ordinary reader is to quote Sir W. Thomson's illustration, that if we

could suppose a cubic inch of water magnified to the size of the earth - i.e., to a sphere 24,000 miles in circumference - the dimensions of its ultimate particles, etherons, magnified on the same scale, or, as he expresses it, its degree of coarse-grainedness, would be something between the size of rifle-bullets and cricket-balls.

Extraordinary as these dimensions are, they are not more so than those at the opposite extremity of the scale, where the distance of stars and nebulae has to be measured by the number of thousand years their light, traveling at the rate of 192,000 miles per second, takes to reach us. Infinitely small, however, as those dimensions appear to our original conceptions derived from our natural senses, they are certain and ascertained facts, if not as to the precise figures, yet beyond all doubt as to the orders of magnitude. In dealing with them also we are to a great extent on familiar ground. Molecules are nothing more or less than small pieces of ordinary matter; and atoms are also matter, for they obey the law of gravity, have definite weights, and build up molecules as surely as molecules build up ordinary matter, and as squared stones build up pyramids.

But to understand the constitution of the material universe we must go a step further, part from the familiar world of sense, and deal with an all-pervading medium, which is at the same time matter and not matter, which lies outside the laws of gravity, and yet obeys other laws intelligible and calculable by us; of which it may be said we know it and we know it not. We call it Ether.

Ether is a medium assumed as a necessary consequence from the phenomena of light, heat, and electricity - primarily from those of light. Respecting light two facts are known to us with absolute certainty.

1st. It traverses space at a rate of 192,000 miles per second.

2nd. It is propagated not by particles actually traveling at this rate, but, like sound through air, by the transmission of waves.

The first fact is known from the difference of time at which eclipses of Jupiter's satellites are seen according as the earth is at the point of its orbit nearest to or farthest from Jupiter - i.e., from the time light takes to traverse the diameter of the earth's orbit, which is about 180 millions of miles; and this velocity of light is confirmed by direct experiments, as by noting the difference of time between seeing the flash and hearing the sound of a gun, which gives the velocity of light compared with the known velocity of sound.

The second fact is equally certain from the phenomena of what are called interferences, when the crest of one wave just overtakes the hollow of a preceding one, so that, if the two waves are of equal magnitude, the oscillations exactly neutralize one another, and

two lights produce darkness. This is shown in a thousand different ways, and for all the different colors depending on different waves into which white light is analyzed when passed through a prism. It is a certain result of wave-motion, and of wave-motion only, and therefore we know without a doubt that light is propagated by waves.

But waves imply a medium through which wave-forms are transmitted, for waves are nothing but the rhythmic motion of something which rises and falls, or oscillates symmetrically about a mean position of rest, slowly or quickly according to the less or greater elasticity of the medium. The waves which run along a large and slack wire are large and slow, those along a small and tightly stretched wire are small and quick; and from the data we possess as to light, its velocity of transmission, its refraction when its waves pass from one medium into another of different density, and from the distance between the waves as shown by interference, it is easy to calculate the lengths and vibratory periods of the waves, and the elasticity of the medium through which such waves are transmitted.

The figures at which we arrive are truly extraordinary. The dimensions and rates of oscillations of the waves which produce the different colors of visible light have been measured and calculated with the greatest accuracy, and they are as follows:

Color	# of Waves in one inch	No. of oscillations in one second
Red	39,000	477,000,000,000,000
Orange	42,000	506,000,000,000,000
Yellow	44,000	535,000,000,000,000
Green	47,000	577,000,000,000,000
Blue	51,000	622,000,000,000,000
Indigo	54,000	658,000,000,000,000
Violet	57,000	699,000,000,000,000

The elasticity of this wonderful medium is even more extraordinary.

The rapidity with which wave-motion is transmitted depends, other things being equal, on the elasticity of the medium, which is proportional to the square of the velocity with which a wave travels through it. As the velocity of the sound-wave in air is about 1,100 feet a second, and that of the light-wave about 192,000 miles in the same time, it follows that the velocity of the latter is about a million times greater than that of the former, and if the density of ether were the same as that of air, its elasticity must be about a million million times greater. But the elasticity is the same thing as the power of resisting compression, which in the case of air we know to be about 15 pounds to the square inch; so that the ether, if equally dense, would balance a pressure of 15 million million pounds to the square inch - that is, it would require a pressure of about 750 millions of tons to the square inch to condense ether to the density of the air. On the other hand, its density, if any, must be so infinitesimally small that the earth moving

through it in its orbit with a velocity of 1,100 miles a minute suffers no perceptible retardation.

Consider what this means. Air blowing at the rate of 100 miles an hour is a hurricane uprooting trees and levelling houses. If ether were as dense as air the resistance to the earth in passing through it would be 600 times that of going dead to wind in a tropical hurricane. But in point of fact there is no sensible resistance, for the earth and heavenly bodies move in their calculated paths according to the law of gravity exactly as they would do if they were moving in a vacuum. Even the comets, which consist of such excessively rare matter that when one of them got entangled among the satellites of Jupiter it did not affect their movements, are not retarded by the ether, or so slightly, that any retardation in the case of one or two of them is suspected rather than proved. But, if the ether has no weight, how can we call it material, weight being, as we have seen, the invariable test and measure of all matter down to the minutest atom? And yet how can we deny its existence when it is demonstrably necessary to account for undoubted facts revealed to us every day by the prism, the spectroscopy, electricity, and chemical action, and deductions from these facts based on the strict laws of mathematical calculation? For the existence of the ether is not based only on phenomena of light: it is an equally necessary postulate to explain those of heat, electricity, and chemical action. We must conceive of our atoms and molecules as forming systems and performing their movements, not in vacuo, but in an all-pervading medium of this ether, to which they impart, and from which they receive, impulses.

These impulses are excessively minute, and when they occur in irregular order they produce no appreciable effect; but when the vibrations of the ether keep time with those of the atoms, the multitude of small effects becomes summed up into one considerable enough to produce great changes. Just so a rhythmic succession of tiny ripples may set a heavy buoy oscillating, and the footfalls of a regiment of soldiers marching over a suspension-bridge may make it swing until it breaks down, while a confused mob could traverse it in safety. The latter affords a good illustration of the way in which molecular structures may be broken down, and their atoms set free to enter into other combinations, by the action of heat, light, or chemical rays beyond the visible end of the spectrum.

Conversely the phenomena of the spectroscopy all depend on the fact that the vibrations of atoms and molecules can propagate waves through the ether, as well as absorb ether-waves into their own motions, and thus spectra distinguished by bright or dark lines peculiar to each substance, by which it can be identified. Whatever ether may be, this much is certain about it: it pervades all space. That it extends to the boundaries of the infinitely great we know from the fact that light reaches us from the remotest stars and nebulae, and that in this light the spectroscopy enables us to detect waves propagated and absorbed by

the very same vibrations of the same familiar atoms at the enormous distances as at the earth's surface. Glowing hydrogen, for instance, is a principal ingredient of the sun's atmosphere and of those distant suns we call stars, and it affects the ether and is affected by it exactly in the same manner as the hydrogen burning in an ordinary gas-lamp.

In the direction also of the infinitely small, ether permeates the apparently solid structure of crystals, whose molecules perform their limited and rigidly definite movements in an atmosphere of it, as is shown by the fact that in so many cases light and heat penetrate through them. A whole series of remarkable phenomena arise from the manner in which the vibrations of ether which cause light are affected by the structure of the molecules of crystals through which they pass. In certain cases they are what is called polarized, or so affected that while they pass freely if the crystal is held in one direction, they are stopped if it is turned round through an angle of 90° to its former position, so that one and the same crystal may be alternately transparent and non-transparent. It would seem as if its structure were like that of wood, grained, and more easy to penetrate if cut with the grain than against it, so that when a ray of light attempted to penetrate, its vibrations were resolved into two, one with the grain which got through, the other against it which was suppressed; so that the emerging ray, which entered with a circular vibration, got out with only one rectilinear vibration parallel to the diameter which coincided with the grain.

Other crystals of more complicated structure affect transmitted light in a more complex way, developing a double polarity very similar to that induced in the iron filings when brought under the influence of the two poles of the magnet. With this polarized light the most beautiful colored rings can be produced from the waves of the different colors into which the white (undifferentiated) light has been analyzed in passing through the crystal, which alternately flash out and disappear as the crystal is turned round its axis, and which present a remarkable analogy to the curves into which the iron filings form themselves under the single or double poles of the magnet.

The importance of this will appear afterwards, but for the present it is sufficient to show that the waves of ether which cause light really penetrate through the molecules of crystals, but in doing so may be affected by them.

An attempt has recently been made, based on abstruse mathematical calculations, to carry our knowledge of the constitution of matter one step further back, and identify atoms with ether. This is attempted by the vortex theory of Helmholtz, Sir W. Thomson, and Professor Tait. It is singular how some of the ultimate facts discovered by the refinements of science correspond with some of the most trivial amusements. Thus the blowing of soap-bubbles gives the best clue to the movement of waves of light, and through them to the dimensions of molecules and at-

oms; and the collision of billiard-balls, knocked about at random, to the movements of those minute bodies, and the kinetic theory of gases. In the case of the vortex theory the idea is given by the rings of smoke which certain adroit smokers amuse themselves by puffing into the air. These rings float for a considerable time, retaining their circular form, and showing their elasticity by oscillating about it and returning to it if their form is altered, and by rebounding and vibrating energetically, just as two solid bodies would do, if two rings come into collision. If we try to cut them in two, they recede before the knife, or bend around it, returning, when the external force is removed, to their original form without the loss of a single particle, and preserving their own individuality through every change of form and of velocity. This persistence of form they owe to the fact that their particles are revolving in small circles at right angles to the axis or circumference of the larger circle which forms the ring; motion thus giving them stability, very much as in the familiar instance of the bicycle. They burst at last because they are formed and rotate in the air, which is a resisting medium; but mathematical calculation shows that in a perfect fluid free from all friction these vortex rings would be indivisible and indestructible: in other words, they would be atoms.

The vortex theory assumes, therefore, that the universe consists of one uniform primary substance, a fluid which fills all space, and that what we call matter consists of portions of this fluid which have become animated with vortex motion. The innumerable atoms which form molecules, and through molecules all the diversified forms of matter of the material universe, are therefore simply so many vortex rings, each perfectly limited, distinct, and indestructible, both as to its form, mass, and mode of motion. They cannot change or disappear, nor can they be formed spontaneously. Those of the same kind are constituted after the same fashion, and therefore are endowed with the same properties.

The theory is a plausible one, and the reputation of its authors must command for it respectful consideration; but it is as yet a long way from being an established theory which can be accepted as a true representation of facts. In the first place it is based solely on mathematical theory, and not, as in the case of atoms and light-waves, upon actual facts of weight and measurement tested by experiment, and to which mathematical reasoning affords only an aid and supplement. No one has proved the existence of such a medium or of such vortex rings, much less weighed or measured them.

Moreover the theory is open to some very obvious objections. How can aggregations of imponderable matter acquire weight, and become subject to the law of gravity, which, as we have seen, is one of the essential and permanent qualities of atoms? If a cubic millionth of a millimeter of ether formed into a big vortex ring of, say, an atom of mercury, has a weight equal to 200 times that of an atom of hydrogen,

which itself has a definite weight, why has it no weight in its original form? And if it had weight, however small, how could the enormous mass of ether filling all space produce no perceptible effect on bodies, even of attenuated cometic vapor, revolving through it with immense velocities? Again, how could these innumerable vortex rings be formed out of the ether without disturbing the uniformity and continuity of the medium, which are essential for the propagation of the light-waves through it? And how could the motions requisite to form the vortex rings be impressed on the ether *de novo* consistently with the principle of the conservation of energy? Energy can no more be created out of nothing than matter, by any process known in nature or conceivable by the human intellect; and to assume it is simply a more refined manner of falling back on the supernatural, which is itself only a more refined manner of saying that we know nothing.

For the present, therefore, we must be content with atoms and ether as the ultimate terms or our knowledge of the material or quasi-material components of the universe. (123) See **ONE SUBSTANCE, UNIVERSAL FLUID, VORTEX**

ETHER CORPUSCLES: "The velocity of the shell is 600,000 miles per second times the ratio in size of a 12 inch diameter sphere to that of the diameter of a molecule." Keely in (1), pg 300. See **NEUTRAL NEGATIVE CENTER, LAWS OF BEING**

ETHER WAVES: See **FORCES-ATOMIC**

ETHERIC: A term used by Keely to designate those rates of vibrations between the 45th and 60th octaves of the Electromagnetic Spectrum (*qv*).

ETHERIC CAPSULES, AFFINITY OF: MacVicar says "The groups of ethereal elements generate material elements. The ethereal atmospheres to become confluent or spherical and the individualized nuclei seek juxtaposition thereby forming molecules." (11) See **ETHER, PYKNOTIC THEORY OF SUBSTANCE**.

ETHERIC CAPSULE, DISINTEGRATION OF: Not until the intermolecular structure of hydrogen is subdivided by interatomic vibrations can it assimilate with the introductory etheric element.

Transmitting vibrations of the atomic order through a three-node transmitter (Trextrinar) produces infinite acceleration of the atomic film and thereby ruptures the capsule, permitting the escape of the gaseous atomic element.

The etheric capsule of one subdivision must be ruptured and the component interstitial ether of that unit released before the next higher subdivision can be disintegrated. The ether from one ruptured subdivision is absolutely essential in operation on that subdivision coming next up in the scale. (11)

ETHERIC CAPSULE, MEASURING THE VELOCITY OF THE: "How can we measure the ve-

locity of the etheric capsule - the differential range of its vibratory action? How can we actually prove the laws governing its motions, attractions and disintegration?"

"By progressive disintegration, accomplished by the proper vibratory focalized exciters we may prove all these things. By means of those introductory acoustic impulses which negativize their molecular, atomic and interatomic neutral affinities for the center of the aggregate mass we may demonstrate the laws of those vibrations which control the etheric capsule and the conditions on which these vibrations act."

"Vibrations of the atomic order, transmitted through the Trextrinar will so accelerate the atomic film or capsule that it ruptures itself and liberates the atomic gaseous element from the molecules. By this means it should be possible to measure the velocity of the atomic etheric envelope." (11)

ETHERIC CAPSULE, ROTATION OF THE:

"Consideration of even the introductory conditions of the etheric stage of vibration convinces me that the attraction of the rotating stream for the neutral center is directly proportional to its velocity. Were it otherwise, there could not be any planetary formations, or a molecular Universe. If a billiard ball is rotated rapidly enough, it will burst into fragments, which will disperse at various tangents. But if I should rotate a ball of ether, the higher the velocity the greater would be its attraction for the neutral center and its consequent cohesion or individuality.

Imagine a magnified molecule twelve inches in diameter, having an atmospheric film $\frac{1}{16}$ inch in thickness, rotating billions of times per second, at the same relative velocity as the etheric molecular capsule. It would rotate with such frequency that a particle on its exterior would travel no less than 600,000 miles per second, which would give to it such rigidity that it would be impenetrable to a steel pointed projectile at the greatest velocity we could give it. Considering the affinity of the capsule for the neutral center, which increases with the velocity, this film could enclose a pressure of several thousands of pounds per square inch. It is simply the internal pressure, registered on the specially built lever, which resulted in pressure of 5,000 to 32,000 lbs. per square inch, as produced in Keely's experiments.

Although no amount of pressure can cause the molecules to actually come in contact with each other or to rub each other, the molecular volume can be reduced by enormous pressure and the resultant tension on the rotating etheric capsule induces heat or "thermal reduction." This induced heat is a positive proof of the wonderful velocity of the etheric envelope. Were the molecules dead to sympathetic vibration and with no rotating etheric envelope, they would be incompressible and the application of pressure would produce no thermal change. (11)

ETHERIC CURRENT: Keely has attained the

transmission of the etheric current in the same manner as the electric current with this one notable difference, that, in order to show insulation to the skeptical, he passes the etheric current, through blocks of glass in running his vibratory devices.

ETHERIC - FIFTH SUBDIVISION OF MATTER:

Keely does not give an analysis of the structure of the etheric, but from the fact that he was able to subdivide it through the same process of "triple subdivision" into "interetherons" we may assume that three inter-etherons, each with its etheric capsule whirling about it, existed within the envelope of the etheron, vibrating with an oscillatory frequency greater than any of the lower subdivisions.

The fundamental mode of vibration changes as we reach the fifth subdivision, to the dominant, the diatonic third of the mass chord, which controls the vibratory states of both etheron and interetheron. The awful might concealed in the depths of the etheric and interetheric subdivisions utterly transcends anything Science has ever known. Even the theoretical energy value of radium now accepted by Science, pales into insignificance in comparison to the energy value of an equal amount of water subdivided to the etheric or interetheric state. (11)

ETHERONIC ENERGY: "Etheronic energy is the emanation from the spirit force through the active force of that which makes for matter being held in its positive position, or in its space of activity. Hence thought as a body, whether of animal or plant, is shown as of plant receiving in its freshness of vigor influences that come from or through the etheronic energy in its activity upon the body, in the expression or upon the plant as in its expression. Hence things that are equal to the same thing are equal to each other." (440-13) (2)

Q.: What is the best substance for induction, conduction, transmission of etheronic energy?

A.: "This is as raised power that would be produced from a combination of crystal. This should be rather interesting to this body, for it is very much like that used by the body in destructive forces in the Atlantean sojourn! Not that which caused the cosmic ray, or the death ray, or the healing ray - but the ray that came from setting of the prismatic influences from high heating - it may be from Arcturus or it may be from the Sun; though Arcturus would be nearer proper. The Sun may be induced to make for destructive or constructive forces, either one. It's a combination of those forces or rays that may be gathered in certain settings or prisms. It would require a lot of detail in preparing same." (440-3) (2)

"Etheronic energy is mental control." (443-5) (2) See **SYMPATHETIC OUTREACH, NEGATIVE ATTRACTION, NODES, SYNCOTHETIC, FORCE-SPIRIT, FORCE-ACTIVE**

EUPHONY: Sweet sound. An agreeable combinations of sounds. (125)

EUTHEMETRIC: Number: a number representing a linear measure only, that is a prime number. (81)

EVESTRUM: The Astral Body (Doppelgaenger) of Man; his conscious ethereal counterpart, that may watch over him and warn him of the approach of death or of some other danger. The more the physical body is active and conscious of external things, the more is the Astral body stupefied; the sleep of the body is the awakening of the Evestrum. During that state it may communicate with the Evestra of other persons or with those of the dead. It may go to certain distances from the physical body for a short time; but if its connection with that body is broken, the latter dies. (131)

EVOLUTION: The working out or development of a subject, *e.g.*, the notes of a scale. (125) See **CHORD, (10), LAW OF DOMINANT, EDGAR CAYCE READINGS ON EVOLUTION**

EXCITERS: See **MOLECULAR DISSOCIATION**

EXPONENTIAL HORN: A horn having a cross-sectional area following an exponential equation. (102)

EXPRESSION: The power or act or rendering music so as to make it the vehicle of deep and pure emotion; the spirit of the music, as opposed to the mere mechanical production of sound. (125)

EXTENDED COMPASS: A range beyond the ordinary limit of a voice or instrument. A pianoforte was formerly said to be of extended compass, when a few notes more than the old five octaves were employed; now, a pianoforte is not considered of extended compass if it has less than seven octaves. (125)

EXTENDED HARMONY: Dispersed harmony. (125)

EXTRANEOUS MODULATION: A modulation to an extreme or unrelated key. (125)

EXTREME: 1) Outside; as extreme parts, the highest and lowest parts in part-music. 2) Expanded to its furthest limit; as, extreme intervals, intervals greater than major or normal; *e.g.*, C to G# an extreme fifth. Such intervals are called also augmented, superfluous, or sharp. 3) Not closely related; a modulation into an extreme key is one into any key, other than, its own relative minor, its dominant, and subdominant, and their relative minors. 4) An old term for any key having more than three sharps or flats. (125)

EXTREME SIXTH, CHORD OF THE: A chord of modern growth, so called because the interval of an extreme or augmented sixth is contained in it, either directly or by inversion. It exists in three principal forms.

It will be noticed that this chord occurs on the sixth

degree of the minor scale, but like many other chords originally formed of notes in the minor scale, it is as frequently resolved into the major key of the tonic, as into the minor. The dominant chord of G, B natural, D, which is common to both C major and C minor, forms the connection between the resolutions thus derived.

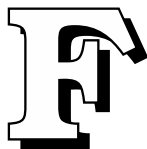
Various explanations of the origin of this chord have been suggested. Some consider it merely a chord of $\frac{6}{3}$ on the sixth of the minor scale, or the first inversion of the subdominant common chord with the sixth raised. Others look upon it as a chord of $\frac{6}{3}$ on the sixth of the major scale, or the first inversion of the subdominant common chord, with the bass-note flattened. These two opinions obtain favor in proportion to the supposed major or minor tonality of the chord.

Some authors find a much more complicated solution, namely, that it contains the minor ninth of the Dominant, combined with the major 3rd, 7th, and other notes of the fifth above the Dominant. Hence it is called a **double-root-chord**, and D/G would be given as its derivative in all the above examples.

This chord, is sometimes known as the Italian Sixth, the French Sixth or German Sixth depending on the combination of notes.

The component notes of these are often converted and form different inversions or positions.

Chords of this kind are occasionally met with in the works of Bach and Handel, but were not of frequent occurrence at that date. Among modern authors, Spohr makes most use of them, and they form an important ingredient of his flowing chromatic progressions. (125) See **THIRDS; INVERSION; SIXTH**



F: 1) The note called parhypate in the Greater Perfect system of the Greeks. The letter-name of Trite in the upper tetrachord.

2) The first note of the Eolian mode, or church scale, commencing four notes above the hypo-Eolian.

3) The note called "Fa ut" in the hexachord system.

4) The key-note of the major scale requiring one flat in the signature; and the key-note of the minor scale related to A flat. (125)

FA: The syllable used in solmisation for F. (125)

FALSE FIFTH: A fifth altered from its perfect or major scale. (125)

FALSE INTONATION: The production of an unnatural or improper quality of tone. (125)

FALSE STRING: A badly woven string, which produces an uncertain and untrue tone. (125)

FANTASIA: A composition in a style in which form is subservient to fancy. (125)

FARAD: The capacitance of a capacitor in which a charge of 1 coulomb produces a charge of 1 volt in the potential difference between its terminals. The farad is the unit of capacitance in the mksa systems.

FAR FIELD: [ACOUSTICS] That part of the sound field in which sound pressure decreases inversely with distance from the source. This corresponds to a reduction of approximately 6 dB in level for each doubling of distance. (85)

FAR-FIELD WELDING: Ultrasonic welding taking place at a distance greater than $\frac{1}{2}$ in. from the point of horn contact with the workpiece. (102)

FEEDBACK: Feedback is a term indicating that a signal is being returned to some earlier point in the amplification chain. In some cases, the return of the signal is intentional and has salutary results. In negative feedback, for instance, part of an amplifier's output signal is applied to an earlier stage in negative (*i.e.*, opposite) phase to the signal normally at that point in the circuit. Negative-feedback circuits reduce distortion, extend frequency response, and are essential to the electronics of high fidelity. Unwanted feedback, however, can be quite pesky. (103) See

ACOUSTIC FEEDBACK.

FEMALE PRINCIPLE: See IMPULSE-CREATIVE, NEGATIVE ATTRACTION, NEUTRAL NEGATIVE ATTRACTION, INTRODUCTORY IMPULSE, SYMPATHETIC OUTREACH, LAWS OF BEING

FERMI: (abbreviated F). A unit of length equal to 10^{-13} cm, about the distance across a proton. (116)

FERMI AGE: [NUCLEO] The value calculated for the slowing down area in the Fermi age model; it has the dimensions of area, not time. Also known as age; neutron age; symbolic age of neutrons. (4)

FERMI AGE MODEL: [NUCLEO] A model used in studying the slowing down of neutrons by elastic collisions; it is assumed that the slowing down takes place by a very large number of very small energy changes. (4)

FERMI BETA-DECAY THEORY: [NUC PHYS] Theory in which a nucleon source current interacts with an electron-neutrino field to produce beta decay, in a manner analogous to the interaction of an electric current with an electromagnetic field during the emission of a photon of electromagnetic radiation. (4)

FERMI CONSTANT: [A universal constant, introduced in beta-disintegration theory, that expresses the strength of the interaction between the transforming nucleon and the electron-neutrino field. (4)

FERMI-DIRAC DISTRIBUTION FUNCTION: [STAT MECH] A function specifying the probability that a member of an assembly of independent fermions, such as electrons in a semiconductor or metal, will occupy a certain energy state when thermal equilibrium exists. (4)

FERMI DISTRIBUTION: [SOLID STATE] Distribution of energies of electrons in a semiconductor or metal as given by the Fermi-Dirac distribution function; nearly all energy levels below the Fermi level are filled, and nearly all above this level are empty. (4)

FERMI ENERGY: [STAT MECH] 1. The average energy of electrons in a metal, equal to $\frac{3}{5}$ of the Fermi level. 2. See FERMIL LEVEL. (4)

FERMI GAS: [STAT MECH] An assembly of independent particles that obey Fermi-Dirac statistics, and therefore obey the Pauli exclusion principle; this concept is used in the free-electron theory of metals and in one model of the behavior of the nucleons of a nucleus. Also known as Fermi-Dirac gas. (4)

FERMI HOLE: [SOLID STATE] A region surrounding an electron in a solid in which the energy band theory predicts that the probability of finding other electrons is less than the average over the volume of the solid. (4)

FERMI LEVEL: [STAT MECH] The energy level at which Fermi-Dirac distribution function of an assembly of fermions is equal to one-half. Also known as Fermi energy.

FERMI LIQUID: [CRYO] A liquid of particles which have Fermi Dirac statistics; an example is the liquid phase of helium-3, in which the atoms belong to the isotope with a number 3. (4)

FERMION: [QUANT MECH] A particle, such as the electron, proton, or neutron, which obeys the rule that the wave function of several identical particles changes sign when the coordinates of any part are interchanged; it therefore obeys the Pauli exclusion principle. (4)

FERMION FIELD: [QUANT MECH] An operator defined at each point in space-time that creates or annihilates a particular type of fermion and its antiparticle. (4)

FERMI PLOT: See KURIE PLOT. (4)

FERMI RESONANCE: [PHYS CHEM] In a polyatomic molecule, the relationship of two vibrational levels that have a zero approximation nearly the same energy; they repel each other, and the eigenfunctions of the two states mix. (4)

FERMI SELECTION RULES: [NUC PHYS] Selection rules for beta decay in a Fermi transition; that is, there is no change in total angular momentum or parity of the nucleus in an allowed transition. (4)

FERMI'S GOLDEN RULES: [QUANT MECH] The equations giving the first-order (rule number 2) and second-order (rule number 1) contributions to the transition probability per unit time induced by a perturbation Hamiltonian, in terms of matrix elements of the perturbation Hamiltonian. (4)

FERMI SPHERE: [STAT MECH] The Fermi surface of an assembly of fermions in the approximation that the fermions are free particles. (4)

FERMI SURFACE: [SOLID STATE] A constant-energy surface in the space containing the wave vectors of states of members of an assembly of independent fermions, such as electrons in semiconductor or

metal, whose energy is that of the Fermi level. (4)

FERMI TEMPERATURE: [STAT MECH] The energy of the Fermi level of an assembly of fermions divided by Boltzman's constant, which appears as a parameter in the Fermi-Dirac distribution function. (4)

FERMI TRANSITION: [NUC PHYS] Beta decay subject to Fermi selection rules. (4)

F HOLES: The openings in the upper plate of a violin or other instrument having a resonance body, so called from their common shape *f*. (125)

FIBER OPTIC BEARING TECHNIQUE: A method for rolling element bearing analysis pioneered by G. J. Phillips which uses a bifurcated fiber optic probe to obtain micro-inch measurements of vibration on the outer race of a bearing. (100)

FIBONACCI SERIES: 1,1,2,3,5,8,13,... *etc.* Where the first two numbers are added to make the third. See PHI

FIDDLE: See VIOLIN

FIELD IONIZATION: [ELECTR] The ionization of gaseous atoms and molecules by an intense electric field, often at the surface of a solid. (4)

FIELD-ION MICROSCOPE: [ELECTR] A microscope in which atoms are ionized by an electric field near a sharp tip; the field then forces the ions to a fluorescent screen, which shows an enlarged image of the tip, and individual atoms are made visible; this is the most powerful microscope yet produced. Also known as ion microscope. (4)

FIFTEENTH: The interval of a double octave. (125)
See BIS-DIAPASON

FIFTH: A diatonic interval of five notes. Its ratio is 2:3, the diapente of the ancients. (125)

FIFTH, PERFECT: See INTERVAL.

FILTER: Changes tone color (timbre) by removing selected harmonics. (69)

FILTER: Electronic circuitry designed to pass or reject a specific frequency band. (100)

FINGERBOARD: 1) The flat or slightly rounded piece of wood attached to the neck of instruments of the violin and guitar class, on to which the strings are pressed when stopped by the fingers. 2) A manual or clavier. (125)

FINGERING: The art of placing and using the fingers properly in performing upon a musical instrument. (125)

FIRMAMENT: The soul-sphere of the Macrocos-

mos, respectively that of the Micocosmos. (131)

FIRST CAUSE: "For, returning to the first principle, - as there are those forces that move one within another to bring harmony, as for light or color, or sound, or motion, all of these are but the variation of movement, vibration. What is the First Cause? That from which all emanates, the SPIRIT of the force or influence itself; breaking itself upon the atomic structures about same, bringing those influences as it associates itself one with another in its varied forms of atomic structures." (2012-1) (2). See **SPIRIT ENERGY, HARMONIES OF TONES AND COLORS, LIGHT, FORCE-ONE, DISINTEGRATION**

FIRST CAUSE: "The Life, or the manifestation of that which is in motion, is receiving its impulse from a first cause.

What is the first cause?

That which has brought, is bringing, all life into being; or animation, or force, or power, or movement, or consciousness, as to either the material plane, the mental plane, the spiritual plane.

Hence it is the force that is called Lord, God, Jehovah, Yah, Ohum [Ohm?], Abba and the like. Hence the activity that is seen of any element in the material plane is a manifestation of that first cause. One Force. And, as seen and stated above, a record in a phonograph is made up of elements of a certain combination of that which has become in manifested form in certain movements in relation to the first cause, for the projection (and does project) by natural laws; as the physical or material laws, then, are the reflection or shadow of spiritual laws. See? And these then make for, under certain laws, certain words, certain regulations, the retaining of that (through one of these elements or attributes of consciousness) which has passed before it; or that has been indented upon this element in this rate of activity of a first cause or first principle that is in movement, and unless in movement is not capable of being manifested in a material world. For, the movement itself (to make applicable another law) draws about a nucleus the positive and negative forces as to bring into visibility from one sphere or realm to another that force or power. Or it has lost that which makes for the raising or reducing of such vibrations as for the force, the power, the first cause, to become active in this or that or the other realm of consciousness.

Then, as the realm of record is made by indentations of other influences that act upon the medium that is used as the source, or plate, or manner of recording, so will there be - with the acoustic arrangements of that which is the negative of that influence which causes the indentation - reproduced that which has been indented by the positive activity upon that record, that plate, that plane, that activity.

So is this, then, as the record that is made of the force that manifests itself in the form of a body-mind

with the attributes of all that vibration through which it has passed in reaching that place or plane of consciousness; it must be in accord, so that the record made is positive or negative (negative being error, positive being right - good), that it may be penetrated to through the application of a negative influence upon that in whatever realm it may have made its indentation or record.

Then, only in attuning the forces of that which may be the medium of reading back that record which has been made, may this be given activity into another realm of consciousness for instruction, for edification, for those various activities of those seeking same. For, how does the answer come? For what purpose is the information sought? To do that which is in accord with that which first made the record, the indentation, or to correct that which has been in an obtuse angle to that which should be in accord with that to which the entity or the soul so making such a record is gathering its influence and force toward?

Hence, how easily may there be a diffusion or a break in that which may be obtained through such a channel, that is capable of attuning self so that it may write, read, hear, see, feel, or experience, and - through some of the modes of approach to consciousness in a material world - give that experience which has been made by some activity; whether in this or that realm, in its course through that of eternity, time, space, or in the realm of the spirit itself!

For, as given, names but give meets and bounds to the consciousness of those that classify such activities in a certain stage or realm of conscious movement.

In the same manner we find the record as of the radio. The influences used here are simply a changed vibration of those very influences that have been described in their activity, and gather from this or that influence that which is being recorded. By the movement of what? The first cause, when in its activity in various forms or manners in a certain realm of consciousness.

What, then, is the variation from the one to the other?

The reproducer of that recorded. In one it is required that it change its realm of activity for reproduction. In the order it is attuned to the first cause, that gives off in whatever realm or place that is attuned to the activity, the immediate response.

Hence, as from our first premise (the post), the conditions are only relative.

Then, the psychic influences or forces in manifestation in their various spheres are as but a type of needle upon the record; a type of acoustics in the recorded or de-recording activity. Or the power and the influence by its development toward the realm of the first cause, as to the power of the tube or of the resoundant or of the length of its activity to care for its reproduction.

Hence, out of tune by many of the channels that have been indicated did prevent at that time [355] from receiving that later given." (254-67) (2)

"The manifestation of all power, force, motion, vibration, that which impels, that which detracts, is in its essence of one force, one source, in its elemental form. As to what has been done or accomplished by or through the activity of entities that have been delegated powers in activity is another story.

God, the first cause, the first principle, the first movement, IS! That is the beginning! That is, that was, that ever shall be! The following of those forces that are in accord with the Force or first cause, known as its Laws, is to be one with the source, or equal with yet separate from that first cause. In the beginning there was the force of attraction and the force that repelled. Hence, in man's consciousness he becomes aware of what is known as the atomic or cellular form of movement about which there begins nebulous activity. This is the lowest form (as man would designate) of active force in his experience. Yet this very movement that separates the forces in atomic influence is the first cause, or the manifestation of that called God in the material plane. As the nebulous activity gathers positive-negative forces in its movement, whether of one element or another, it becomes magnified in its force through the universe. Worlds, suns, stars, nebulae, and whole solar systems move from a first cause." (262-52) (2)

"The eternal question then, arise, "What was or is the first cause of individual existence?" The first cause was, that the created would be the companion for the Creator; that is, the creature would - through its manifestations in the activity of that given unto the creature - show itself to be not only worthy of, but companionable to, the Creator. Hence, every form of life that man sees in a material world is an essence or manifestation of the Creator; not the Creator, but a manifestation of a first cause - and in its own sphere, its own consciousness of its activity in that place." (5753-1) (2) (76)

FIRST CAUSE: "What was the First Cause? Knowledge - Knowledge!" (294-189) (2). See **FORCE-ONE**, **FORCE-GASEOUS**, see **SPIRIT** for comprehensive explanation.

FIRST PRINCIPLE: See **FIRST CAUSE**

FISSION, ATOMIC: Caused by alpha particles and cosmic rays.

FLAGAE: Spirits knowing the secrets of man; familiar spirits; spirits that may be seen in mirrors and reveal secret things. (131)

FLAGEOLET TONES: The natural harmonics of stringed instruments, so called from their pure flute-like quality of tone. (125) See **HARMONICS** § 2

FLAT: 1) The sign which directs the lowering of the note to which it is prefixed by one semitone. Its shape is derived from the ancient b. 2) Singing or playing is said to be flat when the sounds produced fail to reach the true pitch. 3) Minor; as a flat 3rd, a flat 5th, etc. (125)

FLATLAND: See **SPACE**, **MATTER**, **LIGHT**, **VIBRATION MODES**

FLAT RESPONSE: See **FREQUENCY RESPONSE**. (103)

FLATS & SHARPS: The specific levity of notes increases in proportion to the number of times the ratios are multiplied in order to produce them, going upward by sharps; and their specific gravity increases in proportion to the number of times the ratios are divided in order to produce them, going downward by flats. The knowledge of this is attained when everything is in its perfect order. It is the discovery of the Law of Duality in music which shows the method of applying the ascending and the descending ratios so as to exhibit that perfect order of Nature. (8)

FLAVOR: The aspect of a quark that tells which of the six kinds of quark it is. (116)

FLAW DETECTION REGION: In the REBAM analysis of rolling element bearings, the flaw detection region includes high-pass signals of principal spectral components due to bearing defects, but excludes any significant components due to rotor imbalance or rolling element passage at the outer race. Typically, this frequency range lies between 3 and 30 times the rolling element passage frequency (REPx). (100)

FLORID COUNTERPOINT: A counterpoint not confined to any special species, but in which notes of various lengths are used. It is opposed to strict counterpoint. (125)

FLOWS: CURRENT of or flow of a force or stream of particles as in TRIUNE STREAM. See **TRIPLE FLOWS**, **LAWS OF BEING**

FLUTE: One of the most widely used of ancient musical instruments, and at this day one of the most important instruments in an orchestra. It has been remarked in speaking of the *aulos*, that the general idea of a flute, probably included anciently, not only open tubes, but also instruments having a reed, such for instance, as the oboe. But the word for many centuries been used only in the former sense. (125)

FLUTTER: Flutter imparts a quivering quality to sound, and is especially noticeable on sustained notes. It is the result of rapid variations in the speed of a turntable or tape-transport mechanism. Although all record and tape players have some measurable flutter, it should not be audible on musical material. (103)

FOCAL CENTERS: See **NEUTRAL CENTERS**, **IN-**

TRODUCTORY IMPULSE, LAWS OF BEING, DOMINANT, ELECTRICITY

FOOT: 1) A metrical measure. 2) a drone bass. 3) The chorus of a song. 4) The part of an organ pipe below the mouth. 5) To foot, to dance. (125)

FORCE: An influence that can deform an object or cause it to change its motion. (75)

FORCE: Given that force can be exerted by an act of will, do we understand the mechanism by which this is done? And if there is a gap in our knowledge between the conscious idea of a motion and the liberation of muscular energy needed to accomplish it, how do we know that a body may not be moved without ordinary material contact by an act of will? Keely contends that all metallic substances after having been subjected to a certain order of vibration may be so moved. "Scientists are verging rapidly toward the idea that immense volumes of energy exist in all conditions of corpuscular space. I accept Prof. Stoney's idea that an apsidal motion might be caused by an interaction between high and low tenuous matter, but such conditions, even of the highest accelerated motion are too far down below the etheric realm to influence it sympathetically, even in the most remote way. The conception of the molecule disturbing the ether, by electrical discharge from its parts is not correct... the highest conditions associated with electricity come under the fourth descending order of sympathetic conditions. The conjecture as regards the motion being a series of harmonic elliptic ones, accompanied by a slow apsidal one, I believe to be correct... The combination of these motions would necessarily produce two circular motions of different amplitudes whose differing periods might correspond to two lines of the spectrum as conjectured, and lead the experimenter, perhaps, into a position corresponding to an ocular illusion. Every line of the spectrum, I think, consists not of two close lines, but of compound triple lines; though not until an instrument has been constructed, which is as perfect in its parts as is the sympathetic field that environs matter, can any truthful conclusion be arrived at from demonstration."

The molecule is a world in itself, carrying with it all the ruling sympathetic conditions which govern the greatest of the planetary masses. It oscillates within its etheric rotating envelope with an inconceivable velocity, without percussing its nearest attendant, and is always held within its sphere of action by the fixed gravital power of its neutral center, in the same sympathetic order that exists between the planetary worlds. The dissociation of aggregated molecules by intermolecular vibration does not disturb even to an atomic degree these fixed neutral points. Each molecule contributes its quota to the latent electrical force, which shows up by explosion after its gathering in the storm clouds, and then it returns to the molecular embrace it originally occupied. You may call this return, absorption, but it gets there first during corpuscular aggregation, and comes from

there, or shows itself, during sympathetic disturbance of equilibrium.

There are three kinds of electricity, the harmonic and enharmonic, which, with their leader, the dominant, form the first triple. Their sympathetic associations evolve the energy of matter. The dominant is electricity luminous or propulsive positive. The harmonic, or the magnetic, which is the attractive, with its wonderful sympathetic outreach, is the negative current of the triune stream. The enharmonic, or high neutral, acts as the assimilative towards the reinstatement of sympathetic disturbance. In electric lighting, the velocity of the dynamos accumulates only the harmonic current - by atomic and interatomic conflict - transferring one-two hundred thousandth ($1/200,000$) of the light that the dominant current would give, if it were possible to construct a device whereby it could be concentrated and dispersed. But this supreme portion can never be handled by any finite mode. Each of these currents has its triple flow, representing the true lines of the sympathetic forces that are constantly assimilating with the polar terrestrial envelope. The rotation of the earth is one of the excitors that disturbs the equilibrium of these sensitive streams. The alternate light zone being ever followed by the dark zone, holds the sympathetic polar wave constant in its fluctuations. This fact may be looked upon as the foundation of the fable that the world rests upon a tortoise. The rotation of the earth is controlled and continued by the action of the positive and negative sympathetic celestial streams. Its pure and steady motion, so free from intermitting impulses, is governed to the most minute mathematical nicety by the mobility of the aqueous portion of its structure, *i.e.*, its oceans and oceans' anastomosis. There is said to be a grain of truth in the wildest fable, and herein we have the elephant that the tortoise stands on. The fixed gravital centers of neutrality, the sympathetic concordants to the celestial outreach, that exist in the inter-atomic position, are the connective sympathetic links whereby the terrestrial is held in independent suspension. We cannot say that this corresponds to what the elephant stands upon but we can say "This is the power whereby the elephant is sympathetically suspended." (11)

FORCE-ACTIVE: "The active principle from the wild cherry bark with the other ingredients is a stimulation to the lungs, throat and bronchials, and those organs above the diaphragm." (2790-1) (2)

"The first ingredient, the wild cherry bark, is a direct activative force upon the pneumogastrics and the pulmonary system.

"The sarsaparilla works with the gastric juices of the stomach, and the eliminations in the peristaltic movement through the intestinal tract." (1012-1) (2)

"The yellow dock root is an emit and blood purifier, an active principle with the secretions of the liver." (643-1) (2)

"The prickly ash bark acts directly with the active forces in the liver itself, in the gall duct, and as a stimulant to the pancreas and spleen's activity." (1012-1) (2) **See INTRODUCTORY-IMPULSE, POSITIVE, POSITIVE VIBRATIONS, ACTIVE PRINCIPLE, STABILIZATION**

FORCE, ATMOSPHERIC: **See ACTIVE PRINCIPLE**

FORCE, ATOMIC: "The atomic force within an atom was placed there at the birth of the molecule by the LAW of SYMPATHETIC ETHERIC FOCALIZATION towards the negative centers of neutrality with a velocity as inconceivable in its character as would be the subdivision of matter to an ultimate end." (1) pg 299. **See ACTIVE PRINCIPLE**

"Not only able to build that as able to transpose or build up the elements about them but to transpose them bodily from one portion of the universe to the other, through the uses of not only those recently re-discovered gases, and those of the electrical and aeriatric formations - in the breaking up of the atomic forces to produce impelling force to those means and modes of transposition, or of travel, or of lifting large weights, or of changing the face or forces of nature itself..." (900-17) (2)

"Just as there may be with the tungsten in a portion of a vacuum that may raise those sound waves that through their relativity of activity of the electrical vibration that makes for the activity of the atomic forces in same give that which is gathered from the ether waves." (707-1) (2)

"Each atomic force of a physical body is made up of its units of positive and negative forces, that brings it into a material plane. These are of the ether, or atomic forces, being electrical in nature as they enter into a material basis, or become matter in its ability to take on or throw off. So as a group may raise the atomic vibrations that make for those positive forces as bring divine forces in action into a material plane, those that are destructive are broken down by the raising of that vibration!" (281-3) (2) **See MIND, MAGNETISM**

FORCE-ATOMIC, HEALING: Q.: The reading says my mental condition is paramount in light of my physical ailment. Please explain.

A.: "The explanation in this is as this: In every physical being, the whole body is made up of the atomic forces of the system, with the mind of each atom, as it is builded, supervised by the whole mental mind of the body, varied by its different phases and attributes, for, as is seen in its analysis, an atom of the body is a whole universe in itself, in the minutest state. The attitude, then, of all the attributes of the mind toward self, and the forces as manifest through same, become paramount. As to any healing in the body, or any application of any source, nature, character, kind, or condition, is only to create that incentive in that same atomic force to create the better

condition in a body, whether it be medicinal properties, whether it be of manipulation to induce incentive reaction, whether it be of an operative nature, or what not, is to create that same condition in the atomic forces of the body to bring about the better physical conditions in the system. Then, necessarily, it is paramount. How to go about same? May be through self and self's attitude towards those conditions which are of the physical and spiritual natures in an individual, and to this individual especially." (137-81) (2)

"The consideration that is to be given in making any application for corrective forces, that there may be the better coordination in the mental, the superficial, the imaginative and the physical being, would be to create within the system itself that as makes for the proper coordination of atomic forces as control the functioning of, and the changing of, those material conditions, as are taken, for sustenance, into the physical body, into such vibratory forces as to create a normal equilibrium between the matter in the body and that of a normal, or near normal functioning of that matter in a material plane and in a material body.

"As is seen and known, all atomic forces are of an electrical nature in their effect and affect upon a physical organism. Not all portions of the system function in the same vibratory rate, as the nerves of the sensory organism are made - as it were - in a series of necessary portions of system, for the proper alteration of vibration of atomic forces to create either that of vision, hearing, so also, in the assimilation as for gland functioning - as creates in the system those elements that add to either the nerve energies in their activity those necessary elements for the coordination of the muscular forces within the system, as to produce functioning in a nominal or normal manner, or they are over-charged or under-charged - that prevent their functioning in a nominal manner. Hence, as is seen, in a manner, as how the activity of the physical body can be altered by the concerted activity of minds that are directed to the atomic forces of an individual, in raising their vibrations to a nominal or normal manner. Hence we have that of spiritual healing to a body.

"Now, the same vibrations may be raised for a physical body in the physical sense, as may be raised in a mental or spiritual body by its association or its connection with that that creates a necessary element of vibration for corrective forces in a system.

"Then, to find the correct vibration for elements that are lacking in their sustaining forces for a living organism, and to create that within the enlivening portions of the system in such a way and manner as for same to be assimilated by, or become effective in, a living organism, is to be able to change that environ of that physical organism as to be creative and evolving in its activity in that system.

"For this body, then, we would find that we would add those vibrations from the low form of the electri-

cal vibration as comes from that known or called in the wet cell vibration from those atomic forces necessary in the forces of the body itself." (5576-1) (2)

"As is understood, Life - God - in its essence is Vibration, and - as the physical beings are of that atomic force, a portion of the same - the awareness of same is as to how conscious that vibration may be made, even as we find in the physical body that sight, hearing, taste, speech, are but an alteration of vibration attuned to those portions in the consciousness of the physical body, becoming aware of things, of vibrations, reaching same from within or from without. Hence one may not hear the prayer or the thought sent by an individual whose attunement is not sufficient to raise that vibration in an individual, but the combined - as we have in numbers - raise to such an extent that the awakening comes by this continuing of this direction of the spiritual forces to an individual; even as the small drop may wear away the hardest stone." (281-4) (2)

"Here, let's analyze healing for the moment, to those that must consciously - as this body - see and reason, see a material demonstration, occasionally at least! Each atomic force of a physical body is made up of its units of positive and negative forces, that brings it into a material plane. These are of the ether, or atomic forces, being electrical in nature as they enter into a material basis, or become matter in its ability to take on or throw off. So, as a group may raise the atomic vibrations that make for those positive forces as bring divine forces in action into a material plane, those that are destructive are broken down by the raising of that vibration! That's material, see? This is done through Creative Forces, which are God in manifestation! Hence, as self brings those little things necessary, as each is found to be necessary, for position, posture, time, period, place, name, understanding, study each, and assist each in their respective sphere. So does the entity become the healer." (281-3) (2)

"We will find that blue...in stones of every nature...will bring not only the vibrations of healing for the entity, but a pleasant and a beautiful reaction to the mental efficiencies of the body." (2015-1) (2)

"When illness were to come about, soft music and the lighter shades or tones will quiet, where medicine would fail..." (773-1) (2) See **MAGNETISM, MIND, FORCE-MIND, MUSIC**

FORCE, ATTRACTIVE: See **FORCE-GASEOUS, AGGREGATION, NEGATIVE ATTRACTION, MOLECULAR MOTION, LAWS OF BEING, LAW OF ASSIMILATION**

FORCE, BRAIN: "The speculations of the physicists of the present age (1892), in regard to latent energy, would neutralize the sympathetic conditions that are associated with the governing force of the cerebral over the physical organism. The evolution of a thought, the infinite exciter, arouses the latent energy of the physical organism to do its work, - differential

orders of brain- force acting against each other under dual conditions. If there were no latent energy to arouse, sympathetically, there would be no action evolved on the physical mass, nor on any other, as all force is mind force. All evolutions of latent power, in its varied multiplicity of action, induced by its proper exciters, prove the connective link as between the celestial and the terrestrial, the finite and the infinite." (Keely) See **FORCE-LATENT, FORCE-ETHERIC**

The sympathetic influence of the terrestrial envelope gets its introductory impulse from the infinite depths of the earth's neutral center. This impulse radiates in undulating lines far enough into etheric space to become sympathetically associated with the etheric (or Infinite) under the same conditions that associate the mental with the physical organism of man. We can define man's molecular condition in its physical organism as the earth, and its connective link with the convolutionary cerebral centers as the Infinite etheric space, the same conditions of governing rule as exists between the mental and physical forces.

With this medium it is plain to see how simply God works, as well as mysteriously, His wonders to perform, the mental forces kept vitalized from the great storehouse of the etheric realm, and in controlling the physical the deficit caused thereby renewed and kept balanced by the power of its sympathetic concordant receptiveness.

Any visible molecular mass of metal can be impregnated by triple orders of sympathetic vibration as to give it the same sympathetic transmissive qualities that exist in the mental forces, which make such mass subservient to either the attractive or repulsive conditions of terrestrial sympathy.

Gravity is nothing more than a concordant attractive sympathetic stream flowing towards the neutral center of the earth. This force is inherent in all visible and invisible aggregated forms of matter, from the very birth of a planet, around whose center the molecules cluster by the sympathetic affinity which is thus induced. If these conditions had always maintained a neutral position in etheric space, no planet would ever have been evolved. These conditions have been fixed by the Infinite. These rotating neutral centers, set in celestial space, have been endowed with the power of rotation to become their own accumulators. It is through the action of these sympathetic forces of the Infinite etheric realm that planets are born, and their volume of matter augmented.

"If we pick up an object we feel a resisting power in it which physicists call gravity; but they do not explain what gravity is. It is simply a sympathetic flow, proceeding from the molecular centers of neutrality; which flow is concordant with the earth's neutral center of same, seeking this medium of its affinity with a power corresponding to the character of its molecular mass. There is no actual weight in the molecules of the mass of which the earth is composed. If the sympathetic negative polar stream that flows towards the neutral center of the earth were cut off from it, the earth's molecular mass would become

independent, and would float away into space as would a soap bubble filled with warm air.

"The gravital flow comes, in this system, under the order of the sympathetic concordant of the 9ths, and belongs to that third of the triune combinations called polar propulsive.

"Magnetism is polar attraction."

"Gravity is polar propulsion."

"Both magnetism and gravity can be accelerated by the proper medium of sympathetic vibratory influences." (11)

If we take into proper consideration the sympathetic affinity that exists between the centers of the cerebral convolutionary organism, and the polar terrestrial forces, as linked to the celestial, or Infinite, the harmonizing effects they have on the normal brain, and the antagonistic negative bombardment of these streams on the abnormal one, is it not possible, by the diversion of pure, sympathetic streams, to antagonize abnormal conditions, by concordant or magnetic polar sympathetic mechanical exciters, and thus to induce pure normal equilibrium of its corpuscular mass? Which means perfect mental restoration.

At the present time Keely is concentrating his efforts on the perfecting of his mechanical conditions to the point where, according to his theories, he will be able to establish, on the ninths, a sympathetic affinity with pure, polar negative attraction, minus magnetism. In his own opinion he has so nearly gained the summit, or completion of his "graduation" as to feel that he holds the key to the control of the infinitely tenuous conditions which lie before him to be conquered, before he gains mastery of the group of depolar disks that he is now working upon. Twenty-six groups are completed, and when the twenty-seventh and last group is under equal control, Keely expects to establish a circuit of vibrating force, for running machinery, both for aerial navigation and for terrestrial use. If this result be obtained, Keely will then be in a position to give his system to science, and to demonstrate the ever-operative immanence of the Infinite builder of all things...(11)

FORCE, CELLULAR: See **POSITIVE VIBRATIONS**

FORCE, CENTRIFUGAL: "This change, then, will bring about the proper ratio of relations in the centrifugal force as will be manifested with that of the universal forces in their expansion." (195-69) (2) See **FORCE-RADIAL, SYMPATHETIC NEGATIVE ATTRACTION, FORCE-RADIAL, LAWS OF BEING, LAW OF INDIVIDUALIZATION**

FORCE-CONSTRUCTIVE: See **INTRODUCTORY-IMPULSE, POSITIVE, STABILIZATION**

FORCE, CREATED: What creates force? "Elements of the active principle in that called NOW gen-

erated energy, or the breaking of the vibratory unit to begin its expansion in force." (195-54) (2). See **ATOMIC THEORY-KEELY'S**

"Consider as an Octave or a vibration as would be set in motion by this very activity of the gravitation in its activity." (195-54) (2) See **INTRODUCTORY-IMPULSE, IMPULSE-CREATIVE**

FORCE, CREATION: See **ATOMIC THEORY**

FORCE, CREATIVE: "And know that nature is that from which man may take his lesson to learn of the Creative Forces..." (5214-1) (2)

"Yet that which is creative seeks expression in the growth of activity among others." (2648-1) (2)

"...that creative forces grow while destructive forces deteriorate." (1431-1) (2) See **FORCE-ONE, FORCE-GASEOUS, FORCE-ATOMIC, HEALING**

FORCE, DIFFERENTIATION OF POLARITY: See **POSITIVE VIBRATIONS**

FORCE, DIRECTIVE: See **LAW OF OCTAVE**

FORCE, DIVINE: See **FORCE-ATOMIC, FORCE-GOD, CELESTIAL, FORCE-ATOMIC, HEALING**

FORCE, DYNASPHERIC: Also called **ETHERIC FORCE**, is the atomic vibratory energy or Spirit Energy. See **PLANCK'S CONSTANT, FIRST CAUSE, FORCE-ATOMIC, ATOMIC TRIPLETS, ATOMIC THEORY-KEELY'S**

FORCE, EARTH: See **TELEGEODYNAMICS**

FORCE, ETHERIC: "Yet, notwithstanding Professor Crooke's psychical researches and Professor Rucker's experiments in molecular vibration, demonstrating that molecules seem to have a "mental attribute, a sort of expression of free will," physicists still look upon the human organism as little more than a machine, taking small interest in experiments which evince the dominion of spirit over matter. Keely's researches in this province have shown him that it is neither the electric nor the magnetic flow, but the etheric, which sends its current along our nerves; that the electric and magnetic flows bear but an infinitely small ratio to the etheric flow, both as to velocity and tenuity; that true coincidents can exist between any mediums, - cartilage to steel, steel to wood, wood to stone, and stone to cartilage; that the same influence, sympathetic association, which governs all the solids holds the same control over all liquids, and again from liquid to solid, embracing the three kingdoms, animal, vegetable, and mineral; that the action of mind over matter thoroughly substantiates these incontrovertible laws of sympathetic etheric influence; that the only true medium which exists in nature is the sympathetic flow emanating from the normal human brain, governing correctly the graduating and setting-up of the true sympathetic vibratory positions in machinery, necessary to commercial success; that

these flows come in on the order of the fifth and seventh positions of atomic subdivision; that if metallic mediums are brought under the influence of this sympathetic flow they become organisms which carry the same influence with them that the human brain does over living physical positions, and that the composition of metallic and that of physical organisms are one and the same thing, although the molecular arrangement of the physical may be entirely opposite to the metallic on their aggregations; that the harmonious chords induced by sympathetic positive vibration permeate the molecules in each, notwithstanding, and bring about the perfect equation of any differentiation that may exist, - in one the same as in the other, - and thus they become one and the same medium for sympathetic transmission; that the etheric (or mind) flow is of a tenuity coincident to the condition governing the seventh subdivision of matter, a condition of subtlety that readily and instantaneously permeates all forms of aggregated matter, from air to solid hammered steel, the velocity of the permeation being the same with the one as with the other; that the tenuity of the etheric flow is so infinitely fine that a magnifying glass, the power of which would enlarge the smallest grain of sand to the size of the sun, brought to bear upon it would not make its structure visible to us; and that, light traversing space at the speed of two hundred thousand miles per second, a distance requiring light a thousand centuries to reach would be traversed by the etheric flow in an indefinite fragment of a second." **Bloomfield-Moore See ACTIVE PRINCIPLE, FORCE-MIND, LAWS OF BEING ATOMIC THEORY-KEELY'S**

FORCE, ETHERONIC: See **ETHERONIC ENERGY, DOMINANT**

FORCE, FEMALE: See **IMPULSE-CREATIVE, NEUTRAL NEGATIVE, INTRODUCTORY IMPULSE, NEGATIVE ATTRACTION, LAW OF ASSIMILATION ATTRACTION, NEGATIVE ATTRACTION**

FORCE FIELD: The adjective "observable" or the adjective "virtual" should always be used as a modifier for the force field. e.g., in vacuum there is no observable mass, but there is virtual mass. Hence in the vacuum there are no observable EM force fields, but there are *virtual* EM force fields. Feynman stated that there is only the potential for the force field, existing in the vacuum. In observable matter there are observable EM force fields. The observable EM force fields are made from the interaction of the virtual EM force fields with observable particles and the integration of these virtual force fields into observable force fields. (132)

FORCE, GASEOUS: "As there were those individuals that attempted to bring again to the mind of man more of those forces that are manifest by the closer association of the mental and spiritual, or the soul forces that were more and more as individual and personal forms in the world, the use of these elements - as for the building up, or the passage of individuals through space - brought the uses of the gases then (in

the existent forces), and the individuals being able to become the elements, and elementals themselves, added to that used in the form of what is at present known as the raising of the powers from the sun itself, to the ray that makes for the disintegration of the atom, in the gaseous forces formed, and brought about the destruction in that portion of the land now presented, or represented, or called, Saragasso Sea." (364-11) (2) See **DISSOCIATION, FORCE-ATOMIC, LEVITATION, GASEOUS ATOMIC ELEMENT**

FORCE, GOD: "The more ye become aware of thy relationships to the universe and those influences that control same, the greater thy ability to help, to aid, - the greater thy ability to rely upon the God-force within; but **STILL** greater thy **RESPONSIBILITY** to thy fellow man." (5757-1) (2)

"God - is the force that permeates all activity." (5749-4) (2) See **FORCE-GASEOUS, FORCE-ATOMIC-HEALING**

FORCE, IMPELLING: "Hence He is of Himself in space, in the force that impels through faith, through belief, in the individual entity." (5749-4) (2) See **FORCE-ATOMIC**

FORCE, INTERMOLECULAR: "The negative gradients of the potential energy V between two interacting molecules, V being a function of the distance R between the centers of the two molecules. The intermolecular forces are thus repulsive in the region where V decreases with R . Intermolecular forces are conveniently divided into two classes, short-range forces and long-range forces. The former are confined to a region of about 3 Å; the latter act beyond that distance." (3) See **SYMPATHETIC NEGATIVE ATTRACTION**

FORCE, LATENT: "All molecular masses of metal represent in their interstitial molecular spaces incalculable amounts of latent force, which, if awakened and brought into intense vibratory action by the medium of sympathetic liberation, would result in thousands of billions more power in foot-pounds than that necessary to awaken it. The resultant development of any and all forces is only accomplished by conditions that awaken the latent energy they have carried with them during molecular aggregation. If the latent force that exists in a pound of water could be sympathetically evolved or liberated up to the seventh subdivision or compound inter-etheric, and could be stored free of rotation, it would be in my estimation sufficient to run the power of the world for a century." John Keely See **SYMPATHETIC VIBRATION THEORY, SYMPATHETIC OUTREACH, MOLECULAR DISSOCIATION, ATOMIC THEORY-KEELY'S, LAWS OF BEING**; also see Keely's article "Latent Force".

FORCE, LATENT; LIQUIDS & GASES: "It must not be understood that the character of the action of the latent force liberated from liquids and gases is the same in its evolution as that of the latent force existing in metals. The former shows up an

elastic energy, which emanates from the breaking up of their rotating envelopes; increasing, at the same time, the range of their corpuscular action; thus giving, under confinement, elastic forces of an almost infinite character. By liberation from the tube it is confined in, it seeks its medium of concordant tenuity with a velocity greater than that of light." (Keely)

FORCE, LATENT; METALS: "In metals, the latent force, as excited by the same sympathizer, extends its range of neutral sympathetic attraction without corpuscular rupture, and reaches out as it were to link itself with its harmonic sympathizer, as long as its exciter is kept in action. When its exciter is dissociated, its outreach nestles back again into the corpuscular embrace of the molecular mass that has been acted upon." (Keely)

"This is the polar sympathetic harness, as between metallic mediums and the polar dominant current, - the leader of the triune stream of the terrestrial flow." Keely (17)

FORCE, LIFE: "For LIFE itself in every atomic force is that as of an electronic energy." (4128-1) (2)
See **LIFE, VITAL LIFE FORCE**

FORCE, LIFTING: See **LEVITATION**

FORCE, LONG-RANGE: "Long-range intermolecular forces are often called Van der Waals forces because they lead to the Van der Waals equation of state. In particular, the constant a in that equation is a measure of their strength. For unexcited, non-polar molecules the forces are attractive. These forces give rise to a large variety of physical and chemical phenomena, such as surface tension, friction, changes of phase, adhesion and cohesion of liquids and solids, viscosity, diffusion, the Joule-Thomson effect, and the departures of gases from the ideal gas law (virtual coefficients). Van der Waal forces arise from several different physical causes." (3)

FORCE, MENTAL: "The aura, to be sure, develops with the mental influences of the body." (314-1) (2)

"If we take into proper consideration the sympathetic affinity that exists between the centers of the cerebral convolutionary organism, and the polar terrestrial forces, as linked to the celestial, or Infinite, the harmonizing effects they have on the normal brain, and the antagonistic negative bombardment of these streams on the abnormal one, is it not possible, by the diversion of pure, sympathetic streams, to antagonize abnormal conditions, by concordant or magnetic polar sympathetic mechanical exciters, and thus to induce pure normal equilibrium of its corpuscular mass? - which means perfect mental restoration." (1)
pg 318. See **MOLECULAR DISSOCIATION**

FORCE, MIND: "There is a celestial mind-force, a great sympathetic force which is life itself, of which everything is composed." (1). See **LIFE, FORCE-LIFE, MIND**

"All motion is thought, and all force is mind force." Keely, pg 252 of (1). See **MOLECULAR DISSOCIATION**

FORCE, MOMENT OF: [MECH] The moment of a force is the product of the force into the perpendicular distance of its direction from a given point. The moment represents its effect or leverage on a body moving about the given point. (84)

FORCE, MOTIVATIVE: "Only those who seek become aware of that which IS the motivative force of any condition, phase or stage of development in the spiritual, the mental or the material." (2012-1) (2)

FORCE, MOTIVE: See **ACTIVE PRINCIPLE, SYMPATHETIC VIBRATION THEORY, LAW OF OCTAVE, IMPULSE-CREATIVE, STABILIZATION, ETHER**

FORCE, NEGATIVE: See **FORCES-RADIAL, POSITIVE VIBRATIONS, NEGATIVE, LAWS OF BEING, LAW OF ASSIMILATION**

FORCE, OCTAVE: See **LAW OF OCTAVE, GRAVITATION DIFFERENTIATION, EIGHT**

FORCE, ODIC: See **ODYLE**.

FORCE, ONE: "In the manifestation of all power, force, motion, vibration, that which impels, that which detracts, is in its essence of one force, one source, in its elemental form. As to what has been done or accomplished by or through the activity of entities that have been delegated powers in activity, is another story.

"As to the one source or one force, then, are the questions presented in the present.

"God, the first cause, the first principle, the first movement, IS! That's the beginning! That is, that was, that ever will be!

"The following of those sources, forces, activities that are in accord with the Creative Force or first cause - its laws, then - is to be one with the source, or equal with yet separate from that first cause.

"When, then, may man - as an element, an entity, a separate being manifested in material life and form - be aware or conscious of the moving of that first cause within his environ?

"Or, taking man in his present position or consciousness, how or when may he be aware of that first cause moving within his realm of consciousness?

"In the beginning there was the force of attraction and the force that repelled. Hence, in man's consciousness he becomes aware of what is known as the atomic or cellular form of movement about which there becomes nebulous activity. And this is the low-

est form (as man would designate) that's in active forces in his experience. Yet this very movement that separates the forces in atomic influence is the first cause, or the manifestation of that called God in the material plane!

"Then, as it gathers of positive-negative forces in their activity, whether it be of one element or realm or another, it becomes magnified in its force or sources through the universe.

"Hence we find worlds, suns, stars, nebulae, and whole solar systems, moving from a first cause.

"When this first cause comes into man's experience in the present realm he becomes confused, in that he appears to "have an influence upon this force or power in directing same. Certainly! Much, though, in the manner as the reflection of light in a mirror. For, it is only reflected force that man may have upon those forces that show themselves in the activities, in whatever realm into which man may be delving in the moment - whether of the nebulae, the gaseous, or the elements that have gathered together in their activity throughout that man has chosen to call time or space. And becomes, in its very movement, of that of which the first cause takes thought in a finite existence or consciousness.

"Hence, as man himself applies himself - or uses that of which he becomes conscious in the realm of activity, and gives or places the credit (as would be called) in man's consciousness in the correct sphere or realm he becomes conscious of that union of force with the infinite with the finite force.

"Hence, in the fruits of that - as is given oft, as the fruits of the spirit - does man become aware of the infinite penetrating, or interpenetrating the activities of all forces of matter, or that which is a manifestation of the realm of the infinite into finite - and the finite becomes conscious of same.

"As to the application of these as truths, then:

"It may be said that, as the man makes in self - through the ability given for man in his activity in a material plane - the will - one with the laws of creative influence, we begin with:

"Like begets like - As he sows, so shall he reap - As the "man thinketh in the heart, so is he."

"These are all but trite sayings to most of us, even to the thinking man; but should the mind of an individual (the finite mind) turn within his own being for the law pertaining to these trite sayings, until the understanding arises, then there is the consciousness in the finite of the infinite moving upon and in the inner self.

"So does life in all its force begin in the earth. The moving of the infinite upon the negative force of the finite in the material, or to become a manifested force." (262-52) (2)

"Nothing is more important for mankind to realize than the oneness of everything. One - One - One! Oneness of God, oneness of man's relations, oneness of time, oneness of purpose, oneness of every effort - oneness - oneness! In application of the understanding already gained there comes the more perfect realization of the theory. For, though seemingly a vague concept, the oneness of all force is a basic and fundamental truth. As man in his everyday life applies his understanding of this truth, there results a more complete expression of the real self.

In the fall of an apple there was little other than man be experienced in any individual's life. Only Newton first saw that it applied to his relation with the universe and how it held the whole solution to a vast problem. Through the application of that known a great theory was gradually conceived. Just so will man come to the realization of the oneness of all force by the application of that already known. There is in each experience a law that may be reached through working the experience in terms of material application." (900-429) (2) (76)

We have arrived at a few conclusions which may be stated briefly as follows: All force is of one original source. The division of force which seems so evident is due to two conditions: First, the rebellion of beings against Creative will, both in and outside of this material plane, yet, having influence through and upon entities passing through this plane (the earth); second, the limitations of the conscious faculties in this material world. It is possible for man to attain a realization of this oneness, in fact, highly desirable that he do so, through a developed expression of the creative force within. This can best be attained through study of self.

Finally, let us consider the principal law which must be an individual's guide in an attempt to understand himself in relation to the One Force. "Like begets like. Being of God, let us seek ever to fully and completely express His presence within us. Give, then, more thought to acting like His children, His creations. For thoughts are deeds, and the children of the relation to spirit and soul's plane of existence, as they do in the physical or earth plane. What one thinks continually, they become; what one cherishes in their heart and mind they make a part of the pulsation of their heart, through their own blood cells, and build in their own physical, that which its spirit and soul must feed upon, and that with which it will be possessed, when it passes into the realm for which the other experiences of what it has gained here in the physical plane, must be used. The attributes of the soul and spirit are as many, and as many more, as the attributes of the physical and mental mind." (3744-4) (2) It is not hard for an individual to awaken them if he will seek diligently. As has been pointed out, only the will may keep an entity from a realization of the Divine Unity, for, "Each, in itself, through its development known through the ages, as called from the earth plane, builds that which is manifest upon the

earth. With each development, that force, known upon this plane as Will, is given to man over and above all creation; that force that may separate itself from its Maker, for with the will man may either adhere to or contradict Divine law - these immutable laws, as are set between the Creator and the created." (3744-4) (2)

"Hence, man, the crowning of all manifestations in a material world - a causation world - finds self as the cause and the product of that he (man), with those abilities given, has been able to produce, or demonstrate, or manifest, from that he (the soul) has gained, does gain, in the transition, the change, the going toward that (being of that) from which he came." (5753-1) (2)

"Like begets like. As he sows, so shall he reap. As a man thinketh in his heart, so is he. These are but trite statements to most of us, but let each of us turn within our own beings for the law pertaining to these trite sayings, until understanding arises. Then, there will come a consciousness of the infinite moving upon and in the inner self. So does life, in all its force, begin in the earth from one source. It is the moving of the infinite upon the negative force of life of the finite in the material that can bring a consciousness of the oneness even in seemingly diversified manifested force." (262-52) (2) (76)

"Newton, who scoffed at Epicurus' idea that "gravitation is essential and inherent in matter," asserted that gravity must be caused by an agent acting, constantly, according to certain laws. Heat, gravity, light, electricity, magnetism, chemical affinities, are all different phases of the primal force discovered by Keely, and all these forces, it is said, can be obtained from a single ray of sunshine. "The evidence of unity or oneness even between the physical, vital, mental, and spiritual is seen in the light of this law of correlation," says Smith. "A great portion of our muscles contract and relax in obedience to our wills, thereby proving that the mental force can be, and is, in every instance actually converted into the muscular or physical." Keely demonstrates the truth of this assertion, claiming that "all forces are indestructible, immaterial, and homogeneous entities, having their origin and unity in one great intelligent personal will force." (1) See **ATOMIC TRIPLETS, FORCE-WILL, FORCE-MIND, FIRST CAUSE, INFINITE, FINITE, ATOMIC THEORY-KEELY'S**

FORCE, POLAR TERRESTRIAL: "To make a "sympathetic harness" to do work: First, by exciting the sympathetic concordant force that exists in the corpuscular interstitial domain, which is concordant to it; Secondly, after the concordance is established, by negatizing the thirds, sixths, and ninths of this concordance, thereby inducing high velocities with great power by intermittent negation, as associated with the dominant thirds." (1) pg 302 See **DOMINANT, NEGATIZATION, SYMPATHETIC CONCORDANCE, MOTION-ATOMIC, MOLECULES**

FORCE, PHYSICAL: See **MOLECULAR DISSO-**

CIATION

FORCE, POSITIVE: See **POSITIVE VIBRATIONS, LAWS OF BEING, LAW OF INDIVIDUALIZATION**

FORCE, PRAYER: See **FORCE-ATOMIC HEALING, FORCE-ONE**

FORCE, PSYCHIC: "In the present, these individuals do not justly call it science; rather, being close to nature. Listen to the birds. Watch the blush of the rose. Listen for the life rising in the tree. These serve their Maker. Through what? Through that psychic force which is life itself; each in its respective sphere ... put there for the service of man." (364-10) (2)

FORCE, RADIAL: "Not always are radial forces negative forces. Only when they become passive, or of being acted upon as gravitation, do they become negative forces - while they are emanating from the positive; else they would not be drawn to the earth's force, in ITS emanation with the positive rays - and they are positive rays. From the sun's emanation does it produce the heat, see? This is seen in a BETTER application, in that the deflection from - and the direct rays OF - the sun's emanation TO the earth, THROUGH the various stages of its activity, brings summer, or the heat wave, or the moving OF the various forms; for these - acting UPON - become negative, and then are POSITIVE in their action, though at times these, to be sure, become negative in their action; for each has its radial activity and is throwing OFF, as well as drawing TO. Hence the various positions or conditions as is seen in sun, through the activity of the various forms of gas or metal, or those various conditions that seem to cause the various eruptions as apparent within the sun itself. It receives as well as throws off, is positive as well as negative - see? and only until it becomes in such a force that it is altogether negative, as the gravitation that holds in place - for when each are lost in their relative position, these then are thrown off, as was the moon from the earth, or as is the various satellites of the various planets, as WELL as the various effects out in space." (195-70) (2) See **SYMPATHETIC NEGATIVE ATTRACTION, SYMPATHETIC OUT-REACH, GRAVITATION, LAW OF OCTAVE, LAW OF ASSIMILATION, OCTAVE, SYMPATHETIC VIBRATION THEORY, SUN CORONA, GRAVITATION DIFFERENTIATION, PRIME NEUTRAL CENTERS, VACUUM, LAWS OF BEING**

FORCE, REPELLING: See **FORCE-GASEOUS, MOLECULAR MOTION**

FORCE, RELATIVITY OF: "There is, as was set in the beginning, as far as is the concern of this physical earth plane, those rules or laws in the relative force of those that govern the earth, and the beings of the earth plane. That same law governs the planets, stars, constellations, groups, and that constituting the sphere, the space, in which the bodies move. These laws are of one force, and we see the manifestation of the relation of one force with another in many various planes.

"Hence, we bring the word relativity of force to prove itself, for we have this condition: The earth in its motion is so held in space by that force of attraction, of detraction, that those things that do appear to have reality to the human mind, have in truth passed into past conditions before they reach the mind; for, with earth's laws and relation to other spheres, has to man become a past condition. In this, we see the law of the relations of conditions, space or time in relation to the human mind, as is capable of obtaining information upon the earth plane from a normal condition. Such relations can be fully realized only by the superconscious mind of an entity as it journeys on in its evolution from sphere to sphere. While in this material plane the important work lies in understanding the relative activity of laws pertaining to this plane." (3744-4) (2)

As is well known but little understood, the most recent advances in chemistry and physics point directly to a oneness of all force through a definite relation between all forms of matter and force. It has been stated by many eminent authorities that forms of matter differ only in atomic construction and forces only in degree of movement. "Because an atom, a matter, a form, is changed does not mean that the essence, the source or the spirit of it is changed; only in its form of manifestation, and not in its relation with the first cause." (5753-1) (2)

One often hears the expression, "Gods of the Universe." An explanation of this term will further clarify the laws relating to our earth. "All force has its incentive. It must be created and directed. To the human mind many of the laws or individual forces give expression in that which is referred to as the 'god of war,' the 'god of peace,' etc." (3744-4) (2) The Creator has set certain bounds or guards about the various manifestations which to man's consciousness appear as separate forces. As such laws (guards) remain true to the Divine Will, they appear to men to be of the One source; as they, through the activity upon them of entities' wills, rebel against Divine Law, they appear to be of some other source and thus confuse men's minds. All force has but one original source.

Even in considering what men call good and evil forces, we are able to understand the relative position of each. "In the beginning of the celestial beings we have first the Son, then the other sons or celestial beings that are given force and power. That force which rebelled in the unseen forces (or spirit) that came into activity, was that influence which has been called Satan, the Devil, the Serpent. They are one - that of rebellion! When men in any activity rebels against the influences of good he harkens to the influences of evil. Will is given to man as he comes into this manifested form that we see in material forces, for the choice is given. "There is set before thee (man) good and evil." Evil is rebellion. Good is the Son of Life, of Light, of Truth; who came into physical being to demonstrate and show and lead the

way for man's ascent to the power of good over evil in a material world. As there is, then, a personal Savior, there is the personal Devil. When there is delegated power to a body that comes from the infinite into the finite, the unseen into the seen, the activity is life. The will of such a body is of the force giving it existence. As to what it does with or about its associations with the source of its activity, as to how far it may go afield, depends upon how high it has attained in its ability to throw off both negative and positive forces. Then, that which has been separated into the influence to become a body, whether celestial, terrestrial, or plain clay manifested into activity as man, becomes good or bad. The results to the body so acting are dependent and interdependent upon what it does with the knowledge of that source of activity." (262-52) (2)

"Whether separated into the mystic's force of undulating wave links, or into the chemist's vision of atomic force in alchemy or chemistry, or whether of the engineer's division of power as in the forces as may be applied in the breaking up or changing of the elements in their activity, whether as of the fourth dimensional force of electrical combustion or of that of the gaseous explosion or of the steam's condensing, in each activity there is that same wave activity as seen in the continuity of the soul's expansion to meet the needs of that sphere in which it finds itself seeking expression; for, as they may be directed, so may the soul seek that it has created in its activities in whatever sphere its activity finds expression. Law and love are one, even as the forces in nature are one - as is necessary for the budding of the acorn or the flowering of the rose, each seeking through that phase of its position given in nature or this sphere to express that appreciation of the gift of the Creator. Only man abuses that given. How great then may be his estate! How low may he sink through the non-application of that first law of, 'Thou shalt have no other God before me.'" (900-428) (2)

The terms 'psychic force' and 'occult force' are often confusing. "In the truest sense, 'psychic' means the expression to the material world of the latent, or hidden sense of the soul and spirit forces, whether manifested from behind, or in and through the material plane." (3744-1) (2) 'Occult' forces are the channels through which the soul forces manifest. "One is the study of the other. One is the essence of the sources, and the other channels through which, of which, the study." (262-20) (2) "While occultism and mysticism may bring strength in the measure where self may apply same, yet, self must be so grounded as not to be disturbed to the point of destruction. While the influence of the occult and the mysterious in nature, in the universe, in universal forces, are wonderful in their magnitude and in those elements that make up material or human experience, yet, thereof partakes so much of that in the material plane as termed fanatical, that unless one is well grounded self is lost in the maze of experience. Grounded in that truth in self, and relationship of the Creative Energy with the application of the truth in human experience

brings the understanding that enables one to impart to others the strength of the self as pertaining to such experiences." (307-1) (2)

In turning to another phase of the relative activity of forces, let us consider the human body. "In the body of a living, physical being, we have a body made up of many atoms, and their relations to one another depend upon the force as is given in each part to work upon, or in, or through the system. In the nerve system we find that of the force of physical matter or subconscious or soul matter, or superconscious or spirit matter, all receiving a force, as may be illustrated in this: When an injury comes to a portion of the body, the nerves transmit first an urge to move; then, the forces of all the elements of other parts of the body are brought into play, that which carries, (the blood); that which replenishes, (the corpuscles); that which stimulates the building of new cells, (the glands); *etc.* In simpler terms, the Divine force expresses its activity through the various forms of manifestation. From our conscious standpoint we must consider the relative action as manifests through what we call position, space-time." (3744-2) (2)

Another very important manifestation of force is mind. Here, again, man is prone to lose sight of the oneness, for mental activity seems to take so many forms and emanates from so many sources. In our age of science, where everything is put to the test of close inspection and examination, it has been found rather difficult to make the advances in studies of mental faculties such as have been made in other more material sciences. Perhaps, the simplest illustration of the oneness of mental forces can be given by drawing upon what we know of our own conscious activities. We know that we can build two mental pictures which will differ completely one from the other, yet, they are certainly creations of the same mind. One picture may deal with something alive, may be full of movement, while the other may be composed of inert matter. Thus, it is that God expresses Himself in one force that is alive and active, but seemingly in a completely different form. One force is the builder, the other the material; one is the carrier, the other the cellular matter. In essence, all is one.

"The mind may be classified into two forces - that between the physical and soul, and that between the soul and spirit force. We see the manifestations of these rather than the minds them-selves." (3744-1) (2) We call these the conscious mind and superconscious mind. They are but expressions of the same force appearing as different projections because of their relative positions in time and space.

"This one element is the substance of all space, and holds all of its formations, or things, or worlds, in place inside of itself, as a trunk of a tree holds all branches in place as different formations or parts of its own self. The higher dimensional kind of mind would recognize life in this one elemental state in its entirety. This would be the viewpoint of the Creator's

mind. (77)

"The mind of God embraces the one total life energy with its universally evolved portion called mind, in all of its forms, all of its stages of development, and all of its self-conscious individual viewpoints, including ourselves; yet, while in physical form we possess not the Creator's kind of mind, but rather the kind that mind becomes in physically created form." (78) We have a creative mind, but it is limited in physical manifestation.

"God, then, as distinguished from ourselves, is this one elemental life essence, spirit, creative energy, elan vital, or whatever we may call it, with its portion called mind, which latter includes not only our created form of mind, or three-dimensional self-conscious viewpoints, but also in addition, higher than physical, three-dimensional, self-conscious viewpoints; fourth and higher-dimensional, developed and developing self-conscious viewpoints." (78)

"We may understand that we are a self-conscious viewpoint possessed by the One God - are that which God is, capable of doing that which God does; yet, God, the Father, is not only our individual self, but incorporates each and every progressive individual self into one complete whole." (79)

FORCE, SELF IN RELATION TO ALL: In the study of ourselves in relation to the Whole lies the awakening of the inner man to a full consciousness of our respective part which we must play in the scheme of creation. Here again man is baffled by what seems to be a great division of force. This is due to the limitations of the conscious faculties by space-time. Yet, there is open to every individual a door through which he may pass to obtain a new vision. This door leads to the inner self. "We must, in spite of our three-dimensional, finite, physical viewpoints, understand the inner, infinite, higher-dimensional experiences that the inner subconsciousness mind may be induced to bring through imagination into out consciousness, but which visioning, hunches, premonitive or intuitive thoughts, experiences, or spontaneous ideas we will fail to understand, unless we know something of the logic of the higher-dimensional viewpoint." (80)

"Not only one element, but every element in a universal force has its effect upon the various phenomena of life in the action of an individual entity in its relationship to the whole. Hence, we find this prerogative: That while we are apparently reasoning from and through an heterogeneous mass, yet, that one factor of the inner force or spark of the entity's association, or the entity's relative force from the first or from the universal cause of creation, has its activity throughout. This should be understood that it may be applied in the phenomena of life." (900-359) (2)

This is to say that regardless of the seeming complexity of existence in this plane, the original impulse which gave the soul its being will manifest and

dominate throughout any experience if given the opportunity of expression.

"In the greater or lesser degree this same universal force as is applied in this sense is the same way and manner in which ideas or ideals of an individual respond to the various conditions as may be presented to him through the various forms of that called the experience or phenomenon of life. Man, from the purely material sense, only becomes conscious through the sensuousness, or through the five senses. Yet, ever is that sixth, seventh, or eighth sense of the entity alert to the various responses as received by the inner self through the various experiences of life. We find in many various phases of same these - taken as an oneness - become, as it were, branches or lines of study sought out by individuals and classified as the keynote; yet, no one is superior to the other in its influence upon the individual life, save as to what the individual's development or attunement is - through its experiences - to those phases of the same thing.

Hence, we find one may say that all sensuousness of an individual only comes through hearing, seeing, feeling, or experiencing as a whole. Another may say only that sense of inner-preservation, as an individual, is the keynote of experience of life; however, in this very example as has been set, we find this disproves that any one may be the whole; but, all are a part of, a portion of, the whole. Dependent, then, as to individual development as to what the response may be, whether as to self-preservation, self-propagation, or self-expression of sensuousness, in making self big in mind or in the various expressions of sensuous experience." (900-359) (2)

"This shows the necessity of that development of the soul to the awareness of the ability to apply with self's own soul force those energies of the cosmic forces, that these combined in their efforts may bring about the awareness of the physical body to the conditions existent in life in its varied or changed forms, and as to how same may be applied in the material way and manner to the advancement of self in the fuller sense. Not abused, not dis-used but applied in the way that the forces of self find an atonement with the Universal Forces; thus the ability to apply same in the way and manner as has been shown by Him, who gave, 'Yet those come after me who shall do even greater things than I,' for the ways are not past understanding. It is only necessary that one apply that knowledge gained in any direction to make self applicable to greater laws pertaining to conditions in that same direction; yet, all these must be kept as one, even as is shown in the vision or in the experience that all of the forces use their channels to bring about manifestation of one nature." (900-362) (2)

"Often when the activity of the First Cause comes into man's experience the present realm, he becomes confused in that he appears to have an influence in directing this force or power. Certainly! Much, though, in the manner as the reflection of light in a mirror. For, it is only reflected force that many may

have upon those forces that show themselves in the activities, in whatever realm into which man may be delving in the moment - whether of the nebulae, the gaseous, or the elements that have gathered together in their activity throughout that man has chosen to call time, or space, becoming in its, very movement, of that of which the First Cause takes thought in a finite existence or consciousness. As man applies himself, or uses that of which he becomes conscious in the correct sphere or realm, he becomes conscious of that union of infinite and finite force. In the fruits of the spirit does man become aware of the infinite penetrating, or interpenetrating the activities of all forces of matter, or that which is a manifestation of the realm of the infinite into the finite. Thus may the finite become of this oneness.

"In reaching this understanding and state of consciousness, it is well to remember that, through self, man will understand his Maker, when he understands his relation to his Maker - each and every person getting that understanding have their individual niche, place, and work to perform. The understanding for the individual entity, viewed from its own standpoint, with the knowledge, is obtained and made ready by itself, to be manifested through itself, toward its own development, and in that development of the creation or world." (262-52) (2) (76)

FORCE, SHORT-RANGE: "The short-range forces are repulsive. This is usually the case for molecules which do not interact chemically. The steeply rising part of the curve near the origin is then due to the overlapping of electron clouds; that the forces correspond to it are called exchange forces (a term expressing the mathematical origin of these forces, which arise mathematically from certain exchange properties of the molecular energy state functions). Exchange forces can also be attractive. This is the case for atoms which enter into chemical combination with one another. Attractive exchange forces are called valence forces and play an important role throughout the field of chemistry.

"Repulsive exchange forces account for the mechanical rigidity, or impenetrability, of molecules; the steepness of the potential-energy curve in the exchange-force domain gives rise to the limited compressibility of matter." (3)

FORCE, SOUL: See **FORCE-GASEOUS**

FORCE, SOUND: See **MOLECULAR MOTION**

FORCE, SPIRITUAL: "Egypt...the center of the universal activities of nature, as well as the spiritual forces, and where there might be the least disturbance by the convulsive movements which came about in the earth through the destruction of Lemuria, Atlantis and - in later periods - the flood." (281-42) (2) See **SPIRIT, DOMINANT**

FORCE, SYMPATHETIC CONCORDANT: See **FORCE-POLAR-TERRESTRIAL**

FORCE, THOUGHT: "The human brain being formed of an inestimable number of spherical resonators, termed in medical science nerve cells, forming the gray matter of the brain, these minute spheres take up the thought force which permeates all space in endless waves, eternally active. This force we term atomolic; the cells are composed of atomoles, whose vibratory motions under the action of universal thought force result in the phenomena of thought, cognition, intellection, *etc.* Understanding this, no one should continue to feel surprise at the caring emotions and impulses of a human being in an undeveloped state, as only be developed WILL can the motions of this force be directed.

The entire human economy, in the action of all its functions, assimilations, and motions, is the result of differentiation of this unitary force, all tending to supply the instrument connecting the organism with this force (the brain) with certain gases whereby it sustains its ceaseless action from birth to death: these gases supply the rotating envelopes with necessary substance for their continued activity. Were this supply cut off, death would immediately ensue; it is a fact well demonstrated that the resonating brain-structure is the first to undergo decomposition.

In all embodied conditions of the manifested universe, the law of harmony reigns supreme; the cause of this manifestation is the result of the positive being stronger than the negative; the positive is everywhere the dominant order of the universe; this reality is perfectly embodied in the words I AM; it is the reason why annihilation is both inconceivable and impossible in the universe. The truth of this statement can be experimentally demonstrated; its law is found in all threefold aggregations, and there is a universal trinity composed of two positives and one negative. Eternal consciousness, immortal life, and an infinite order of beings is the result, whilst every provision is made in the order of creation for the happiness and enjoyment of all manifested beings. Conditions are also provided whereby satiety falls to the lot of none.

The eternally conscious entity - call it by whatever name we please - moves in cycles as eternal and infinite as itself; it oscillates and vibrates perpetually and is never unconscious of any present condition, be it pain or pleasure, joy or sorrow, shame or glory; like the pendulum of a clock or the sun, moon, or tides, it swings from the one to the other of these conditions, now in pleasure, now in pain, by its contact with the extremes of all varying conditions, like a child which throws up its head and laughing for joy exclaims, I KNOW I AM." (8) See MIND FORCE; FORCE, MIND; MOLECULE; FORCE, ONE.

FORCE, UNIVERSAL: See LAWS OF BEING, ATOMIC THEORY - KEELY'S, FORCE-ONE, FORCE-CENTRIFUGAL

FORCE, VACUUM: See ACTIVE PRINCIPLE, VACUUM, NEGATIVE ATTRACTION

FORCE, van der WAAL: See VAN DER WAAL, FORCE-LONG-RANGE

FORCE, VIBRATORY: See GRAVITY, ACTIVE PRINCIPLE, POSITIVE VIBRATIONS

FORCE, WASTE: Q.: "What metallic elements used in producing the rays (of a simple spectrum) will be most used?"

A.: Those elements that occupy as numbers, on atomic scale, 16, 32, 64 or molecule elements as go to make up the waste forces, and of the electric units." (165-13) (2)

FORCE, WILL: "All forces are indestructible, immaterial, and homogeneous entities, having their origin and unity in one great intelligent personal will force." Keely pg 73 of (1). See FORCE-MIND, FORCE-MENTAL, INTRODUCTORY IMPULSE, DIFFERENTIATION

FORCE, WIND: See ACTIVE PRINCIPLE, VACUUM, FORCE-RADIAL, HEAT, SPECTROSCOPY, DIFFERENTIATION OF CHORDS

FORCE X: Described by Colonel Marcus McCausland as: action independent of distance; when properly directed can part flesh, dematerialize matter, produce telepathic effects, heal; humans can detect it; can be directed by mind; can be amplified and filtered; can be used for diagnosis of all types of disease; can be refracted, combined with other energies, resonated, stored; affected by weather, cosmic flares, is pulsing, *etc.* (90)

FORCED VIBRATION: The oscillation of a system under the action of a forcing function. Typically, forced vibration occurs at the frequency of the exciting force. (100)

FORM: The shape and order in which musical ideas are presented. Form has been divided into harmonic and melodic. By harmonic form is meant the key-tonality of chords, such, for instance, as would be illustrated by a comparison of a composition by Palestrina with one by Spohr. By melodic form is meant the proper grouping of the successive sounds which form a tune. (125)

FORM AND MATTER, PERMANENCE OF: Every mass is an aggregation of molecules each having its "neutral center" wherein are equated its component forces consisting of the three fundamental modes of vibration. The balanced activity of these vibrations at the "neutral center" without diminution of force, makes possible the permanence of form and matter.

Since the continuity of existence of all molecules - and all masses - depends on the three fundamental component modes of vibration being held in balance at the "neutral center" it follows that certain orders of vibration can, by their influence on this neutral center, break the balanced equation, divide the components of the molecules, and therefore divide the com-

ponents of the mass. (11)

FOUR-CHANNEL SOUND: Also called quadraphonic sound, is a way of reproducing music with four separate sound channels to replicate sonic ambience from the rear of the listener in addition to frontal stereo presentation. (103)

FOURIER ANALYSIS: "The Fourier Analysis of signals into components of various frequencies makes it possible to study the transmission properties of a linear circuit for all signals in terms of the attenuation and delay it imposes on sine waves of various frequencies as they pass through it." (4) See **ACOUSTICS §11,12**

FOURIER'S THEOREM: See **ACOUSTICS §11,12**

FOURTH DIMENSION: "The fourth dimension is an idea." (364-10) (2) See **ACTIVE PRINCIPLE, DIMENSION, TIME & SPACE**

FOURTH: An interval of four notes. (125)

FOURTH DIMENSION: "The fourth dimension is nothing more or less than the rate of vibration." (Lewis)

FOURTH DIMENSION: "Fourth dimension then being that condition as is reached wherein physical objects are spiritually understood, spiritual objects are physically understood, and able of experience." (900-66) (2). See **MATTER, LIGHT, VIBRATION MODES**

FOURTH FIFTH: In a key-system composed of three fifths, a comma less than the harmonic fifth. (8)

FOURTH, PERFECT: See **INTERVAL**.

FRACTAL: Benoit Mandelbrot coined the term fractal to describe a shape made of parts similar to the whole in some way. That is, a fractal contains unlimited copies of itself. Fractals offer shapes which more closely approximate natural shapes such as clouds, coastlines, trees, ferns and so on. Many natural shapes are fractals because they look the same regardless of how far you zoom in on them. For example a line that approximates a mile of coastline from an aerial view will look pretty much like one that approximates a foot of the coastline as viewed on earth. A boulder looks a lot like a rock, which looks a lot like a pebble, which looks a lot like a grain of sand, depending on your view. (130) See **MANDELBROT; MANICEPTION; KEYNOTE**

FRAUNHOFER LINES: "The Fraunhofer lines represent the silences, or the places of invisible pitches between the luminous pitches of rad-energy. They cannot therefore be conveniently used as data from which to measure the fundamental pitches of the atoms undergoing examination. When a series of sound-pencils are projected upon a screen, they undergo a combination of overtones and under-tones at the point of contact producing tones of a pitch either

too low to be recognized by the human ear or too high to be called sound. The Fraunhofer lines are not therefore simply silences, but may be the higher invisible ultra-actinic rays. The fact is that some of the Fraunhofer lines are capable of producing a variety of chemical actions, when reflected and focalized. Observation thus far shows that these lines do not bear any definite ascertainable relation to the pitches producing them, but that they do bear some uniform relation from which the fundamental pitch could be determined cannot be doubted. The relation of the Fraunhofer lines to the luminous spectra are undoubtedly such as would enable one to compute the creative pitches producing them; but as yet no such determinations have been made. The accurate method of determining them is from the mutual relation of the harmonic pitches of the luminous spectra.

A table representing the harmonic overtones and undertones of simple vibrations, and the resultant harmonics of associate vibrations, will be of great convenience in making these determinations.

The natural unity of sonity lies above 1 per second, and below 2 per second, and for this reason the numbering of the octaves is accomplished by calling the end of the first octave No. 1 instead of No. 2. At the end of the twenty-first octave sono-thermity commences, and the bodies oscillating at this pitch are either correspondingly smaller by $\frac{1}{8}$ than the preceding sonitic aggregates; or larger aggregates undergo vibration in submultiple portions of themselves. In either case the originating oscillation of sono-thermic pitch is that of an isolated or localized aggregation. This first class of forces, or first double gamut, is included within the range of about forty-three octaves. The bodies of the translatory pendulous motion and produce waves of the transverse form, while the bodies of the second gamut undergo internal nodal vibration and produce waves of a longitudinal form. Beyond the upper limit of the forty-third octave we reach bodies of a size (determined by the same method as in sonity) which we know to be about the size of an atom as approximately determined by various physicists to lie between eleven and twelve micromillimeters (hydrogen molecules), which gives the highest pitch of the known atoms, and from which can be roughly estimated the pitch of the heavier atoms. Starting with the approximate pitch of hydrogen as determined from its associate spectrum with oxygen, and working back to the size of the largest atoms, we again reach a pitch corresponding to the highest sono-thermic vibrations. Starting with the known temperature and pitch of a heated body, emitting definite rays of light, and working back to absolute zero, we again reach the pitch of the sono-thermic limit." pg 77-78 of (9)

FREE FIELD: [ACOUSTICS] An environment in which a sound wave may propagate in all directions without obstructions or reflections. Anechoic rooms can produce such an environment under controlled conditions. (85)

FREE VIBRATION: Vibration of a mechanical system following an initial perturbation (change of position or velocity). Depending on this kind of perturbation, the system responds by free vibration at one or more of its natural frequencies. (100)

FRENCH SIXTHS: See **EXTREME SIXTHS**

FREQUENCY: The repetition rate of a periodic vibration within a unit time. This is normally expressed in units of cycles per minute (cpm), events per minute (epm), or cycles per second (cps or Hz). It can be expressed relative to shaft rotative speed. With respect to rotating machinery vibrations, there are two types of frequencies of interest: **A**) the shaft rotative frequency, and **B**) the various vibration frequencies as measured by vibration transducers. Rotative frequency is usually expressed in terms of rpm. Vibration frequencies are commonly expressed in terms of a fraction or percentage of the shaft rotative frequency: 1X means one times rotative frequency, 2X means two times, $\frac{1}{2}X$, or 50 percent, means one-half times, *etc.* (100)

FREQUENCY: Number of cycles per unit time. SI unit: hertz, Hz (cycles/s). (5)

FREQUENCY: The number of vibrations per second; expressed in hertz (Hz). (75)

FREQUENCY: Rate at which a waveform repeats. Expressed in cycles per second or Hertz (Hz). (69)

FREQUENCY: [ACOUSTICS] The number of cyclical variations per unit time. Frequency is generally expressed in Hertz (Hz) also denoted cycles per second (cps). (85)

FREQUENCY MODULATION: A periodic change in the pitch of a sound; for instance, vibrato. (69)

FREQUENCY MODULATION: More commonly, FM, is a method of radio broadcasting in which information is transmitted by varying the frequency of the broadcast signal. It is better suited to high-fidelity transmission of music than ordinary radio, which operates on a principle known as amplitude modulation, or AM. Broadcast standards in the U.S. are such that FM broadcasts have a wider frequency range (up to 15,000 Hz, as compared to about 5,000 Hz in ordinary AM radio), freedom from static and noise, and a greater spread between loud and soft passages. (103)

FREQUENCY RESPONSE: A filter's amplitude (in dB) and phase response (in degrees of lead or lag) as functions of frequency presented in tabular and/or graphical form.

FREQUENCY RESPONSE: Frequency response describes how evenly a component responds to notes of different pitch. Ideally, a component should increase the loudness of all tones, from the highest to the lowest, by exactly the same amount. A frequency response varying no more than ± 3 db can be considered "flat" within the given frequency limits. (103)

FREQUENCY RESPONSE: The measured amplitude and phase response characteristics of a mechanical or electronic system with respect to frequency. (100)

FREQUENCY SCALES: See **LINEAR AMPLITUDE**, **LOGARITHMIC AMPLITUDE**.

FREQUENCY SHIFT KEYED (FSK) FILTER: A highly selective bandpass filter which passes two closely spaced FSK frequencies corresponding to binary ZEROES and ONES, while rejecting voice; this allows transmission of digital data over voice frequency channels.

FRET: Small pieces of wood or ivory placed upon the finger-board of certain stringed instruments, to regulate the pitch of the notes produced. By pressing the string down to the finger-board behind the fret, only so much of the string can be set in vibration as lies between the fret and the bridge. (125)

FRONTAL SURFACE: The horn area that contacts the workpiece. (102)

FULL CADENCE: A perfect cadence. (125)

FULL CHORD: 1) A chord, some of the essential notes of which are doubled. 2) A chord for the full power of an instrument, orchestra or voices. (125)

FULL HARMONIC CHORD: Travels in a straight line and governs the magnetic sympathetic terrestrial flow. (Keely) See **MAGNETIC STREAM**, **STRAIGHT LINE**

FULL POWER RESPONSE: An approximate, large signal specification stating the maximum frequency and conditions under which a filter or amplifier can deliver a variously defined "full output"; the definition can vary from one supplier to the next.

FULL WAVE-LENGTH HORN: A horn one wave-length long in the direction of sound transmitted there through. (102)

FUNCTIONALLY PRIME: An integer is functionally prime when it fills a position which is normally prime, although the integer is not prime by the definition given above (see **PRIME**). It will have other limiting conditions concerning the factors which it may have. (14)

FUNDAMENTAL: Usually the lowest frequency component in simple waveforms, perceived as the "pitch" of the sound. (69)

FUNDAMENTAL BASS: See **HARMONY**

FUNDAMENTAL MODE: The mode of lowest frequency. (75)

FUNDAMENTAL TONES: The tones from which harmonics are generated. (125) See **ACOUSTICS** § 10

FUSING: See **PLASTIC WELDING**. (102)



- G:** 1) The note Lichanos in Greek music.
 2) The first note of the church mode, called Eolian, the highest pitch of the authentic modes.
 3) The lowest note of the grave hexachord; in the Guidonian system, gamma ut.
 4) The fifth note of the normal scale of C, called Sol.
 5) The lowest or fourth string of a violin, the third of the viola and violoncello.
 6) The key-note of the major scale, having one sharp in the signature.
 7) The letter-name of the treble clef. (125)

G: Is the lowest note of the octave as is Red the lowest color of the light octave. See **RADIOMETER, ELECTROMAGNETIC SPECTRUM, (10)**

G: The value of acceleration yielded by the force of gravity, which varies somewhat with the earth latitude and elevation of the point of observation. By international agreement, the value of $9.8\text{m/s}^2 = 32.2\text{ft./s}^2$ has been chosen as the standard acceleration due to gravity. (100)

GA: The fourth syllable in the system of Bobibation. (125)

GABEL: [Ger.] A fork. *Stimmgabel*, a tuning fork; *Gabelton*, the note A, as given for the pitch. (125)

GAIN: The built-in amplitude of a horn or amplitude transformer. (102)

GAIN: See **SIGNAL GAIN. (100)**

GAIN: The factor by which the filter output signal exceeds the input signal, usually the opposite of attenuation and expressed in dB.

GAIN: Gain, usually measured in decibels, means the amount of amplification and is sometimes applied to the volume control on an amplifier. (103)

GAMAHEU: Stones with magic characters and pictures, possessing powers received from astral influences. They may be made by art or in a natural manner. Amulets; charms. (131)

GAMATHEI: See **GAMAHEU**

GAMUT: Used to represent the first or lowest tone

(G) in the medieval scale, and *ut*, later *do*. Also the whole series of recognized musical notes; sometimes the major scale; the whole range of anything.

GANG WELDER: A system having several converters that are sequentially or simultaneously operable. (102)

GANGLIONIC: Of the ganglia, or knots or centers of the nervous-system. (121)

GASEOUS ATOMIC ELEMENT: "The transmission of sympathetic atomic vibration, through a triple nodal transmitter, induces an inter-atomic percussion, that results in triple atomic subdivision, 'not oscillating across the diameter of the atom', but accelerating to an infinite degree the atomic film that surrounds it and at the same time extending the vibratory range of the atom far enough to set free the gaseous atomic element." Keely in (1) pg 310 See **FORCES-GASEOUS, LEVITATION, FORCES-ATOMIC**

GASES: See **FORCES-ATOMIC, LEVITATION, FORCE-GASEOUS, HELIUM, HYDROGEN, OZONE, OXYGEN, RADIATION-CELESTIAL-SYMPATHETIC**

GASES, CREATIVE: See Edgar Cayce Circulating File "[Theory of Creation](#)"

GASES, METALLIC: See **LEVITATION, HELIUM, HYDROGEN, OZONE, MOLECULAR RESONANCE, OXYGEN, ATOMIC ANGLE OF RADIATION, LIGHT, VACUUM**

GASTRÆA: A primitive extinct organism from which all the higher animals are descended. (121)

GASTRULA: The form which the embryo takes immediately after impregnation. (121)

GASTRULATION: The process of the formation of the gastrula. (121)

GATE: On/Off signal indicating beginning, duration, and end of an event. (69)

GAUGE SYMMETRY: A symmetry in which no measurable property of the world changes if protons and neutrons can be substituted for each other at each point in space independently. (116)

GAUGE THEORY: Any theory that incorporates gauge symmetry. (116)

G CLEF: The character placed at the beginning of a stave, to indicate the pitch of the notes. (125)

GEAR MESH FREQUENCY: A potential vibration frequency on any machine which contains gears. It is represented by the number of gear teeth times shaft rotative frequency. (100)

GEIGER COUNTER: A device that detects ions created by a charged particle. (116)

GEIST: Spirit, genius, soul. (125)

GEMMATION: Birth by budding from the parent-form. (121)

GENERAL PURPOSE MACHINERY: See **BALANCE-OF-PLANT MACHINERY.** (100)

GENERATOR: A ground note, fundamental bass, root, derivative. (125)

GENERATOR: See **POWER SUPPLY.** (102)

GENESIS: [Music] The begetting and birth of notes by numbers. (8)

GENETIC: Pertaining to development or birth. (121)

GENETIC ROOT: The root in the genesis of a chord, or of the whole system. (8)

GENRE: 1) Manner or style. 2) Kind or class (of scales); as, diatonic, chromatic, enharmonic. (125)

GENUS: Sort or class, especially used with reference to scales; as, the diatonic, chromatic, enharmonic genera. (125)

GEOCENTRIC THEORY: The system which takes the earth to be the center of the universe. (121)

GEOGENY: The science of the formation of the earth. (121)

GEOLOGICAL SEARCHES: Searches for quarks presumably trapped in various materials on the earth. (116)

GEOMETRY:

**PROPOSITIONS DEMONSTRATING THE
RELATIVE PROPERTIES OF STRAIGHT AND
CURVED LINES**

by

John Ernest Worrell Keely, 1874

PROPOSITION I

"One of the relative properties between straight lines and a perfect curve or circle is such, that all regular shapes formed of straight lines and equal sides, have their areas equal to half the circumference multiplied by the least radius which the shape contains (which is always the radius of an inscribed circle) than which every other radius contained in the shape is greater, and the circle has its area equal to half the circumference multiplied by the radius, to which every other radius contained in the circle is equal."

PROPOSITION II

"The circumference of any circle being given, if that circumference be brought into the form of a square, the area of that square is equal to the area of another circle, the circumscribed square of which is equal in area to the area of the circle whose circumference is first given."

PROPOSITION III

"The circle is the natural basis or beginning of all area, and the square being made so in mathematical science, is artificial and arbitrary."

PROPOSITION IV

"The circumference of any circle being given, if that circumference be brought into any other shape formed of straight lines and of equal sides and angles, the area of that shape is equal to the area of another circle, which circle being circumscribed by another and similar shape, the area of such shape circumscribing the last named circle is equal to the area of the circle whose circumference is given."

PROPOSITION V

"The circumference of a circle by the measure of which the circle and the square are made equal, and by which the properties of straight lines and curved lines are made equal, is a line outside of the circle, wholly circumscribing it, and thoroughly enclosing the whole area of the circle, and hence, whether it shall have breadth or not, forms no part of the circle."

PROPOSITION VI

"The circumference of a circle, such that its half being multiplied by radius, to which all other radii are equal, shall express the whole area of the circle, by the properties of straight lines, is greater in value in the sixth decimal place of figures than the same circumference in any polygon of 6144 sides, and greater also than the approximation of geometers at the same decimal place in any line of figures."

PROPOSITION VII

"Because the circle is the primary shape in nature, and hence the basis of area; and because the circle is measured by, and is equal to the square only in ratio

of half its circumference by the radius, therefore, circumference and radius, and not the square of diameter, are the only natural and legitimate elements of area, by which all regular shapes are made equal to the square, and equal to the circle."

PROPOSITION VIII

"The equilateral triangle is the primary of all shapes in nature formed of straight lines, and of equal sides and angles, and it has the least radius, the least area, and the greatest circumference of any possible shape of equal sides and angles."

PROPOSITION IX

"The circle and the triangle are opposite to one another in all the elements of their construction, and hence the fractional diameter of one circle, which is equal to the diameter of one square, is in the opposite duplicate ratio to the diameter of an equilateral triangle whose area is one."

PROPOSITION X

"The fractional diameter of one circle which is equal to the diameter of one square being in the opposite ratio to the diameter of the equilateral triangle whose area is one, equals 81."

PROPOSITION XI

"The fractional area of one square which is equal to the area of one circle, equals 6561; and the area of the circle inscribed in one square equals 5153."

PROPOSITION XII

"The true ratio of circumference to diameter of all circles, is four times the area of one circle inscribed in one square for the ratio of circumference, to the area of the circumscribed square for the ratio of diameter. And hence the true and primary ratio of circumference to diameter of all circles is 20612 parts of circumference to 6561 parts of diameter."

PROPOSITION XIII

"The line approximated by geometers as the circumference of a circle is a line coinciding with the greatest limit of the area of the circle, but not enclosing or containing it."

PROPOSITION XIV

"An infinity in minuteness is always such, that it is capable of increase; therefore, in material things, an infinity equals one ultimate particle of matter, such, that in the nature of the material or thing under consideration, it cannot be less."

AXIOMS as proven herein and self evident:

First: The circumference of a circle is a line outside

of the circle thoroughly enclosing it, and of itself forms no part of the area of the circle. (Prop. V)

Second: The line approximated by geometers, if it could be correctly determined, is a line coinciding with the greatest limit of the area of the circle, but not enclosing it. (Prop. I)

Third: The line approximated by geometers is consequently the circumference of a circle whose diameter is less than one in its relative value to the area of a circle. (Prop. I, III, IV & XIII)

Fourth: The difference between a line coinciding with the greatest limit of the area of any circle and a line enclosing the same circle, is an infinity, such that it cannot be less. (Prop. XIV)

Fifth: In material things an infinity equals one ultimate particle of whatever material or thing is under consideration, such that it cannot be less. (Prop. XIV)

Sixth: An infinity is a value, such that it is always capable of increase. (Prop. XIV)

PROPOSITION XV

"The value of that infinity which is the difference between the inscribed and circumscribed lines (axiom 4th), and which is omitted by geometers, is increased in the process of bisection of a circumference, so that at some great number of sides of a polygon it will always equal one or more in the sixth decimal place, and may be increased, until it shall equal circumference itself."

AXIOMS as proven herein and as self-evident:

First: Space is infinitely divisible. (Prop. XIV)

Second: Any imaginary line (not a material line), which shall have breadth, is equal to the same portion of space.

Third: Any such imaginary line is, therefore, infinitely divisible.

Fourth: Any such imaginary line may, therefore, be divided, until each part or division is less than any magnitude which is, or can be, developed to our senses.

Fifth: At whatever point the division of such a line may be arrested, because the sum of all the parts is equal to the whole; therefore, each part must have breadth, though the breadth of each part may be such, that no conceivable number of them form a developed magnitude.

Sixth: One line cannot occupy two places at the same time; neither can two lines be in one and the same place, at the same time.

Seventh: Two lines without breadth, cannot exist

with no breadth between them.

Eighth: The existence of shape signifies limit; hence, no shape can exist without a boundary line definitely located, which forms no part of the shape itself, which boundary is its circumference."

PROPOSITION XVI

"No two lines lying in the same plane, parallel to each other, and between two other straight lines, which are at an angle to each other, can possibly coincide, and be equal, except they shall become one and the same line."

PROPOSITION XVII

"All lines which have a fixed and definite locality must have breadth, whether they be lines of circumference, or lines of division."

PROPOSITION XVIII

"The circle inscribed and circumscribed about an equilateral triangle, is in duplicate ratio to the circle inscribed and circumscribed about a square."

AXIOMS as proven herein and as self-evident:

First: Circumference and radius (and not the square of diameter) are the only natural and legitimate elements of area by which all regular shapes may be measured alike and made equal to one another. (Prop. VII)

Second: The equilateral triangle and the circle are exactly opposite to one another in the elements of their construction, which are circumference and radius. (Prop. VIII & IX)

Third: The equilateral triangle is the primary of all shapes in nature formed of straight lines and of equal sides and angles (Prop. III), and has the least number of sides of any shape in nature formed of straight lines, and the circle is the ultimum of nature in the extension of the number of sides.

PROPOSITION XIX

"In all the elements of their construction which serve to increase or diminish area, the equilateral triangle and the circle are exactly opposite to one another in respect to the greatest and the least of any shapes in nature, and hence they are opposite to one another in ratio of the squares of their diameters, or in duplicate ratio." *For greater details see Quadrature of the Circle.*

GERMAN SILVER: See **SILVER**

GERMAN SIXTHS: See **EXTREME SIXTHS**

GERM-PLASM: The protoplasmic matter of the embryonic germ. (121)

GeV: Abbreviation for giga (10^9) electron volts of energy. (116)

GIGANTES: Elementals having the human form but of superhuman size. They live like men, and are mortal, though invisible under ordinary circumstances. (131)

GIMEL: The 3rd Hebrew letter, Gimel (G), means a camel, which suggests fortitude and wondrous power of endurance, for that strange animal, familiarly known as "the ship of the desert," can endure hardships and privations that no other quadruped could sustain. Hieroglyphically this letter signifies a half-closed hand extended to grasp whatever may be needed for its owner's sustenance. (72)

GITTITH: [Heb.] This word, which is found in the titles of Ps. viii, lxxxi, lxxxiv., is by some supposed to signify a musical instrument (perhaps as used at Gath); by others, a vintage-song, or well-known tune, to which the Psalm could be sung. (125)

GLASS: Musical instruments of this material are of two kinds, percussion and friction; the first consists of a series of small plates of graduated sizes, supported on tapes secured in a wooden box, the several tones being regulated by the size of the glass; this is a mere toy. For a description of the best of the second class see **HARMONICA**. Another form of a glass friction instrument is made of a number of tubes of various lengths, and as the tone is brought out by stroking the length of the several tubes with flannel or india rubber, it is only capable of producing slow melodies. (125)

GLEE: A composition for voices in harmony, consisting of two or more contrasted movements, with the parts so contrived that they may be termed a series of interwoven melodies. (125)

GLITCH: See **ELECTRICAL RUNOUT, MECHANICAL RUNOUT.** (100)

GLOCKENSPIEL: An instrument made of bells tuned diatonically and struck with hammers, or by levers acted upon by a keyboard. (125)

GOLD: Q-12: [1993] I was told through a reading [1993-4, A-7] to acquire an educational knowledge of gold and silver necessary to healing. How should I go about to obtain that knowledge? May I have any information on this subject which may be given at this time?

A-12: "Seek first that as has been compiled by the chemical analyses of same as related to the physical body. Remember we are speaking physically. Then there may be given the mental and spiritual application of same in healing, see? These are, as has been indicated before, as influences that represent in the mind of man forces that are necessary.

How few there be that a few dollars would not heal

many, many a feeling - at least bring security! Then may not that spiritual force, with the essences of same as applied to the physical body, be applied in a spiritual manner as to bring efficacy in its spiritual application? Silver is a sustaining cord, a renewer of the energies as applied between the physical forces and the energies of activity of life itself upon nerve and brain forces as well as the very essence of the glandular secretions of the body. The same applies then in that given.

First, then, study the chemical analyses as related to bodily function. Then seek again; we will make practical application for thee." (281-27)

"The principle being that these change the vibratory forces as they add to or take from impulses within the system, from which those of the sensory system, or senses, react in the brain itself, and which takes place much as has been given with gold and silver in their varied conditions as may be applied to the system." (1880-16) 2

"In these, too, there should be seen in this, as known as Number Three - is always to carry the gold, see? While that as known as Number Four would carry the silver, see? and that should always be on the negative pole also, and will always be attached to the umbilicus and to the upper and right portion of same." (1800-16) 2

"The ordinary conclusions of the activity of gold, when assimilated, is incorrect - for these feed directly to the tissue of the brain itself, and - given properly - Silver and Gold may almost lengthen life to its double, of its present endurance." (120-5) 2

"Silver and Gold, then, as metals for the body, enliven the glands of the system that are lax in their physical functioning, supplying the brain centers even themselves that impulse, that incentive, as to make for proper physical coordination in the body here."

"The Gold Activity Upon the System: is to supply that necessary element in the glands that secrete in the system for the supplying of the assimilated forces of a developing body, and pour their fluids as from the 'horn' into the body."

"While those of the Silver 'cord' makes for that transmutation of impulse from the brain to the organs of the body, sustaining - as it were - that spark of life itself in a material plane." (5500) 2

"The Gold, which is carried into the system vibratorily through the Appliance, is to act upon the elements in the nerve system so as to renew the energies in same.

"The Silver, is to enable the activity of the eliminating system to so eradicate the effects of the suppression of activity in the muscular and tendon forces as to allow same to be eliminated from the body."

"The, (Gold & Silver) through the absorption of same by the Radial activity, would add to the gland forces in the circulation that which would become NOT only constructive to their proper functioning, but would become destructive to the organisms that accumulate from the adhesions and cohesions through the portions of the system as indicated."

"The Wet Cell Appliance, with Gold Chloride added, carries "those properties that are as stamina to the nerve forces of the body..." "...where there are vibrations of a specific nature (Gold in this instance) carried into the body through those centers (Lacteal Duct) from which the radial activity of the circulation is carried, are to carry those elements that stimulate growth to the very glands and the very nerve fibres themselves. And we will be able to find or to see how that various portions of the body, in the extremities, in the strengthening of the stamina along the Cerebrospinal System itself, will be created little by little." (735) 2

"The vibrations (via Wet Cell) from the Gold Solution are to act upon the nerve impulse as to be as a creative force or to become active as an influence to the glandular system through the assimilating body." (1853) 2

"The vibration through the electrical forces of the Gold (with Wet Cell) should stimulate the activity to the various portions of the system so affected. While the Hydrochloric Acid (also via Wet Cell Solution Jar) is necessary in (this) system, the Gold - being an acid - will induce such activity in the ducts and glands themselves as to induce or cause the body, though low in its vitality, to CREATE that necessary acid in the present low state.

"Not only does the activity of the Gold (Chloride) then, make for this vibration in the body but it produces in the Endocrinals - through its associations of the metallic forces (electrical flow) from copper to nickel, through the electric charges, the low form passing through the system - the stamina, as it were, to the plasma of the nerve forces themselves. It also stimulates an increase in the numbers of the leucocyte that are the warriors in the blood." (988-7) 2

GONG: An Eastern pulsatile instrument, composed of several metals mixed in proportion as yet unknown in this country. The gong has no distinct or appreciable note, but gives out a sound consisting of a combination of harmonics. It has been introduced with remarkable effect as an orchestral instrument by Meyerbeer. (125) See **ACOUSTICS** § 24

GNOMI: Little Elementals having the human form and the power to extend their form. They live in the element of the earth, in the interior of the earth's surface, in houses and dwellings constructed by themselves. (131)

GNOMON: Within the context of Quantum Arithmetic, the gnomon is considered to be a right-angled

rectilinear figure which is L-shaped. The legs of the figure are of equal width, and equal length, unless the figure is specified to be an unsymmetrical gnomon. (14)

GOOD & EVIL: Matter can and does differentiate into different forms of energy, i.e., radiation and radiant substances such as uranium and cesium, alpha & beta emissions, etc. This is a proven fact. Not to mention that matter manifests as the many different elements we can see in a Table of the Elements, this latter conforming to "rules" of octave structures as are found in music. More on this later.

NOTE: In the first place the concepts of Good and Evil are created by Man and have no real place in the universe's natural state of things. But anyway let's procede:

Depending on the context we are using to define "evil" how can matter be evil? It cannot act on its own behalf (through volition), it cannot cause harm of its own initiative so therefore, in a moral context, it cannot therefore be considered evil or that which causes evil.

Matter is formed according to Natural Law or function - yes we may consider "God" created matter as a perfect thing from a perfect creator. (Natural Laws are infallible (according to themselves and not as we humans interpret them) and may therefore be considered perfect in operation or may be equated with a divine being [anthropomorphized by Man].) So the form of matter or the archetype form is perfect and therefore again we cannot say matter is evil. (Natural Laws or functions determine the archetype form.)

In the context of Vibratory Physics there are two fundamental states of matter and energy: Harmonic and enharmonic. A state of energy (or matter) that is considered harmonious is one in which all the vibratory modes and activities are in a state of perfect harmony and balanced and centralized to a focal point. A state of harmony cannot be considered as evil when all these parameters are in a state of perfect balance.

On the other hand. Any thing or activity that is contrary to harmony may be considered as evil or not-good to that state of harmony. In this narrow case we can say a dischord or enharmonic activity is evil to the original state of harmony. Therefore an energetic state (positive propulsive or enharmonic in relation to the original harmony) can be considered as evil as this condition disrupts the harmony and causes commotion, chaos and disruption.

Yet again - matter is brought into being through a dischord to the harmonious natural states of purer energies. (Big debate waiting here.) From this context matter is the result of a dischord or disturbing of that original energetic balance. Here we can then say matter is an evil (discordant result) when considered apart from the originating concord of high energy states which were originally in a state of perfect har-

mony.

So to answer THE question: Yes matter is evil and no matter is not evil.

Some follow-up questions here then are: What is harmony (good=balance) and what is dischord (evil=disturbance)? Where do they come from? Why are they what they are? How do they interact?

GRACE NOTES: See GRACES

GRACES: A General term for ornamental notes or short passages, introduced as embellishments into vocal or instrumental music, not actually essential to its harmony or melody. (125)

GRADATION: Gradation, by degrees of the scale. (125)

GRADUAL MODULATION: A change of key by diatonic progression. (125)

GRADUATION OF MACHINES: Mr. Keely gives a few introductory words concerning the necessary graduating of his instruments, for effecting conditions necessary to ensure perfect sympathetic transmission which serve to show the difficulties ... attendant upon getting his machines under control and equate the differentiation in molecular masses, requiring greater skill than in researching the force of a sunbeam. He writes: "The differentiation in the molecular metallic masses, or grouping, is brought about in their manipulations in manufacturing them for commercial uses; in the forging of a piece of metal, the drawing of a length of wire, and in casting a molten mass of any form.

"The nearest approach to molecular uniformity in metallic masses is in the wire drawn for commercial uses, gold and platina being the nearest to freedom from differentiation. But even these wires, when tested by a certain condition of the first order of intensified molecular vibration for a transferring medium between centers of neutrality, I find to be entirely inadequate for the transfer of concordant union, as between one and the other, on account of nodal interferences. We can appreciate the difficulty of converting such a medium to a uniform molecular link, by knowing that it can be accomplished only after removing all nodal interferences, by inducing between the nodal waves a condition in which they become subservient to the inter-sympathetic vibratory molecular link of such structure or wire."

Therefore, it is necessary to submit the wire to a system of gradation in order to find what the combined chords of these nodal interferences represent when focalized to one general center. Then the differentiation between these nodal waves and the inter-molecular link must be equated, by what I call a process of vibratory induction, so as to induce pure concordance between one and the other. To elaborate on this system of gradation, for effecting conditions

necessary to ensure perfect and unadulterated transmission, would make up a book that would take days to read and months to study.

The graduating of a perfectly constructed instrument, to a condition to transmit sympathetically, is no standard whatever for any other one that may be built, nor ever will be, because no concordant conditions of compound molecular aggregation can ever exist in visible groupings. If it were even possible to make their parts perfectly accurate one to the other, in regard to atmospheric displacement and weight, their resonating qualities would still have a high rate of sympathetic variation in their molecular groupings alone. If one thousand millions of coins, each from the same die, were sympathetically graduated under a vibratory subdivision of 150,000, the most amazing variation would be presented, in regard to molecular grouping and resonance.

"That tuning forks can be so constructed as to show coincident or concordant association with each other, is but a very weak illustration of the fact which governs pure acoustic assimilation. The best only approach a condition of about a fortieth, as regards pure attractive and propulsive receptiveness. By differentiating them to concordant thirds, they induce a condition of molecular bombardment between themselves, by alternate changes of long and short waves of sympathy. Bells rung in vacuo liberate the same number of corpuscles, at the same velocity as those surrounded by a normal atmosphere, and hence the same acoustic force attending them, but are inaudible from the fact that, in vacuo, the molecular volume is reduced. Every gaseous molecule is a resonator of itself, and is sensitive to any and all sounds induced, whether accordant or discordant. (11)

GRADUATION OF SYMPATHETIC MACHINERY: Keely very properly terms his methods as "radiophonic vibratory positions with microphonic adjustments."

To illustrate the necessity for accuracy, he states the best of our tuning forks, the actual standards of pitch, are usually about 1/40th from being concordant!

"The mechanical requirements necessary to successfully conduct my researches will never be properly appreciated until my system is demonstrated under perfect control for commercial use."

Keely states that his "compound device" will, with his system of graduation, enable anyone to correct the variations existing in "compound molecular masses."

He states that commercial drawing, forging and casting of metals leaves differentiation in their molecular masses, and that this differentiation must be equated before the proper action can be obtained from the metallic mass.

"Drawn wire of silver and of platinum nearest ap-

proaches molecular uniformity but even these, when tested by a certain condition of the first order of intensified molecular vibration for its effectiveness as a transferring medium, is found entirely inadequate on account of interference in the transfer of concordant union. All nodal interference must be removed by inducing between the nodal waves a condition in which they become subservient to the intermolecular vibratory link in their structure. It is therefore necessary to submit the wire to a system of graduation to find what combined chords these nodal interferences represent when focalized to a general center."

The graduation of Keely's device for overcoming gravity - with which he also disintegrated quartz rock - occupied over four years. It was operated successfully and exhibited on several occasions and Keely destroyed it to prevent it falling into the hands of his enemies at the time of the court proceedings against him. Some time afterwards he was urged to repeat the experiment of quartz disintegration and constructed three successive disintegrators from scale drawings he had prepared from his first instrument, but they would not operate. Keely stated the difficulty was caused by the fact that no two chord masses can be made alike by duplication. After solving the conditions governing chords of multiple masses he later said this paradox was fully explained so as to be perfectly clear to him and the underlying reasons fully understood. (11)

GRAVE: 1) Deep in pitch; as, grave hexachord, the lowest hexachord in the Guidonian system. 2) Slow in pace, slowly. (125)

GRAVISM: "Gravism is the transmissive form (of energy) through a medium of atomoles in the fourth state, or a medium composed of atomolini." (Keely)

GRAVITA: Dignity, weight, majesty. (125)

GRAVITAL FLOW: See **MOLECULAR DISSOCIATION, GRAVITY**

GRAVITAL SYMPATHY BETWEEN GASES: Keely mentions observing a "wonderful variation of gravital sympathy between the molecules of gaseous elements and gaseous chemical compounds, all coming under the molecular subdivision." This strongly indicates the existence of gas-crystals, the plus- molecular aggregation applying to their gaseous state. Inductive sympathetic negative mass attraction also, when applied to gases, mixture of gases and gas compounds, would very likely have often times a frequency which would not induct resonance, simply by formation of these gas crystals in a great variety of degrees, with corresponding complex variations in the mass chord of each combination. These variations would be caused by the residual molecular affinities causing formation of these plus-molecular aggregates. This feature caused Keely a great deal of trouble at one stage of his experiments. (11)

GRAVITATION: What is gravitation? "The cen-

tralization of vibratory forces, ready to be changed in power by non-activity." (195- 54) (2) **See CENTRALIZATION, NEUTRAL NEGATIVE AGGREGATION, FORCE-ATOMIC, NEGATIVE ATTRACTION, LAW OF OCTAVE, FORCE-CREATED, MOLECULAR DISSOCIATION**

GRAVITATION, CHEMICAL: "The problem then, is whether he should make a casting for the tank and bearing stand, as a unit, and use the old revolving drum, or whether it would be better to discard this machine, as built, in its entirety, and build another motor, using direct gravitation forces instead of using those of chemical gravitation." (195-60) (2) **See STABILIZATION, VAN DER WAAL, SYMPATHETIC ATTRACTION, COHESION, MOLECULAR DISSOCIATION**

GRAVITATION DIFFERENTIATION: "In each atomic force has its energy, as is seen in that of the variation of the force as would be by the fall of an apple or that of an orange from the same distance. Or, to put it in a different degree, would be as is seen in the ability of force to cast off a metal - or to cast off a wooden ball. Each weighing the same, the metal can be cast off farther on account of the variation in atomic energy (**See MASS**), as is exercised through that of the force itself, and the variations in these are as the variations as are shown in the activity of the force as seen in gravitating towards that thrown off or that drawn to by the activity of the energy itself; for, as is and as has been given, the atomic force - with which gravitation in space, as is seen, as related to the earth's atomic position (**See FORCE-ATOMIC**) - is with that ability of the rotating energy to produce to other conditions and other elements, of which it is a part in its relative position. Hence we find that the earth's forces are as in the same relation to those elements as is a portion of that center about which it rotates. **See NEUTRAL NEGATIVE CENTER, RADIAL CENTER, FORCE-RADIAL, MOLECULAR DISSOCIATION**

"Then, in the varying elements as are kept in their activity, in keeping these in that same rotary motion, are those as produce the varying conditions through which the varying changes come to the various portions of the surface. (**See FORCE-RADIAL**) Hence, as gravitation is produced, so does the element - or the air - as brings gravitation - in its elemental activity - bring about or create about, that from which the radiation is thrown off, or we have air about the earth. As we have in other elements - created then in its own activity, and the variation in the gravitation, as is seen from the surface of those elements or those planets, are as the variation - or that attractiveness from which the radiation comes to produce its gravitation; that is, as would be seen - one that would be able to leap in the air in the earth's gravitational force would be able say six feet - would be able in another sphere to leap only, one two, three - while in others would be that of four, ten, twenty-four, thirty. This is a variation in the attractiveness, or attractability, of that from which the radiation comes - as to that which produces its force.

"As is seen here in this application of this same here to the motor: As the race through which the element of the gravitating force brings one into the contracting, throwing off of one portion, rotates the other in that it pulls while the other pushes, keeping that continued motion as would prevent the throwing off or the drawing to of the active principle in the rotary forces." (195-57) (2) **See CHEMICAL GRAVITATION, STABILIZATION, ATOMIC FORCE, FORCE-ONE, NEGATIVE ATTRACTION, POSITIVE, NEGATIVE, FORCE-RADIAL, LAW OF OCTAVE, MOON, REVERSION, MOLECULAR DISSOCIATION, LAWS OF BEING, LAW OF ASSIMILATION**

GRAVITON: The quantization of the gravitational field equations suggests the existence of the graviton. (3)

GRAVITY: [MUSIC] The downward effect, to the ear, of a sound in a key. **See LEVITY (8)**

GRAVITY: The force exerted by the earth on all objects on or near it. (75)

GRAVITY: "Gravity is the mutual attraction of atoms." (Keely)

GRAVITY: Gravity is an eternal existing condition in etheric space, from which all visible forms are condensed. It is inherent in all forms of matter, visible and invisible. It is not subject to time or space. It is an established connective link between all forms of matter from their aggregation. Time is annihilated by it, as it has already traversed space when the neutral centers of the molecules were established. It is nothing more than an attractive, sympathetic stream, flowing towards the neutral center of the earth, emanating from molecular centers of neutrality, concordant with the earth's center of neutrality and seeking its medium of affinity with a power corresponding to the character of the molecular mass. (11)

GRAVITY: "Gravity is transmissive inter-etheric force under immense etheric vibration." Keely (1)

GRAVITY: "Gravity acting through space on everything has no action on space itself." (195-57) (2)

GRAVITY: "The Amount of Aggregation reached by any system of bodies at any point in time depends upon the relative proportions of its Forces and its Energies at that moment." (18)

GRAVITY: **See LAWS of VIBRATING STRING #5, LAW OF OCTAVE**

GRAVITY: "Gravity may be considered a negative force, for it tends to balance the positive forces. Gravitational forces are vibratory forces and might be defined as the centralization of vibratory forces ready to change into power by non-activity." (195-70) (2)

GRAVITY: "Gravity is nothing more than an attrac-

tive, sympathetic stream, flowing towards the neutral center of the earth, emanating from molecular centers of neutrality; concordant with the earth's center of neutrality, and seeking its medium of affinity with a power corresponding to the character of the molecular mass. Gravity, he defines as transmissive inter-etheric force under immense etheric vibration. He continues: - The action of the mind itself is a vibratory etheric evolution, controlling the physical, its negative power being depreciatory in its effects, and its positive influence elevating." Chapter 5 of (1)

GRAVITY: "The force of gravity may be considered to have elements in octave of density, and these in relativity to same force of the object being acted upon. See, as to how the octave of forces - Now let this apply not only to what is commonly considered as octave (meaning vibration thrown off as sound), but as an octave or a vibration as would be set in motion by this very activity of the gravitation in its activity - as pushes up as well as pushes down. Not until you have overcome gravitation. Now you are beginning to understand the law of gravitation. So as the raising power, there must be the opposite power, (See 18) understand these, then we begin to see how the vibratory forces is the active principle all radiates from.

What is gravitation? The centralization of vibratory force, ready to be changed in power by non-activity, see?" (195-54) (2). **See CENTRALIZATION, NEGATIVE ATTRACTION, FORCE-ATOMIC, FORCE-RADIAL, LAW OF OCTAVE, LAW OF ASSIMILATION, LAWS OF BEING**

GRAVITY: "Molecular terrestrial masses, composed of the "ultimate ether" bound latent in substance, are sympathetically drawn to the earth's neutral center according to the density of their molecular aggregation, from which must be deducted their celestial sympathetic outreach. In other words, molecular weight consists in the difference between these forces. Either one can be intensified by polar or antipolar vibrations, giving either one predominance. If the celestial (repulsive) predominates, the mass will rise, its velocity proportionate to the concentration of the dominant or the "negative thirds of its mass chords" inducing high neutral radiation together with "celestial attraction." The "terrestrial propulsive" and "celestial attractive" cause ascension and the "celestial propulsive" and "terrestrial attractive" cause descension or increased weight." (11)

Beyond disintegration lies dispersion, and Keely can just as easily disperse atoms of matter as disintegrate its molecules, dispersing them into ether. The law of gravity appears in the light of Keely's experiments but one manifestation of a law which provides for the reversion of the process of attraction in the shape of a process of repulsion. Keely, by means of a belt and certain appliances which he wore upon his person moved single-handed, a 500 horsepower vibratory engine from one part of his shop to another, without a scratch on the floor, and astounded engineers declared it could not have been moved without

a derrick, to use which would have required the removal of the roof.

Demonstrating the overcoming of gravity, Keely used an air-ship model weighing about 8 lbs., which, when the differentiated wire of silver and platinum was attached to it, communicating with the sympathetic transmitter, rose, descended, or remained stationery midway, the motion as gentle as that of this-tledown floating in the air.

The experiment illustrating "chord of mass" sympathy was repeated, using a glass chamber, 40 inches in height, filled with water, standing on a slab of glass. Three metal spheres, weighing about 6 ounces each, rested on the glass floor. The chord of mass of these spheres was B flat first octave, E flat second octave and B flat third octave. Upon sounding the note B flat on the sympathetic transmitter, the sphere having that chord of mass rose slowly to the top of the chamber, the positive end of the wire having been attached, which connected the covered jar with the transmitter. The same result followed the sound of the other spheres, all of which descended as gently as they rose, upon changing the positive to the negative. J.M. Wilcox, who was present remarked: "This experiment proves the truth of a fundamental law in scholastic philosophy, that when one body attracts or seeks another body, it is not that the effect is the sum of the effects produced by parts of one body upon parts of another, one aggregate of effects, but the result of the operation of one whole upon another whole."

The vibrations induced by this experiments reached over 700,000,000 per second, unshipping the apparatus, thus making it insecure for a repetition of the experiments. The decarbonized steel compressors of said apparatus moved as if composed of putty. Volume of sphere 15 cubic in weight of surrounding metal, 316 lbs."

"Gravity is not subject to time or space. It pervades the Universe without reference to time or space, instantaneously and without intermission. It is, however, a sympathetic flow, proceeding from the molecular or mass neutral centers to the earth's neutral center with a power corresponding to the character of each individual molecular mass." He believed gravity dependent on the medium of the polar stream, for he says "If the sympathetic negative polar stream were cut off from the earth the molecular neutral centers would float away into space like a swarm of bees."

"Under my system the gravital flow comes under the order of the "sympathetic concordant of the 9ths" and is that third of the triune combination called the "polar propulsive." Gravity is polar propulsion while magnetism is polar attraction. Both magnetism and gravity can be accelerated by proper vibrations."

He believed gravity to be the result of a law which provides for a reversion of attraction in repulsion, and which acts by transmission of force under immense

etheric vibration through the "interetheric subdivision." He also showed that gravitation acts "as a lever." MacVicar states "Every individualized object assimilates itself to itself in successive moments of its existence and all objects tend to assimilate one another." Keely says "Gravity is an ever existing eternal force, coexistent with the compound etheric or high luminous (seventh subdivision) since it entered into, and is an inherent property of, all forms of aggregated matter from their birth. It is the source from which all matter originated and each substance-unit or neutral center is a concordant link, attractive and dispersive, to all other neutral centers. Each neutral center is the nucleus of what we recognize as substance and is potentially the nucleus of a planet."

"The sympathetic concordants (planetary vibrations) established by the Infinite One from the birth of the planetary neutral centers, are simply the operation of the laws of gravity. The inaudible atomic, etheric and interetheric vibrations, which control and direct the movements of the Universe, must of necessity from the magnitude of their result, be the most powerful of all sounds." These vibrations collectively constitute the "Music of the Spheres" discovered by Pythagoras of old and so long considered merely a poetic fancy. This is now proved experimentally in Keely's workshop to be an actual fact.

He calls all planetary masses "terrestrial" and says the "celestial concordant sympathetic vibrations between the spheres govern their motions in their orbits, that at their maximum distance the attractive forces assume supremacy, bringing them toward each other, and at the minimum distance, the repulsive forces assume control causing them to again recede from each other.

Molecular terrestrial masses, composed of the "ultimate ether" bound latent in substance, are sympathetically drawn to the earth's neutral center according to the density of their molecular aggregation, from which must be deducted their celestial sympathetic outreach. In other words, molecular weight consists in the difference between these forces. Either one can be intensified by polar or antipolar vibrations, giving either one predominance. If the celestial (repulsive) predominates, the mass will rise, its velocity proportionate to the concentration of the dominant or the "negative thirds of its mass chords" inducing high neutral radiation together with "celestial attraction." The "terrestrial propulsive" and "celestial attractive" cause ascension and the "celestial propulsive" and "terrestrial attractive" cause descension or increased weight. (11)

GRAVITY: "Any visible molecular mass of metal can be so impregnated by triple orders of sympathetic vibration as to give it the same sympathetic transmissive qualities that exist in the mental forces, which make such mass subservient to either the attractive or repulsive conditions of terrestrial sympathy.

"Gravity is nothing more than a concordant attrac-

tive sympathetic stream flowing towards the neutral center of the earth. This force is inherent in all visible and invisible aggregated forms of matter, from the very birth of a planet, around whose center the molecules cluster by the sympathetic affinity which is thus induced. If these conditions had always maintained a neutral position in etheric space, no planet would ever have been evolved. These conditions have been fixed by the Infinite. These rotating neutral centers, set in celestial space, have been endowed with the power of rotation to become their own accumulators. It is through the action of these sympathetic forces of the Infinite etheric realm that planets are born, and their volume of matter augmented.

"If we pick up an object we feel a resisting power in it which physicists call gravity; but they do not explain what gravity is. It is simply a sympathetic flow, proceeding from the molecular centers of neutrality; which flow is concordant with the earth's neutral center of same, seeking this medium of its affinity with a power corresponding to the character of its molecular mass. There is no actual weight in the molecules of the mass of which the earth is composed. If the sympathetic negative polar stream that flows towards the neutral center of the earth were cut off from it, the earth's molecular mass would become independent, and would float away into space as would a soap bubble filled with warm air.

"The gravital flow comes, in this system, under the order of the sympathetic concordant of the 9ths, and belongs to that third of the triune combinations called polar propulsive.

"Magnetism is polar attraction."

"Gravity is polar propulsion."

"Both magnetism and gravity can be accelerated by the proper medium of sympathetic vibratory influences." Keely in (1) Chap.19 See **MOLECULAR DISSOCIATION, LAWS OF BEING, ATOMIC THEORY-KEELY'S**

GREATER: Belonging to the major scale; as, a *greater third*, a major third, as C to E; *greater sixth*, a major sixth, as C to A. A peice of music, said by the old writers to be in any key with the *greater third*, was in the major mode; with the *lesser third*, in the minor mode. (125)

GREEK FIRE: The composition known as "Greek Fire" and invented, apparently, in the 5th century A.D. in Byzantium was a mixture of finely ground sulphur (one part), coal (two parts), and saltpeter (six parts). It is interesting to note that this composition differs only slightly from that of black (smoky) gunpowder. (88)

GREEK MUSIC: The original seven-stringed system of the lyre was:

UPPER TETRACHORD:

d - NETE, the shortest string, giving the highest sound

c - PARANETE, (beside NETE)

b flat - PARAMESE, (beside MESE)

a - MESE, middle string and eky note, connecting the two fourths

LOWER TETRACHORD:

G - LICHANOS, forefinger string

F - PARHYPATE, (beside Hypate)

E - HYPATE, longest string, giving the lowest sound.

The above are names of the strings of the lyre and not of notes of a fixed pitch. The following is the scale for the seven, and eightstringed lyre upon THE EGYPTIAN or OCTAVE SYSTEM. It is here printed in the Greek, "common" usical scale - our A minor with a minor seventh:

SEVEN STRINGED LYRE

UPPER TETRACHORD:

e - NETE

d - PARANETE

c - (omitted)

b - PARAMESE or TRITE

LOWER TETRACHORD:

a - MESE (keynote)

G - LICHANOS, forefinger string

F - PARHYPATE, (beside Hypate)

E - HYPATE, longest string, giving the lowest sound.

EIGHT STRINGED LYRE

UPPER TETRACHORD:

e - NETE

d - PARANETE

c - TRITE

b - PARAMESE

The tone of Disjunction or Diazeuktik tone

LOWER TETRACHORD:

a - MESE (keynote)

g - LICHANOS or Diatonos

F - PARHYPATE

E - HYPATE

THE LESSER PERFECT SYTEM

The Synemmenon Tetrachord or Conjunct Fourth

d - NETE

c - PARANETE

b flat - TRITE

The Meson Tetrachord or Middle Fourth

a - MESE

G - LICHANOS

F - PARHYPATE

E - HYPATE

The Hypaton Tetrachord or Lowest Fourth

D - LICHANOS or Diatonos

C - PARHYPATE

B - HYPATE

The acquired not not included in any Tetrachord

A - PROSLAMBANOMENUS

THE GREATER PERFECT SYSTEM

The extreme or Hyporboleon. Tetrachord.

a - Nete Hyperboleon

g - Paranete

f - Trite

The disjunct or Diezeugmenon Tetrachord

e - Nete

d - Paranete Diezeugmenon

c - Trite

b - Paramese

The tone of disjunction or Diazeuktik tone. The middle or Meson Tetrachord

a - Mese (keynote)

G - Lichanos (or Diatonos) Meson

F - Parhypate

E - Hypate

D - Lichanos (or Diatonos)

C - Parhypate

B - Hypate

The acquired not not included in any Tetrachord

A - Proslambanomenus

THE FIFTEEN SCALES OF ALYPIUS

A - Hypo-Dorian

B flat - Hypo-Ionian

B - Hypo-Phrygian

C - Hypo-Eolian

C# - Hypo-Lydian

D - Dorian

E flat - Ionian

E - Phrygian

F - Eolian

F# - Lydian

G - Hyper-Dorian or Mixo-Lydian

A flat - Hyper-Ionian

A - Hyper-Phrygian

B flat - Hyper-Eolian

B - Hyper-Lydian

THE GREEK ENHARMONIC SCALE

Mese

Mixo-Lydian

1

$\frac{1}{4}$

$\frac{1}{4}$

2

$\frac{1}{4}$

$\frac{1}{4}$

2

1

Lydian

$\frac{1}{4}$

$\frac{1}{4}$	2	$\frac{1}{4}$	$\frac{1}{4}$	2	1	$\frac{1}{4}$		
Phrygian	$\frac{1}{4}$	2	$\frac{1}{4}$	$\frac{1}{4}$	2	1	$\frac{1}{4}$	$\frac{1}{4}$
Dorian	2	$\frac{1}{4}$	$\frac{1}{4}$	2	1	$\frac{1}{4}$	$\frac{1}{4}$	2
Hypo-Lydian	$\frac{1}{4}$	$\frac{1}{4}$	2	1	$\frac{1}{4}$	$\frac{1}{4}$	2	$\frac{1}{4}$
Hypo-Phrygian	$\frac{1}{4}$	2	1	$\frac{1}{4}$	$\frac{1}{4}$	2	$\frac{1}{4}$	$\frac{1}{4}$
Hypo-Dorian	2	1	$\frac{1}{4}$	$\frac{1}{4}$	2	$\frac{1}{4}$	$\frac{1}{4}$	2

(125)

GREEN: Pure emerald green, particularly if it has a dash of blue, is the color of healing. It is helpful, strong, friendly. It is the color of doctors and nurses, who invariably have a lot of it in their auras. However, it is seldom a dominating color, usually being over-shadowed by one of its neighbors. As it tends toward blue it is more helpful and trustworthy. As it tends toward yellow it is weakened. A lemony green, with a lot of yellow, is deceitful. As a rule the deep, healing green is seen in small amounts, but it is good to have a little of it in your aura.

Saturn is the planet of this color, and fa is its musical note. In the early church it symbolized youthfulness and the fertility of nature, taking this quite naturally from the sight of the fields in spring. (73)

GREEN: [COLOR THERAPY] Use green to alleviate: Heart troubles, blood-pressure, ulcers, cancer, headaches, neuralgia, influenza, *etc.* (87)

GRENZ RAYS: See **RAYS**, **GRENZ**.

GROUND: Ground, in audio terminology, usually refers to the metal chassis of the equipment. In the electrical sense, ground is the reference point from which most voltage measurements are made. When a technician measures the amount of voltage applied to a tube, for example, he attaches one wire from his voltmeter to the appropriate tube pin and the other to the chassis, or ground. (103)

GROUP: A series of notes, of small time-value, grouped together; a division or run. (125)

G STRING: The name of the first string on the double bass, the third on the violoncello, viola, and guitar, and the fourth on the violin. (125)

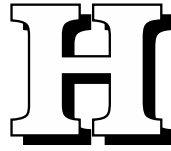
GUIDONIAN SYLLABLES: See **ARETINIAN SYLLABLES**

GUIDONIAN SYSTEM: See **NOTATION**

GUTTURAL: Tones produced in the throat. (125)

GYROMAGNETIC RATIO: When a nucleus with a magnetic moment is placed in a magnetic field, it acts as though it were undergoing precession around the field axis at an angular velocity ω_0 , which is directly proportional to the magnetic field at the nucleus, H_0 . This precession is analogous to the precession of a spinning gyroscope when allowed to topple in the earth's gravitational field. The direction of precession of a gyroscope depends on the direction of its

angular momentum vector, and the angular velocity depends on the magnitude of the angular momentum vector and the strength of the gravitational field to which it is subjected. For nuclei, the proportionality constant γ between the angular velocity of precession and the field strength depends on the angular spin momentum and the magnetic moment of the nucleus. γ is called the "gyromagnetic" ratio or, less commonly, the "magnetogyric" ratio. All nuclei of the same charge and mass number have the same gyromagnetic ratio. Thus, all protons act as though they precess at the same angular velocity when the magnetic field strength *at the nucleus* is the same. γ may be either positive or negative, corresponding to different directions of precession. (118)



H: The note B natural in the German system of nomenclature, the letter B being used only for B flat. (125)

HADRON: Any particle that participates in the strong interactions. (116)

HALF-LIFE: The time required for one-half of a given sample of particles or nuclei to decay. (116)

HALF NOTE: 1) A minim. 2) Semitone. (125)

HALF WAVE-LENGTH HORN: A horn one-half wave-length long in the direction of sound transmitted there through. (102)

HALL EFFECT: The development of a transverse electric potential gradient in a current-carrying conductor placed in a magnetic field when the conductor is positioned so that the direction of the magnetic field is perpendicular to the direction of the current flow. (3) See **PELTIER EFFECT, THOMSON EFFECT.**

HAMMER: 1) A piece of wood having a padded end or a nob, with which strings are struck. In the case of the dulcimer the hammers are held in the hand; in keyed instruments the hammer is acted upon by leverage from the end of the key. 2) The iron or wood striker of a bell. According to Denison, the weight of the hammer should be a fortieth part of a bell whose diameter is equal to twelve times the thickness of the sound bow. But the distance the hammer is made to rise for the blow must of course influence the weight of the hammer. (125)

HARD ROOM: [Acoustics] A room in which the surfaces have very low values of sound absorption and are therefore highly reflective to sound. (85)

HARMONIC: Overtones that give a tone a particular sound or timbre. Harmonic frequencies are always exact multiples of the fundamental. (69) See **EVOLUTION, HARMONICS-RATES-OF; LAW OF VIBRATING STRING, ACOUSTICS**

HARMONIC: A fundamental and its harmonics expressed in and by whole numbers.

HARMONIC: Sinusoidal quantity at a frequency

which is an integer multiple of the fundamental frequency. (100)

HARMONIC: [Mathematical] Having relations or properties bearing some resemblance to those of musical consonances -- said of certain numbers, ratios, proportions, points, lines, motions and the like. (11)

HARMONIC & ENHARMONIC: "If a violin string is bowed steadily, the frequencies of the partials of the resulting complex tone will be integral multiples of the lowest (fundamental) frequency, and the partials may properly be called harmonics. If, however, the same string is struck or plucked and then allowed to vibrate freely, the frequencies of the partials in the airborne sound and the frequencies of the corresponding modes of vibration are, in general, no longer exactly in the ratios of integers, and the partials and modes of vibration are inharmonic." (3) See **OVERTONES, LAW OF SUPERPOSITION, BEATS, POWER OF HARMONICS, LAWS OF BEING**

HARMONIC ANALYZER: "A device for separating and measuring the frequencies and amplitudes of the Fourier-series components of a complex periodic wave." (3)

HARMONICA: An instrument, the tones of which are produced by striking rods or plates of glass with hammers, either held in the hand or acted upon by keys. It has a compass of about two octaves from middle C or D upwards. (125)

HARMONIC ATTRACTIVE CHORD: "Thirds, induces a nodal interference on that third of the triune combination of the terrestrial envelope, that is immediately associated with this medium of interference, and moves towards the negative pole of the magnet, then flows through it to reassociate with the full triune combinations, through the positive thus:

Dominant
Harmonic
Enharmonic

The triune stream; one current of which is diverted from the Dominant, flowing in at the Negative end of the magnet; and out to join the triune terrestrial stream at the Positive end." page 314 of (1) See

TRIPLE FLOWS, TRIPLE CURRENT, TERRESTRIAL, MAGNETISM, SYMPATHETIC OUTREACH, MAGNETIC STREAM, LAWS OF BEING

HARMONICHORD: An instrument played like a pianoforte, but sounding like a violin. The tone is produced by the pressure of the keys, which sets a revolving cylinder of wood, covered with leather, and charged with rosin, in action over the strings. It has also been called piano-violin, violin-piano, tetrachordon, etc. (125)

HARMONIC CHORD: The Harmonic chord is the third current of the terrestrial stream. See **MAGNETIC STREAM, HARMONIC ATTRACTIVE CHORD, CHORD, TRIUNE FLOW**

HARMONICI: The followers of the Pythagorean system of music as opposed to that taught by Aristoxenus. They were also called Musici. The Aristoxenians viewed music as an art governed by appeal to the ear; the Pythagoreans, as a science founded on physical laws. (125)

HARMONIC COMPONENTS: The aliquot part of a complex or compound wave form always multiples of the fundamental. See **ACOUSTICS § 15, 16**

HARMONICON: An instrument only used as a toy, which consists of free reeds enclosed in a box in such a way that inspiration produces one set of sounds, respiration another. (125)

HARMONIC DIVISION: See **EVOLUTION, HARMONICS-RATES-OF; LAW OF VIBRATING STRING, ACOUSTICS**

HARMONIC MEAN: See **HARMONIC PROGRESSION.**

HARMONIC POWER: See **POWER, HARMONICS**

HARMONIC PROGRESSION: "The reciprocals of sequence form a harmonic progression. There is no compact expression for the sum of n terms. If x, x^2, x^3 are in harmonic progression,

$$x^2 = 2x, x^3 / x, + x^3$$

is called their harmonic mean." (3)

HARMONICS: The sounds produced by a vibrating string or column of air, when it is subdivided into its aliquot parts. (125) See **ACOUSTICS § 10**

HARMONIC SCALE: A harmonic scale is formed by taking a series of notes produced by vibrations whose numbers in a given time are respectively as 1, 2, 3, 4, etc. If we take as fundamental tone the open C string of the violoncello, the series of tones which with it form a harmonic scale will be as pictured.

HARMONIC SCALE: The scale formed by a series of natural harmonics. It should be noted that our conventional music scale is a melodic modification of a

naturally occurring harmonic scale or series of naturally occurring tones.

As the character of a sound depends upon that of the vibrations by which it is caused, it is important to know of what kind the latter must be in order that they may give the sensation of a perfectly simple tone, i.e., one which the ear cannot resolve into any others. Such a vibration is perhaps best realised by comparison with that of the pendulum of a clock when it is swinging only a little to and fro. Under these circumstances it is performing what are called harmonic vibrations, and when the air particles in the neighborhood of the ear are caused by any means to vibrate according to the same law as that which the pendulum follows, and also with sufficient rapidity, a perfect simple tone is the result. Such a tone is, however, rarely heard except when produced by means specially contrived for the purpose. If a note on the pianoforte is struck, the impact of the hammer on the string throws it into a state of vibration, which, though periodic, is not really harmonic; consequently we do not hear a perfectly simple tone, but one which is in reality a mixture of several higher simple tones with that one which corresponds to the actual length of the string. The former are, however, generally faint, and become associated by habit with the latter, appearing to form with it a single note of determinate pitch. These higher tones are harmonics of the string, and are produced by vibrations whose numbers per second are respectively twice, three times, four times, etc., as great as those of the fundamental tone of the string. (125) See **ACOUSTICS § 10**

HARMONIC STOPS: Organ stops, both flute and reed, having tubes twice the normal length but pierced with a small hole in the middle. Harmonic flute stops are of great purity and brilliancy, they are of 8 ft. or 4 ft. pitch. Harmonic piccolos are of 2 ft. pitch. Harmonic reed stops (tromba, tuba, trumpet, etc.) are generally on a high pressure of wind, one of the great advantages of all harmonic stops being that they will take a very strong pressure of wind without overblowing. The fact is, that the harmonic-tube, having two synchronous vibrating columns of air, partakes of the nature of a pipe already overblown to its first harmonic, the octave. (125)

HARMONIST: One who can sing or play in harmony. (125)

HARMONIC SYMPATHY: "Concordance of vibrations on harmonic levels as in the action of gravity." (1) pg 302 See **OCTAVE, GRAVITY**

HARMONIC SYMPATHIZER: See **SYMPATHETIC OUTREACH**

HARMONIC THIRDS: Keely estimates that, after the introductory impulse is given on the harmonic thirds, molecular vibration is increased from 20,000 per second to 100,000,000.

HARMONIC TRIAD: The chord of a note with its

third and fifth. The common chord. (11)

HARMONIC UNDULATORY: 3rd FLOW or CURRENT. See POWER, LAWS OF BEING, ATOMIC THEORY-KEELY'S

HARMONICS: Is the difference in harmonic relationship between the negative and positive potentials of a cell.

HARMONICS: Modes of vibration whose frequencies are multiples of the frequency of the fundamental mode. (75)

HARMONICS: The sounds produced by a vibrating string or column of air, when it is subdivided into its aliquot parts. (125)

HARMONICS, RATES OF: The following table show the number of divisions a vibrating body divides itself and the ratio of frequencies generated. see Charts section.

Bell as a disk Number of Divisions:

4, 6, 8, 10, 12 *etc.*

Squares of vibration:

2, 3, 4, 5, 6 *etc.*

Free Bar Number of Divisions:

2, 3, 4, 5, 6, 7 *etc.*

Squares of vibration:

3, 5, 7, 9, 11, 13 *etc.* (approx)

Fixed Rod (fixed at both ends)

Number of Divisions 0, 1, 2, 3 *etc.*

Cycles per second 9, 25, 49, 81 *etc.*

Squares of vibration 3, 5, 7, 9 *etc.*

Fixed Rod (fixed at one end)

Number of Divisions 0, 1, 2, 3, 4 *etc.*

Cycles per second

36, 225, 625, 1225, 2025 *etc.*

Squares of vibrations

6, 15, 25, 35, 45 *etc.*

For longitudinal as well as lateral the number of vibrations executed in a given time is inversely proportional to the length of the wire. The rates of vibration follow the order of numbers (of nodes) 1, 2, 3, 4, 5 *etc.*

For longitudinal rods & bars the same as above.

For longitudinal rods & bars fixed at one end, see page 192 of (6) See ACOUSTICS §14, 15, 16; TUBE RESONATOR, SPHERE, TONE-SIMPLE OR COMPOUND, LONGITUDINAL VIBRATIONS, HARMONIC & INHARMONIC, BEATS, LAW OF SUPERPOSITION, OVERTONE, POWER OF HARMONICS

HARMONIES IN GOD'S NATURAL LAWS: "In the present, from that sojourn we have the visions which have been a part of the experience, as the entity has attempted to put into song, or has attempted to depict upon china or upon canvas -- or with the pencil or brush -- the harmonies in God's NATURAL LAWS among men, and how they bring harmony,

and how (it comes about) that the clashing of same is but man's feeble attempt either to override or to follow same." (2166-1) (2)

HARMONIES OF COLORS: "Just as white and pink make for harmonies of colors in the entity's experience, so do these in their activity represent the activity of the entity." (276-6) (2)

"Color, to the entity, has an appealing place, as do the activities of the animals or the outdoors -- those that make noises, as it were. ... So does color vibrate to the entity. More in ... tones or shades, or in combinations of color and shades and tones ... Harmony is more easily found by the entity in the harmonizing tones, shades, or colors." (276-6) (2)

"... the entity so applied itself as to bring harmony. Not as ruled by might but rather by love. Hence the instruments ... used were of the reed or flute (kind) and made the hearts of many merry! (Influencing others) not as to those things that would satisfy carnal forces; but rather ... awakening within each one those abilities to express, in its physical body, the music of the spirit in its activity in and through the body." (276-3) (2)

HARMONIZATION: See STOPPING POWER, LINEAR ENERGY TRANSFER.

HARMONIZE: "Harmonize thy life as ye do the tones of nature itself; and more joy and beauty will be in thy daily experience." (262-121) (2)

HARMONY: Harmony is the simultaneous vibration of two or more bodies whose harmonics do not produce discords, and whose fundamental pitches are harmonies of the lowest pitch, or are a unison with the resultant notes or overtones, or undertones, of any two or more of them." (Keely)

HARMONY: "Harmony is concordance of vibrations." (Lewis) See SYMPATHETIC CONCORDANCE, COINCIDENT ACTION, RATIO, DISSONANCE

HARMONY: Two or more simultaneous tones, implying tonality. (69)

HARMONY: In its earliest sense among the Greeks this word seems to have been a general term for music, a sense in which our own poets often use it. But from its meaning of "fitting together" it came to be applied to the proper arrangement of sounds in a scale, or, as we should say, to "systems of tuning". (125)

HARMONY, BODY CHORDS: "For the joy of living, in an material experience, is dependent upon the peace of mind -- not indolence but activative peace, activative harmony. Though the entity has seen and has known and touched much dis-harmony; the desire for harmony reaches almost to that which is sought by the musician, in bringing about the arou-

sal of the emotions ... which answer to the chords within the body; whether in movements of the dance, or arousal of emotions for the celestial or terrestrial activity in the emotions." (880-1) (2)

HARMONY NATURAL: Harmony is produced by its Principle, is controlled by it and abides with it. Divine Principle is the Life of man. Man's happiness is not, therefore, at the disposal of physical sense. Truth is not contaminated by error. Harmony in man is as beautiful as in music, and discord is unnatural, unreal.

The science of music governs tones. If mortals caught harmony through material sense, they would lose harmony, if time or accident robbed them of material sense. To be master of chords and discords, the science of music must be understood. Left to the decisions of material sense, music is liable to be misapprehended and lost in confusion. So man, not understanding the Science of being, - thrusting aside his divine Principle as incomprehensible, - is abandoned to conjectures, left in the hands of ignorance, placed at the disposal of illusions, subjected to material sense which is discord. A discontented, discordant mortal is no more a man than discord is music." (74)

HARMONY, PLANETS: Constructive music is built upon right sound, vibrations and color; the pattern upon which the Universes, with their planets, suns, stars and moons are built and are kept in their rightful orbits. Sound and the correct building of vibrations hold all things in their own place. Were there disharmony in the plan, all would crumble as in the domino effect. Right sound, music, is God's Love for all He has created. A true composition has its progression of harmony, chords moving in numerical progression, right bridges, and counterpoint, all weaving about each other, one key, the sub-dominant or dominant of the key progressing into another key, and completing in various keys progressively.

Sound creates form and color. Each of the Seven Building Rays has their Sound and vibration, making up the seven notes of the Major Scale with many variations. Sound in action, vibratory power, and the Great Silence is the highest rate of vibration - in the Silence is heard the Voice of God. Sound and vibration are the creative Cosmic Power. A Universe is formed through Sound and is the source of the Music of the Spheres emanating from the ONE LIFE. A Cosmic symphony of the planets thus is formed by their rotary activity - in perfect harmony and progression of chords and keys. Each planet has its own note. The note of earth is "fa", the fourth degree of the scale above middle C. When earth is perfected, her Tone will advance one degree to "G", the fifth note of the scale. Each individual has their own Tone which is often heard while in meditation. As the Path of Holiness advances, then there are two notes heard - Soul's keynote and the Dominant, the 5th degree of the scale-key of the Monadic Ray.

Pythagoras developed the scale with its numbers, and

is the basis of perfect music. Rock music does not observe sequence of numbers. This is why it is discordant to the Soul.

All vibrations are changeable into Sound, because from this source all things proceed, and eventually will return to its source. Music power is little understood - either the good or the evil. If the knowledge of these facts were made known, the perfect progression of music would be a Spiritual Force in the world, and the results would be phenomenal. It is the representative in the tonal world of the Sounds of man's Spiritual progress. This Manvantara has its special Sound, due to the point of evolution the human race has made coming up from the lower kingdoms. In a few words, music is mathematical, and it is this that Pythagoras worked out. Good music is the basis of equilibrium in one's life and affairs.

The source for man is the out-going of the Tone from the Atmic or Monadic level. It is the basic Spiritual Tone, the Tonic (which one knows as the keynote, first degree of the scale), with all its latent overtones. The Spiritual Monadic Tone does not change, but becomes more audible as the Soul progresses. On the Path of Return, the fulfillment of all the Spiritual potentials within the Monadic Tone become apparent. With each Soul the chorded archetype is conceived in the chord of the individual - the Goal is Oneness with the Monad, the Christ within. The same law of progression with the Monad is comparable in the Cosmos; so the end is contained within the beginning. (119) **See CHORD, ONE FORCE; OVERTONES; PROGRESSION; LAW OF PROGRESSION.**

HARP: A stringed instrument of triangular form, furnished with gut strings. It has a compass varying from three to six octaves and a half, according to the size of the instrument. (125)

HARPSICORD: A stringed instrument with a keyboard, similar in form to a modern grand piano-forte. (125)

HE: The 5th Hebrew letter, He (E), means a window, but it also refers to aspiration or ascending breath. The full significance of this letter is said to be an established dual base in which masculinity and femininity are united in perfect equilibrium, constituting, therefore, a foundation which cannot be removed. (72)

HEAD: 1) The membrane stretched upon a drum. 2) That part of a violin or other stringed instrument in which the pegs are inserted. 3) The portion of a note which determines its position upon the stave, and to which the tail is annexed. (125)

HEADING: See **STAKING.** (102)

HEADS: Heads are the parts of a tape recorder that apply the signal to the tape in recording and pick up the signal from the tape in playback. A separate head is sometimes employed to erase previously recorded

material from the tape. (103)

HEALING: See **MUSIC, FORCE-ATOMIC-HEALING, DIFFERENTIATION, FORCE-HEALING**

HEARING: See **SPEECH, SIGHT, TASTE**

HEARING: "The vibrations needed to produce hearing are $\frac{1}{3}$ of those for speech and equal to those of sight." (2) See **SIGHT, SPEECH, TASTE**

HEAT: See **RADIATION-CELESTIAL-SYMPATHETIC, THERMAL ELEMENT, LIGHT & HEAT**

HEAT: "Heat may be classified as a vibro-atomic element, not exceeding 14,000 vibrations per second at its greatest intensity, latent in all conditions of matter both visible and invisible. The velocity of the sympathetic flows which emanate from our solar world, the sun, coming into contact with our atmospheric medium, liberates this element in all the different degrees of intensity that give warmth to our earth. Light is another resultant; the different intensities of which are produced according to the different angles of this sympathetic projectment.

The light that emanates from a glowworm is the resultant of the action of the sympathetic medium of the insect on a center of phosphorescent matter, which is included in its structure. The resultant of the two conditions are quite different, but they are governed by the same laws of sympathetic percussion.

Radiation is the term used to express the reaching out of the thermal element, after its liberation from its corpuscular imprisonment, to be absorbed or returned again to its sympathetic environment, teaching us a lesson in the equation of disturbance of sympathetic equilibrium. (11)

No molecular structure can contain and hold the ether of the seventh subdivision, not even that lowest order - ether of the fourth subdivision - which is liberated as heat in chemical action. (1) See **TEMPERATURE, THERMAL ELEMENT, LIGHT & HEAT, RATES OF VIBRATION, LUMINIFEROUS ETHER, FORCE-WIND**

HEAT: "These conditions of luminosity (luminiferous ether) have no thermal forces associated with them; although, paradoxically, all thermal conditions emanate from that source. The tenuity of this element accounts for it. It is only when these sympathetic streams come in conflict with the cruder elementary conditions, either the molecular or atomic, that heat is evolved from its latent state, and a different order of light from the etheric luminous is originated, which has all the high conditions of thermal force associated with it; the sun being the intermediate transmitter. Thus is shown the wonderful velocity of these sympathetic streams emanating from the celestial." pg 271 of (1)

"Radiation is the term used to express the reaching

out of the thermal element, after its liberation from its corpuscular imprisonment, to be re-absorbed or returned again to its sympathetic environment; teaching us a lesson in the equation of disturbance of sympathetic equilibrium." pg 273 of (1)

Heat he calls "thermal concentration." Of its origin he says "The celestial sympathetic streams (inflowing currents) percussing on the earth's dense atmosphere, wrest from atomic confinement by their infinite velocities the latent energies we call heat and light." The sun is the intermediate transmitter of these celestial streams."

"My researches lead me to think that hydrogen carries heat in a latent condition, but I do not believe it will ever be possible to invent a device whereby hydrogen may be vibrated with a velocity to induce heat."

"The origin of heat and light is easily accounted for by the action of the sympathetic celestial streams, when we consider the vibratory frequency of light as say 500,000,000,000,000 per second. Heat and light belong to the highest orders of the phenomenal and can only be accounted for by considering sympathetic streams under high velocity as being interchangeable both to and from focalized negative attractive centers."

"Heat and light do not exist in space. The percussion of the vibratory sympathetic streams emanating from the neutral center of the sun, evolves them from the earth's atmospheric envelope. The interchangeability of light and heat, which are in a certain sense, one and the same, has been a mystery. However, this is explained by the sympathetic etheric stream bombarding the dense portion of the molecular in seeking its sympathetic concordant focalized neutral center in the planetary or molecular mass."

"There is no thermal accompaniment to self-luminescence evolved by vibrational frequency of the ether (seventh subdivision) and yet, paradoxically, all thermal conditions emanate from those same etheric vibrations. This is accounted for by the tenuity of the ether. Only when the streams come in contact with crude matter is heat evolved from its latent state. Accompanying this evolved heat is a different order of light from the luminiferous ether, this being a translation through the neutral center of the molecule of the sympathetic streams into radiations of heat and light."

"The celestial current or etheric dominant which is also the prime third of the triune electric flow induces "aqueous disintegration" and "thermal concentration" and these two "prime conductors" display a "coincident sympathetic chord" with the celestial current. They are themselves the link between the terrestrial and celestial. The absence of the sun on one side of the earth and the absence of water on one side, would make terrestrial magnetism and electricity static - the highest order of chaos."

"The heat generated by the electric stream is caused by the velocity of the triple subdivision at its point of dispersion as each component seeks its medium of affinity."

"Heat is a vibro-atomic element with a frequency at its greatest intensity of not more than 14,000 per second and is latent in all matter, visible and invisible. This element in varying degrees of intensity, is liberated together with light by the velocity of the sympathetic flow from the sun, the intensity varying with the angle of this sympathetic projectment in the terrestrial atmosphere."

"Thermal radiation (and its accompaniment, thermal vacuum or cold) comes below the first atomic" (probably atomic). Since its vibratory frequency is so low and its effects so considerable, it probably will be found to vibrate in the dominant mode.

"Radiant heat" is that property of the element heat, after its liberation from corpuscular imprisonment, by means of which it reaches out for reabsorption and return to its sympathetic environment.

All moving bodies of visible matter produce heat according to their velocity. The flow of gases induces "thermal reduction" (transmutation to the thermal element) from molecular friction. The molecules never actually come in contact with, or rub each other, and no pressure, however great, can cause molecular contact. However, the molecular volume can be reduced by enormous pressure and the tension on their rotating etheric envelopes induces heat. This induction of heat is a positive proof of the wonderful rotating frequency of the rotating envelope. Were the molecules dead to sympathetic vibration and possessing no rotating etheric envelope, all molecular volumes would be compressible and thermal change in the slightest degree could not result from pressure." (11)

HEAT FROM VIBRATION: "My researches lead me to believe that hydrogen carries heat in a latent condition, but I do not believe it will ever be possible to construct a device which can vibrate hydrogen with a frequency sufficient to liberate the latent heat from its interstitial structure."

All of Keely's experiments were unaccompanied with evolution of heat. Therefore the laws of vibration and the experiments set forth herein probably contain no possible inkling as to the liberation of this all-potent source of mechanical energy. Had he discovered this alone his perfect engine would have unfailingly resulted. The likelihood exists that the discovery of the nature and laws of heat will mark a long, long step toward our understanding of the mystery of the Universe and the constitution of matter. Heat is very likely the third dimension which brings about the permanence of form in substance. It is probably the essence of cohesion. (Editor's note: Keely undoubtedly understood the nature of heat far

beyond the our grasp even today in 1986, Mr. Snell's above paragraph is in error.) (11)

HEAVY LEPTON: A particle having properties similar to the electron or mu-meson, but more massive. (116)

HEAVY SPOT: A term used to describe the position of unbalance. It is the point angular location of the imbalance vector (the summation of the mass unbalance distribution) at a specific lateral location (plane) on a rotor. See **HIGH SPOT**. (100)

HEAVY WATER: [INORG CHEM] A compound of hydrogen and oxygen containing a higher proportion of the hydrogen isotope deuterium than does naturally occurring water. Also known as deuterium oxide. (4)

HELICON: An instrument used by the Greeks in the calculation of musical ratios. (125)

HELIUM: See **METALLIC GASES, LEVITATION, GASES, FORCE-GASEOUS**

HELMHOLTZ RESONATOR: A vibrator consisting of a volume of enclosed air with an open neck or port. (75)

HEMIDIAPENTE: An imperfect fifth. (125)

HEMIDITONE: The lesser or minor third. (125)

HEMIOLE: Sesquialter relationship: the relationship of 3 to 2. It measures the consonances of the fifth. (81)

HEMIOLIOS: 1) The ratio 3 to 2. The same as the sesquialtera in Latin treatises on music. 2) A kind of metre. A verse consisting of a foot and a half. (125)

HEMITONE: A semitone. (125)

HENRY: The cgs electromagnetic unit of inductance or mutual inductance. The inductance of a circuit is 1 henry when a current variation of 1 ampere per second induces 1 volt.

HEPTACHORD: 1) A series of seven notes. A diatonic octave without the upper note. 2) An instrument with seven strings. (125)

HERMETIC PRINCIPLES: See **PRINCIPLE**

HERMETIC SEAL: A seal or bond able to withstand positive and negative pressure without leaking. (102)

HERTZ: (Hz) Unit of frequency measurement represented by cycles per second. (100)

HERTZ: (Hz) Term for cycles per second. (69)

HETEROMEIC: (Fr) Unequilateral number: the

product of two factors which differ by one unit. (81)

HETH: The 8th Hebrew letter, (H), means a field, or, in somewhat wider significance, any definite place surrounded by a hedge or fence. Owing to its close alliance with hah, meaning a hook, some commentators have attached that meaning also to it; it has also been connected etymologically with the Arabic word *khah* which signifies something that has descended or been poured down. From these distinct but nearly related meanings this letter has been spoken of as indicating in some manner the power of mind over matter, or of the higher over the lower planes of human intellect. Poetical writers who delight in drawing out the utmost meaning possible from Hebrew letters have taken advantage of the idea of the octave note in connection with this 8th letter in the sacred alphabet and have associated Heth with the New Jerusalem and with The Garden of Hesperides wherein are gathered together the numberless souls of the righteous who have passed through Libra, the 7th zodiacal sign, and have thereby attained to the eminence of an equilibrated estate in consciousness. (72)

HEXACHORD: A series of six sounds. (125)

H factor: [CYMATICS] Term for chord or vibration spectrum, vibration spectra or vibration signature.

HIDDEN FIFTHS or OCTAVES: See CONSECUTIVES

HIEROPHANTY: (from sacred, and to reveal): explanation of the mysteries, one of the ceremonies of initiation. (81)

HIGHPASS FILTER: Also known as low cut. A filter which passes all signal frequencies above a specified corner frequency, while rejecting those frequencies below.

HIGHPASS FILTER: A filter having a single transmission band extending from some finite lower cutoff frequency (defined as the point where amplitude is attenuated by 3 dB) to infinite frequency (or the upper frequency response limit of the transducer or instrument.) (100)

HIGHPASS FILTER: Passes high frequencies, cuts out low frequencies. (69)

HIGH SPOT: The term used to describe the response of the shaft due to unbalance force. It is the point angular location on the shaft directly under the vibration probe at that point in time when the shaft makes its closest approach to that probe. Also, the location on the shaft surface under the vibration probe at the instant of time when the 1X filtered vibration signal produced by that probe reaches its positive peak. (100)

HINDU SCALE: See SROUTIS

HISTIONIC: Pertaining to the tissues (*hista*). (121)

HISTOLOGY: Microscopic anatomy, or the anatomy of the tissues. (121)

HOLD TIME: See DWELL TIME. (102)

HOLDING NOTE: A note sustained in one part while the others are in motion. (125)

HOMOLOGY: Likeness or parallel in organisms of different species. (121)

HOMOPHONY: Unison of voices or instruments of the same character. (125)

HOMOTHEISM: See ANTHROPOMORPHIC DOGMA.

HOMUNCULL: Artificially made human beings, generated from the sperm without the assistance of the female organism. (Black Magic.) (131)

HOMUNCULI IMAGUNCULAE: Images made of wax, clay, wood, etc., that are used in the practice of black magic, withcraft, and sorcery, to stimulate the imagination and to injure an enemy, or to affect an absent person in an occult manner at a distance. (131)

HORN: Usually a one-half wave-length long resonant bar or metal section transferring energy from the convertor to the workpiece, made preferably of aluminum or steel. (102)

HORN: A metal wind instrument, formed of a continuous tube twisted into a curved shape for the convenience of holding. It is furnished with a mouthpiece and a bell. The mouthpiece is moveable, so as to allow additional pieces of tubing called crooks, to be added to its length in order to alter the pitch, and the bell is sufficiently wide to admit the hand of the player. The horn sounds the harmonics of the fundamental note of its tube. (125)

HORN ABRASION: Material removed from the face of the horn through frictional wear. (102)

HORN AMPLITUDE: The peak-to-peak excursion of the horn at its frontal surface (anti-nodal region) during one cycle. (102)

HORN ANALYZER: An electronic unit for providing such data as horn frequency, horn balance, and Q of the horn. (102)

HORN CHANGE BUTTON: A switch for activating the carriage mechanism without ultrasonics, exposing the horn for removal. (102)

HOST COMPUTER: A computer system which is interfaced to a machinery monitoring system for data acquisition and diagnostic purposes. (100)

HUM: Hum is a steady low-pitched sound usually caused when a small amount of the 60-Hz voltage

from the AC power line mixes with the audio signal. A certain amount of hum is inevitable, but if your equipment is in good condition, no hum should be audible with the amplifier controls set in normal playing position. (103)

HYDROGEN: "Hydrogen is composed of three parts having a metallic base and comes under 2nd order atomic." (1) See **LEVITATION, METALLIC GASES, FORCE-GASEOUS, RATES OF VIBRATIONS, RADIATION-CELESTIAL-SYM-PATHETIC, FRAUNHOFER LINES**

"The Horizon of matter does not rest on hydrogen. I contend that hydrogen is composed of three elements with a metallic base and that it belongs to the "interatomic" subdivision, by reason of its vibrational frequency and sympathetic outreach. Hydrogen is not an actual etheric element, for if it were such, it could not be confined in any container. No molecular structure can contain and hold the ether of the seventh subdivision, not even that lowest order - ether of the fourth subdivision - which is liberated as heat in chemical action. Were hydrogen a simple element, such as the ether, it would seek its medium of correspondent tenuity with a speed greater than that of light, notwithstanding any restraining influence at our command.

"My researches lead me to think that hydrogen carries heat in a latent condition, but I do not believe it will ever be possible to originate a device which will vibrate hydrogen with a sufficient frequency to cause it to evolve this latent heat.

"All known gases are compounds, the proof being that all of them submit to vibratory dissociation.

"There is much atmospheric celestial material that has never been revealed to man's senses. Attenuated elements extend to infinite reaches beyond hydrogen, including actual substances or compounds which have never been revealed to our senses. Beings fashioned of these substances could walk by our sides unseen and cast no shadow in the noonday sun." (11)

HYDROGEN, METALLIC: "M. Dumas has communicated to the French Academy some curious experiments of MM. Troost and Hautefeuille on the hydrates of mercury or combinations of hydrogen with that metal. These combinations, it is said, so strongly resemble those which constitute the amalgams of mercury, with silver and other white metals, that it is hardly possible to doubt that they are themselves amalgams, and hence that hydrogen is a metal, a fact apparently indicated in many other analogies." Nature Magazine

HYGROSCOPIC PLASTIC: A plastic that absorbs moisture. (102)

HYLOZOISM: The theory which regards the world as an organism, or all matter as animated. (121)

HYPATE: Implies the last - but also the first, or

highest. Tetrachord of the hypates: the lowest of the tetrachords or the perfect system. The hypate of the bypates was the lowest string of the tetrachord of the hypates; it was higher by one tone than the proslambanomenos. The hypate of the meses was the lowest of the tetrachord of the meses and also served as the highest of the tetrachord of the hypates. (81)

HYPEPIMER: Relationship: the inverse relationship of the epimer relationship. (81)

HYPER: Above. A prefix to the names of modes one fourth *above* the authentic; as, Hyper-Eolian, Hyper-Dorian, Hyper-Iastian, or Ionian, Hyper-Lydian, Hyper-Phrygian. (125)

HYPERBOLE: Tetrachord of the hyperboles: the highest of the tetrachords in the perfect system. (81)

HYPER-DIAPASON: Super-octave. (125)

HYPERHYPATE: The string above the parhypate of the hypates and below the hypate of the meses. (81)

HYP0: Below. A prefix to the names of modes commencing one fourth *below* the authentic, otherwise called Plagal, as, Hypo-Dorian, Hypo-Eolian, Hypo-Iastian or Ionian, Hypo-Lydian, Hypo-Phrygian. (125)

HYP0-POLYEPIMER: Relationship: the inverse of the polyepimer relationship. (81)

HYSTERESIS: Hysteresis is the variation in output when a specific input pressure is reached by increasing and by decreasing pressures. (20)

HYSTERESIS: Non-uniqueness in the relationship between two variables as a parameter increases or decreases. In particular, the maximum difference in output at any given value of the measured variable within the specified range, when the value is approached first with an increasing signal and then with a decreasing signal. Also called **DEADBAND**, or that portion of a system's response where a change in input does not produce a change in output. (100)



IAMBUS: A metrical foot consisting of a short syllable and a long. (125)

IASTIAN: Ionic. (125)

IATROCHEMICAL: Biologists who reduced all vital processes to chemical action. (121)

IATROMECHANICAL: Biologists who reduced all vital processes to physical or mechanical action. (121)

ILEADUS: See **ILECH PRIMUM**

ILECH CRUDUM: The combination of a body out of its three constituent principles, represented by salt, sulphur, and mercury, or body, soul, and spirit; respectively the elements of earth, water, and fire. (131)

ILECH MAGNUM: The specific healing power of medicine. (131)

ILECH PRIMUM: The first beginning; primordial power; causation. (131)

ILECH SUPERNATURALE: The union of the superior and inferior astral influences. (131)

ILEIADES: The element of the air; the vital principle. (131) See **NOUS; FORCE, VITAL**

ILEIAS: See **ILECH PRIMUM**

ILIASTER: The hidden power in Nature, by means of which all things grow and multiply; primordial matter; materia prima; A'kasa. (131)

ILIASTER PRIMUS: Life; the balsam of Nature. (131)

ILASTER QUARTUS: Perfection; the power obtained by the mystic process of squaring the circle. (131) See **QUADRATURE; GEOMETRY**

ILIASTER SECUNDUS: The power of life inherent in matter. (131)

ILIASTER TERTIUS: The astral power of man. (131)

ILLUMINATION: See **LIGHT, HEAT, LIGHT & HEAT, FORCE-WIND, SUN, LUMINOSITY**

IMAGINATIO: The plastic power of the soul, produced by active consciousness, desire, and will. (131)

IMBALANCE: (UNBALANCE) Unequal radial weight distribution on a rotor system; a shaft condition where the mass centerline (principle inertial axis) does not coincide with the geometric center-line. Also, the effective mass causing the rotor to be out of balance. (100)

IMPEDANCE: Impedance is an engineering term used to describe the degree to which a circuit impedes the flow of an alternating current. When two circuits or devices are electrically linked, their separate impedances must be matched for efficient transfer of energy. In hooking up an audio system, for instance, the impedance of the loudspeaker must be matched to the output impedance of the amplifier. (103)

IMPERFECT: Not perfect. 1) An imperfect interval is one which is a semitone less than perfect. 2) The imperfect consonances are the third and sixth, as opposed to the fourth and fifth. 3) An imperfect cadence is one which does not give complete rest in key. All cadences not having a dominant or subdominant penultimate are said to be imperfect. (125)

IMPLIED DISCORD: A discord, the actual percussion of which is not found unless other parts be added to the chord. (125)

IMPLIED INTERVALS: Intervals not expressed in thorough bass figuring. (125)

IMPRESSIONES: Effects of a passive imagination, which may give rise to various bodily affections, diseases, malformations, stigmata, monsters (hare-lips, acephali, etc.) moles, marks, etc. (131)

IMPULSE, CREATIVE: "The attraction increases that as gives an impulse, that that becomes the aid, the stimuli, for an impulse to create." (364-6) (2) See **NEUTRAL NEGATIVE ATTRACTION, INTRODUCTORY IMPULSE, FORCE-CREATIVE, LAWS OF BEING**

IMPULSE, SYMPATHETIC ACOUSTIC: See THIRDS. (11)

INAUDIBLE VIBRATIONS: Nature has established her sympathetic concordants...The is gravity therefore gravity is fixed, inherent. There is no flight of gravity. The difference in the condition of the sympathetic nerve centers and the variations in the chord aggregation of the masses, as established in the man or woman at birth, constitutes the molecular condition of the individual. The molecular state of animals, vegetables and minerals, depends upon the aggregation of their chord centers. It is impossible to make two coins from one die the same in their molecular aggregation. Merely picking up a coin and replacing it causes billions of molecules to be lost ... produces a change in the chord of mass of the coin. As this fact has only been developed by persistent progressive research, it is quite easy to comprehend the nature of the difficulties that lie in the way of perfecting devices for the guidance of artificers and mechanics whereby they can bring a proper vibratory action into play to induce positive sympathetic transmission. In order for me to transmit my knowledge by demonstration it will be necessary to have much more perfect instruments than those crude devices which I first constructed for my researches. One of my perfected instruments shows to the eye, in the molecular effects produced by a certain order of vibration, when the chord of harmony is established between two neutral centers. Another, when connected with the sympathizer, denotes accurately, by color of a certain sound or combination of sounds the number of vibrations that are necessary to induce certain effects of mechanical combinations.

Inaudible vibrations are tested by the magnetic needle and sound colors. Every gaseous molecule is a resonator of itself and is sensitive to any and all sounds induced, whether accordant or discordant. At the normal density of the atmosphere we hear a volume of sound, focalized by the combined association of every molecule brought under sound influence. When we reduce the atmospheric volume of a chamber to $\frac{50}{100}$, then the ear is sensitive to the reduction of the acoustic force evolved on the same ratio, and so on, until sound becomes inaudible. This inaudibility to our organ of hearing is no proof whatever of any reduction of the acoustic force evolved on the introductory impulse given to the bell. It is only a proof that the number of the molecules left for the acoustic force to act upon has been so reduced by increasing the vacuum, that the concentration of sound from the diminished number cannot be heard. The ear is not susceptible to the acoustic force emanating from one molecule, nor even from the concentration of one hundred millions of billions of molecules. The highest vacuum that can be induced, taking but a cubic inch in volume to act upon, will leave a residual number of molecules one hundred billion times as great as the above given number and yet be perfectly inaudible when all their acoustic forces are focalized.

The audible has been conquered in my instruments to that extent which brings me into sympathetic contact with the inaudible, the vitalized conditions of which as regards sympathetic union with the terrestrial are the pure and only essentials necessary towards establishing the sensitive link between the instrument and terrestrial chord-masses, in order to run sympathetic machinery. But there is still before me a vast region to be explored before the keystone of this sympathetic arch is set in position to carry the high order of sympathetic transfer that I aim at. I have every reason to hope that when I have mastered these mechanical difficulties I shall be able to control this most subtle of Nature's forces. When this is done, the commercial engine will soon follow. There is no truer nor quicker way to reach that end than the one I am now pursuing. My obligations on this line once fulfilled, I shall be at liberty to turn my attention to the consideration of the mental forces associated with the physical and in fact, the solution of the mechanical problem is one and the same in principle, as is the physical and mental. When one is solved, all is solved. The convolutions which exist in the cerebral field are entirely governed by the sympathetic conditions that surround them.

All abnormal discordant aggregations in these resonating convolutions produce differentiation to concordant transmission, and according as these differentiations exist in volume, so the transmissions are discordantly transferred producing antagonism to pure physical action. Thus, in motor ataxy, a differentiation of the minor thirds of the posterior parietal lobule produces the same condition between the retractors and exteriors of the leg and foot, and thus the control of the proper movements is lost through this differentiation. Taking the cerebral condition of the whole mass as one, it is subservient to one general head center, although as many neutrals are represented as there are convolutions. The introductory minors are controlled by the molecular, the next progressive links by the atomic, and the high third by the etheric. All these progressive links have their positive, negative and neutral position. When we take into consideration the structural condition of the human brain, we ought not to be bewildered by the infinite variety of its sympathetic impulses, inasmuch as it unerringly proves the true philosophy that the mass chords of such structures are governed by etheric vibratory flows. There is no structure that is not built up from the cosmic ether. Certain orders of attractive vibration produce certain orders of structure, thus the infinite variety of effects, more especially in the cerebral organs. Discordance cannot exist in the molecule proper. Discordance in any mass is the result of differentiated groups induced by antagonistic chords, and any differentiated mass can be brought to a condition of harmony or equation by proper chord media, and an equated sympathy produced whether the mass be metal or brain.

There is good reason for believing that insanity is simply a condition of differentiation in the mass chords of the convolutions, which creates an antago-

nistic molecular bombardment towards the neutral or attractive centers of such convolutions. This may be compared to a knot on a violin string. Discordant conditions, *i.e.* differentiation of mass, produce negatization to negative discordants as the negative is to the positive, but the vast volume the sympathetic holds over the non-sympathetic, in ethereal space, makes it at once the ruling medium and readjuster of all opposing conditions, when properly brought to bear upon them.

"Josial Royce is right as regards correspondent sympathetic association between two conditions. If concordance can be established, even of unlike states, no matter whether it be of the high tenuous forces of nature, gases with liquids, liquids with solids, solids with gases, the structural conditions can be perfectly adverse. Their neutral centers are the focalized seat of sympathetic concordance for controlling any differentiation that may exist outside or in the mass that surrounds them. Certain orders of vibration can reach these centers and establish a concordant flow of sympathy, independent of any and all mass antagonism, in other words, certain orders of sympathetic vibratory transmission can correct and equate all differentiation that may exist between physical organisms and their cerebellic flows. Discord is disease, Harmony is Health." (K) (11)

INCANTATION: The utterance of a charm or spell in a singing, monotonous tone. (125) **See CHANT**

INCH-POUNDS PER SECOND: A unit of power 8.85 in.-lbs./sec. equal to one watt. (102)

INCUBUS: 1) Male and female parasites growing out of the astral elements of man or woman in consequence of a lewd imagination. 2) Astral forms of dead persons (Elementaries), being consciously or instinctively attracted to such persons, manifesting their presence in tangible if not visible forms, and having carnal intercourse with their victims. 3) The astral bodies of sorcerers and witches visiting men or women for immoral purposes. The Incubus is male, and the Succubus female. (131)

INDETERMINISM: The theory of the freedom of the will. (121)

INDIGO: Use indigo to alleviate: eye troubles, ear and nose complaints, facial paralysis, pneumonia, bronchitis, bronchial croup, whooping cough, asthma, nervous complaints such as creeping palsy, infantile convulsions, and also the mental complaints; delirium tremens, obsession and other forms of insanity, *etc.* (87) **See VIOLET.**

INDUCTION: **See POTENTIAL**

INDUCTION: "Induction is the transmissive force of the electric vibration in ether." (Keely)

INERT GAS: **See NOBLE GAS**

INERTIALLY REFERENCED: Motion that is referenced to free space or to a fixed point in space. Also describes a transducer which measures such motion. (100)

INFERIOR: Lower. At an interval below; inversion at the octave below. (125)

INFINITE CANON: **See CANON**

INFLEXION: A departure from the monotone in chanting. (125)

INFRARED REGION: 0.78 to 300 $\hat{\text{E}}\text{m}$. (5)

INNER PARTS: Those portions of the harmony that are not at the top or bottom. (125)

INNER RACE: A generally cylindrical component of rolling element bearings which is positioned between the shaft and the rolling elements. (100)

INNER RACE ROLLING ELEMENT OR BALL PASS FREQUENCY: For rolling element bearings, the frequency at which the rolling elements pass a fixed point over the inner race. This frequency always exceeds the corresponding outer race ball frequency and typically is 50 percent greater. (100)

IN-PHASE (DIRECT) MOTION COMPONENT: (IN z) The Cartesian value of the 1X vibration vector that is in-phase with the vibration transducer angular location. This may be expressed as : $\text{IN } z = A \cos O$, where A is the peak-to-peak amplitude, and O is the phase angle of the 1X vector. In-phase and quadrature signals are used to generate a polar plot with an XY plotter or recorder. (100)

INPUT: Input is the signal fed into a component - a radio signal, or the signal from a cartridge or tape head. Also, by extension, the connection or jack through which such a signal is fed. (103)

INSANITY: **See INAUDIBLE VIBRATIONS.**

INSERTION: The process whereby a metal piece is implanted in plastic. (102)

INSTRUMENT: Any mechanical contrivance for the production of sound. (125)

INSTRUMENTATION: The art of using several musical instruments in combination; also, the style or treatment of orchestral instruments with a view to the production of special effects. (125)

INTEGRATION: "Much more may be given as respecting space, or of the forces as are active through space in the various forms of condensation and disintegration, or throwing out and coming in, and that take a part in the activity of the forces as are called gravitation; yet - as is demonstrated here in the race about which the active forces of the gravitating of the motor in its activity creating in itself the very forces

as will build up those properties as create energy in both disintegrating and integrating in its activity." (195-57) (2) See **NEGATIVE AGGREGATION, GRAVITA-TION, DISINTEGRATION, NEGATIVE ATTRACTION, FORCE-ATOMIC, STABILIZA-TION, LAWS OF BEING**

INTEGRATOR: An electronic circuit that performs mathematical integration; converts a velocity signal to a displacement signal or converts an acceleration signal to a velocity signal. (100)

INTENSITY: The Intensity of the sound produced by a vibratory body, depends upon the amplitude of its vibrations.

The Intensity of a sound varies inversely as the square of the distance from its origin, only when the sound waves can radiate freely in all directions without interruption. (68)

INTER-ATOMIC: A term used by Keely to designate those rates the vibrations between the 31st and 44th octave of the Electromagnetic Spectrum. See **MAGNETIC POLAR STREAM, RATES OF VIBRATIONS**

INTERATOMIC BOMBARDMENT: "Reception and dispersion are kept up in the earth's atmospheric envelope by atomic and interatomic conflict as between the dominant and enharmonic."

Keely states he found the electric stream to be as free from percussion (bombardment) as an infant's breath, for "the three streams flow together as one in the mildest ways." (11)

INTERATOMIC - FOURTH SUBDIVISION OF MATTER: Keely does not define the structure of the interatom, but from the fact that the "triple" vibrations cause it to further subdivide, we may assume it to consist of portions arranged in the same manner as in the lower subdivisions. Certain it is that Keely found the interatomic to subdivide into three "etherons" of the fifth subdivision. We may therefore conclude that the internal structure of the interatom is fundamentally the same as that of the first, second and third subdivisions. Its fundamental vibratory mode is the same as that of the atomic subdivisions - the harmonic or true fifth of the mass chord. Its vibratory frequency, however, is higher than any of the preceding. The interatom is subject to the general laws of mass and is ponderable.

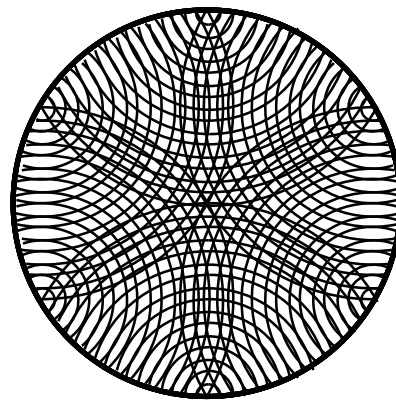
Keely says the atomic triplets revolve "around each other" at "about $\frac{4}{3}$ of their circumference." He says they remain in a triangular position unless disturbed by a magnet, when they lie in a straight line and the otherwise spherical dynasphere or etheric capsule then becomes oblate. He explained what was afterwards called the "Zeeman effect" by this physical change in the light emitting body.

He states the repulsion of molecules by each other

is caused by "electromagnetic radiation."

"The diamagnetic receding motion of metallic silver, exhibited toward a magnetic field, is caused by some 800,000 corpuscular percussions per second, or "interatomic bombardment." This would be more exactly expressed as "intersympathetic vibrations." (Vibrations acting on the atomic subdivision regardless of the existence about the atomic of the molecular, intermolecular and atomic capsules.)

"The negative sympathetic" portion of the polar stream, which has neutral affinity and is the magnetic flow proper, "coincides sympathetically" with the "second atomic flow." (11)



INTER-ETHERIC: A term used by Keely to designate those vibrations above the 60th octave of the Electromagnetic Spectrum. See **RATES OF VIBRATIONS**

INTER-ETHERIC NINTHS: 24,300-,000,000 See **RATES OF VIBRATION**

INTERETHERIC - SIXTH SUBDIVISION OF MATTER: The interetheron consists of three component parts which are true simples, inasmuch as they defied any further analysis at Keely's hands. These three components are the three individualized neutral centers, oscillating and vibrating about a "center of coincidence" set up by their vibratory nodes, which assumes control of them through its affinity for their vibratory nodes. Whether any etheric capsule surrounds any or all of these three component neutral centers as they vibrate and oscillate about the fourth and controlling neutral center of the interetheron, is somewhat in doubt. But since Keely's subdivisions he believed were brought about through vibratory disintegration of the etheric capsules, and he was able to subdivide the sixth subdivision into the seventh, such would appear to have been the case.

The fundamental mode of vibration in the interetheric is the dominant, the diatonic third of the mass chord,

the same as in the etheric.

Keely states this medium transmits the vibrations of gravity, which he defines as "transmissive inter-etheric force under immense vibration." (11)

INTERFACE: The area at which two mating parts meet. (102)

INTERFERENCE DIAGRAM: See **CAMPBELL DIAGRAM.** (100)

INTERFERENCE FILTER: A filter designed to eliminate one or more frequencies such as, for example, a 60 Hz power line interference filter.

INTER-MOLECULAR: A term used by Keely to designate those rates of vibration between the 4th and 14th octaves of the Electromagnetic Spectrum. See **RATES OF VIBRATIONS**

INTER-MOLECULAR AXIS: See **Chart section**

INTERMOLECULAR FORCES: See **FORCE, INTERMOLECULAR**

INTERMOLECULAR - SECOND SUBDIVISION OF MATTER: Each intermolecule is surrounded by its rotating etheric capsule, within which the "atomic triplets" composing it, vibrate with the fundamental mode of the enharmonic - the diminished seventh of the mass chord. The constituent atomic triplets rotate with a mass action similar to that governing the molecule and intermolecule, differing only in having a higher oscillating frequency. The intermolecular field is called in current physical and chemical terminology "atoms" that is, dissociated, uncombined, elementary substances which so far have defied their attempts at further dissociation and analysis. (11)

INTER-MOLECULAR VAPOR: "Taking for the keynote of his experiments, in applying intermolecular vapor to the running of an engine, that all the movements of elastic elements are rhythmical." Chapter 6 of (1) See **ODOR, MOLECULAR DISSOCIATION**

INTERVAL: The distance between any two sounds. In discussing all subjects relating to melody, or to the construction of chords, it is necessary to find names for the various kinds of intervals. Hence, in the earliest treatises on music they are divided into classes. The old axiom that consonance depends on simplicity of ratio naturally led authors to draw a line at the point at which two sounds ceased to be consonant and became dissonant. Among the Greeks, the unison, octave, fifth and fourth were considered more perfect than the third and sixth and other intervals. In medieval treatises an interesting division of intervals into perfect, medium, and imperfect is found; the unison and octave belonged to the first class, the fourth and fifth to the second, the third and sixth to the last. In later works appeared a division which is to this

day followed by many writers, namely, into Perfect and Imperfect. This division runs thus:

INTERVALS

Consonant

Perfect

4th

5th

8th

Imperfect

3rd

6th

Dissonant

2nd

7th

All augmented and diminished intervals

So far, this division seems plain enough. But modern music requires that intervals shall be designated according to their scale value.

Hence a perfect interval when accidentally flattened becomes imperfect and a major interval becomes minor. But the application of the word imperfect to a perfect interval made smaller led to serious confusion, because, an imperfect fifth came as a subdivision of perfect intervals, while imperfect intervals of themselves formed a separate class. To avoid this cross-division, theorists have in the last few years used the name diminished for perfect fifths reduced by one semitone. But it is important to note that by this change of a name a new difficulty arises, for diminished has almost by universal consent been applied to certain intervals when made less than minor, for example, C# to Bf is a diminished seventh, C# to B# a major seventh, C# to Bn a minor seventh, C# to Bf one semitone less than minor. The word diminished when applied by these authors to a fourth or fifth signifies that it is reduced from its normal state by one semitone, but the same word "diminished" when applied to a seventh signifies that it is reduced by two semitones. That utter confusion should result from such an undigested system is absolutely inevitable; and it will be found that professors and teachers of music to this day are unable to talk intelligibly to each other on the simple subject of Intervals. For many years a system has been taught in Germany which makes the whole matter perfectly plain. It is this:

1) Intervals are reckoned upwards, inclusively, and by the number of notes they contain.

2) Intervals are in their normal state when reckoned from the first note of the major scale. The lowest note of the interval being considered for the time as a tonic.

3) Normal intervals are major. Thus, D to F# is a major third, because F# is the third degree of the scale of D; F to Bf is a major fourth, because Bf is the fourth of the scale of F; B to F# is a major fifth, because F# is the fifth of the scale of B; and so on. In other words, all the intervals of any major scale reck-

oning up from the tonic respectively are major.

4) Intervals one semitone less than major are minor. Thus, C to Df is a minor second because it is one semitone less than the normal D in the scale of C; B to Fn is a minor fifth because one semitone less than the normal F# in the scale of B; and so on.

5) Intervals one semitone greater than major are augmented. Thus, C to D# is an augmented second, because it is one semitone greater than C to D, the normal interval; C to G# an augmented fifth; and so on.

6) Intervals one semitone less than minor are diminished. Thus, F# to Ef is a diminished seventh; C# to Gf, a diminished fifth; C# to Ef, a diminished third; and so on.

The simplicity of this system is already apparent. The following shows it at a glance:

Tonic	C
Major 2nd	D
Major 3rd	E
Major 4th	F
Major 5th	G
Major 6th	A
Major 7th	B
Major 8th	C

Tonic	C
Minor 2nd	Df
Minor 3rd	Ef
Minor 4th	Ff
Minor 5th	Gf
Minor 6th	Af
Minor 7th	Bf
Minor 8th	Cf

Tonic	C
Augmented 2d	D#
Augmented 3rd	E#
Augmented 4th	F#
Augmented 5th	G#
Augmented 6th	A#
Augmented 7th	B#
Augmented 8th	C#

Tonic	C	or	C#
Diminished 2nd	Dff		Df
Diminished 3rd	Eff		Ef
Diminished 4th	Fff		Ff
Diminished 5th	Gff		Gf
Diminished 6th	Aff		Af
Diminished 7th	Bff		Bf
Diminished 8th	Cff		Cf

It will be seen from this that diminished intervals are produced in two ways - either by making the upper note of a minor interval flatter, or by making the lower note of some interval sharper. Hence it is that some intervals have to be calculated from notes not having a diatonic scale of their own; thus, B# to An. In such cases, the nature of the interval is readily found by

temporarily reducing the lower note; thus, Bn to An is a minor seventh, therefore B# to An, being a semitone less than minor, must be a diminished seventh.

The following is the simplest form of stating the rule for naming intervals according to this system: "When asked the nature of any interval, bear in mind the major scale of the lower note, then, if the upper note is higher by a semitone than it would be in the major scale of the lower note, it is *augmented*; if the upper note is actually a note of that major scale it is *major*; if it is less than major by one semitone it is *minor*; if it is less than minor by one semitone it is *diminished*. When the lower note is a sharpened note, which has no scale of its own, consider it as one semitone lower, e.g., C## to G# is a minor fifth, because the interval is one semitone less than C# to G#, the normal fifth. When the lower note is a flattened note, which has no scale of its own, consider it as temporarily raised before determining the nature of the interval, thus Cff to Gf is an augmented fifth, because it is one semitone greater than the normal fifth Cf to Gf."

The only obstacle to the general adoption of this excellent method of tabulating intervals is to be found in the pertinacity with which professors adhere to the expression *perfect* fifth and *perfect* fourth, and abhor the term *major* fifth and *major* fourth. This absurd prejudice, which arguments drawn from the history and science of music seem to have no power to remove, must be allowed to die of old age. If there is any real distinction between the perfection of a fifth and the imperfection of a third, it might even then be allowed to students to call fourths and fifths majors, on the understanding that they also possessed a remarkable perfection which no other intervals possess.

It has been suggested that intervals should be called, instead of (1) minor, (2) major, and (3) augmented; (1) minor, (2) normal, and (3) major. This would certainly be a better system than any yet devised; but it is to be feared that it would be impossible to disturb the universally accepted meaning of the word major.

Intervals greater than major or normal have been termed (besides *augmented*) extreme, sharp, superfluous, pluperfect, etc. (125) See **TEMPERAMENT; RATIO; SCALE**

INTERVAL: The distance in pitch between two notes, which is expressed in terms of the number of notes of the diatonic scale which they comprise (e.g. third, fifth, ninth) and a qualifying word (perfect, imperfect, major, minor, augmented, or diminished). The number is determined by the position of the notes on the staff, the qualifying word by the number of tones and semitones in the interval. Thus (no clef) C - G is always a third, while (F clef) C - G is a major third, being a distance of two tones, and (G clef) C - G is a minor third, being a distance of a tone and a half. (21)

An interval is a combination of two tones. It is also the distance between or the difference between two

tones. When these two tones are sounded together the result is an harmonic interval, and when they are sounded one after the other the result is a melodic interval. The quality of an interval is determined by its size and by the relationship of its position to the keynote.

There are five types of intervals: major (indicated by M), minor (m), perfect (P), diminished (dim.), and augmented (Aug.).

A major interval contracted - by lowering the upper note or raising the lower note - by one half step becomes minor, and contracted by another half step becomes diminished.

A perfect interval contracted by a half step becomes diminished, and contracted by another half step (not usually practical), becomes doubly diminished.

A perfect or a major interval expanded by a half step becomes augmented. (13)

Harmony is concerned with chords, and every chord is a combination of intervals sounded simultaneously. Any systematic study of harmony must therefore begin with an examination of intervals. The intervals that form the basis of music, and their measurements relative to one another are as follows:

INTERVAL	RATIO
Unison	1:1
Pythagorean Komma	81:80
Enharmonic	128:125
Lesser Chromatic Semitone	25:24
Diesis	25:24
Greater Chromatic Semitone	135:128
Minor Diatonic Semitone	17:16
Major Diatonic Semitone	16:15
Limma	16:15
Minor Second	27:25
Smaller Step or Minor Tone	10:9
Greater Step or Major Tone	9:8
Major Second	9:8
Augmented Second	75:64
Minor Third	6:5
Major Third	5:4
Diminished Fourth	32:25
Augmented Third	125:96
Perfect Fourth	4:3
Augmented Fourth	25:18
Tritone	45:32
Diminished Fifth	64:45
Diminished Fifth	36:25
Perfect Fifth	3:2
Augmented Fifth	25:16
Minor Sixth	8:5
Major Sixth	5:3
Augmented Sixth	125:72
Harmonic Seventh	7:4
Dominant or Minor Seventh	16:9
Minor Seventh	9:5
Tonic Seventh	9:5
Major Seventh	15:8
Diminished Octave	48:25
Augmented Seventh	125:64

Octave	2:1
Minor Ninth	32:15
Major Ninth	9:4
Harmonic Minor Tenth	7:31
Minor Tenth	12:5
Major Tenth	5:2
Perfect Eleventh	8:3
Harmonic Eleventh	11:4
Augmented Eleventh	45:16
Perfect Twelfth	3:1
Augmented Twelfth	25:8
Minor Thirteenth	16:5
Harmonic Thirteenth	13:4
Major Thirteenth	10:3
Harmonic Fourteenth	7:2
Dominant Fourteenth	32:9
Tonic Fourteenth	18:5
Major Fourteenth	15:4
Double Octave	4:1

(Editor's Note:) This is not a comprehensive list but only introductory in extent. As these ratios are found out, they will be published from time to time. There is much license in interval definition. Some authorities give the intervals as so many semitones and tones without an accurate definition as to the relative frequency of either. In this publication we will try to stick with the numerically defined ratios thereby diminishing ambiguities. It should also be kept foremost in mind that we are discussing the natural derivation of numbers and NOT sensorial pleasing music. Nature obeys the infinite relations of number and not what Man may find pleasing to his finite senses.)

Of the above, the octave and the perfect fifth are classified as perfect consonances. The thirds and sixths, both major and minor, are imperfect consonances. The seconds and sevenths, both major and minor, are dissonances.

The perfect fifth, the augmented fourth and the diminished fifth are ambiguous in character. (Theoretically, the perfect fourth is per se consonant; the augmented fourth and diminished fifth are both dissonant.) In practice they are treated as dissonances when the bass forms the lower note. But when they occur between two of the upper constituent notes of a chord, they rank as consonances, inasmuch as they require no prescribed method of resolution, as do the authentic dissonances.

The augmented fourth and diminished fifth are included in the above list because they may be diatonic intervals formed between the fourth of the scale and the leading note or vice versa. In addition to these, the perfect fifth, the major second, and the major sixth may be augmented by raising the upper or lowering the lower note chromatically. Similarly the minor third, perfect fourth, minor sixth and minor seventh may be diminished by lowering the upper note or raising the lower note chromatically. These are the only augmentations and diminutions in practice. Others exist in theory; but only the paradoxically-minded need spend any time in considering, for example, just what kind of a second is formed by the interval B# - Cflat.

The unison is the most perfect of all consonances, but there seems no good reason to follow the usual practice of including it in the list of intervals. Its very name implies that there is no interval between the two sounds which form it.

Any intervals listed above becomes what is known as a compound interval if the upper note is raised or lower note lowered an octave, or both.

Any chord which contains no dissonant interval is a concord, any chord which does contain a dissonant interval is a discord. The ambiguous nature of certain intervals will explain how it is, for example, that a diminished triad in root position is a discord, its first inversion a concord, and its second inversion once more a discord. It all depends on the position in the chord of the augmented fourth or diminished fifth. See **VIBRATION RATIO**.

INTERSTITIAL SPACES: "Were our sight able to penetrate the interstitial spaces that exist inside the orbits of the oscillating intermolecules and analyze the conditions in those interstitial spaces, where dwells incalculable latent energy, we would be bewildered with amazement. And assuming our vision, which is limited by persistency, could follow the intermolecules in their rapid oscillations and the intermolecular etheric capsule as it revolves with infinite velocity like a transparent shell about the three component atoms that exist inside it, which in turn revolve in their orbits and oscillate with even a higher frequency than the intermolecules, we would still be only on the border gazing into the remote depths of the interstitial realms that stretch far down into the interatomic, etheric and interetheric subdivisions, and, within the interetheric subdivision at last arrive at the neutral center, the nucleus of everything we know as substance. This neutral center bears about the same relation to the etheric subdivision that the atomic subdivision bears to the crude molecular, in other words, its texture is as much finer than electrons as electrons are finer than coarse molecules." (11)

INTONATION: 1) The method of producing sound from a voice or an instrument. 2) Correctness of pitch; *e.g., just intonation*, singing or playing in *perfect tune*. 3) The method of chanting certain portions of the church service. 4) The notes which precede the reciting-note in a Gregorian chant. (125)

INTONATOR: A monochord, or single string stretched across a flat sound-board. Below the string is a diagram of the exact divisions of the true musical scale. By means of a moveable bridge, the student is able to sound the notes represented on the diagram, and so, to educate his ear to a true sense of relative pitch. (125)

INTRODUCTORY ACTION: See **QUADRATURE OF THE CIRCLE**

INTRODUCTORY ACOUSTIC IMPULSE: See **MOLECULAR DISSOCIATION**

INTRODUCTORY IMPULSE: "Now, respecting the conditions regarding motor, and motive forces or powers in the activity of that as is set forth, both in that as builded and that as contemplated - while it becomes necessary for the stabilizing of the energy that is created in the active forces of the integration and disintegration of the elements, in the active force of gravitation produced in the motive energy that is to be expanded in motor - it is well that these be changed to meet the needs of such stabilization, and with the ability to control the force and power created. But to change from the chemical activity, that brings the force to act with the expansion in gravitation, would be to defeat the purpose of that as being created. While the drawings, and the constructive force, may carry out the principle in action, there must be that motive power to create the first active force. And this will only act in the way as has been set up.

Make the stabilizing power or element stable, and not to leave out the chemical reaction that must begin the activity from the place of the operating element. When one pulls, the other must pick up, and it must be as the gravitation in its action to create this." (195-61) (2)

"Keely teaches that an unknown potency is held in the atom's tenacious grasp until released by an introductory impulse given by a certain order of vibration, depending upon the mass-chord of the aggregation; which impulse so increases the oscillation of the atoms as to rupture their etheric capsules." Bloomfield-Moore

"When the proper impulse is given to induce the rotation with pure alternating corpuscular action, the conditions of action become perpetual in their character, lasting long enough from that one impulse to wear out any machine denoting such action, and on the sympathetic stream eternally perpetual. The action of the neutral or focalizing centers represents molecular focalization and redistribution, not having any magnetism associated with them; but when the radiating arms of their centers are submitted to the triple compound vibratory force, representing their mass thirds, they become magnetic and consequently cease their rotation. Their rotation is induced by submitting them to three different orders of vibration, simultaneously giving the majority to the harmonic third." Keely in (1) pg 180; See **THIRDS, GRAVITATION DIFFERENTIATION, CHEMICAL GRAVITATION, INTEGRATION, NEGATIVE ATTRACTION, IMPULSE-CREATIVE, FORCE-CREATIVE, HEAT, FORCE-WIND, SUN, POWER, MOLECULAR DISSOCIATION, LAWS OF BEING, ATOMIC THEORY-KEELY'S**

INVERSE SQUARE LAW: [Acoustics] Under far field/free field conditions, sound intensity varies inversely with the square of the distance from the source. The difference in sound pressure level be-

tween far field locations is expressed as:

$$Lp^2 = Lp^1 - 20 \log(R^2/R^1)$$

where: Lp^1 = sound pressure level in decibels at location 1

Lp^2 = sound pressure level in decibels at location 2

R^1 = distance from noise source to point 1

R^2 = distance from noise source to point 2

(R^1 and R^2 must have the same units) (85)

INVERSION: The transposition of certain phrases having a common root. There are three kinds of inversions in music – 1) of chords; 2) of intervals; 3) of subjects.

1) The inversion of a chord is effected by making one of the inner notes act as a bass note, and by this means as many inversions can be made, as there are actual notes in the chord, not counting the root. In such inversions the harmony remains the same, although the order of component parts is changed.

2) Intervals are inverted by making that which was the upper note the lower, and the reverse. The inversion of an interval within the octave may readily be found in the difference between the figure 9 and the interval known; thus an interval of a second becomes a seventh by inversion, etc.

3) The inversion of a subject is produced by inverting the intervals of which it consists. (125)

INVISIBLE LIGHT: [OPTICS] Can be seen (not seen) when light is caused to be in phase. Pg 197-199 of (6)

IOD: The 10th Hebrew letter, Iod (I), means the hand. It has been designated the head of the 4th triad from unity, and the culmination of the Sepherotic series. It has also been declared that from *heth* all other Hebrew letters proceed, it representing both the origin and synthesis of forces, therefore it symbolizes spiritual perfection. This letter, which denotes the hand, is naturally associated in idea with an extension of the active principle of life in all directions. Its Greek equivalent, Iota, stands for the lowest of one series and the highest of another. As the number 10 and its multiples occupy so extremely exalted a place in the esteem of Kabbalists the first 10 letters of the alphabet are considered much richer in primal significance than the remaining 12, but each of those has a distinct value worthy of careful consideration. (72)

ION: An atom from which one or more electrons have been stripped, leaving it with a net positive charge. (116)

ION: [CHEM] An isolated electron or positron or an atom or molecule which by loss or gain of one or more electrons has acquired a net electric charge. (4)

ION-ACOUSTIC WAVE: [PLASMA PHYSICS] A longitudinal compression wave in the ion density of a

plasma which can occur at high electron temperatures and low frequencies, caused by a combination of ion inertia and electron pressure. (4)

IONIAN MODE: The Church mode commencing on the note C. (125)

IONIC BOND: [PHYS CHEM] A type of chemical bonding in which one or more electrons are transferred completely from one atom to another, thus converting the neutral atoms into electrically charged ions; these ions are approximately spherical and attract one another because of their opposite charge. Also known as electrovalent bond. (4)

IONIC CHARGE: [PHYS] 1. The total charge of an ion. 2. The charge of an electron; the charge of any ion is equal to this electron charge in magnitude, or is an integral multiple of it. (4)

IONIC CRYSTAL: [CRYSTAL] A crystal in which the lattice-site occupants are charged ions held together primarily by their electrostatic interaction. (4)

IONIC LATTICE: [CRYSTAL] The lattice of an ionic crystal. (4)

IONIC RADII: [PHYS CHEM] Radii which can be assigned to ions because the rapid variation of their repulsive interaction with distance makes them repel like hard spheres; these radii determine the dimensions of ionic crystals. (4)

IONIC STRENGTH: [PHYS CHEM] A measure of the average electrostatic interactions among ions in an electrolyte; it is equal to one-half the sum of the terms obtained by multiplying the molality of each ion by its valence squared. (4)

ION IRRADIATION: [PHYS] Bombardment of a substance by high-velocity ions. (4)

IONIZATION: [CHEM] A process by which a neutral atom or molecule loses or gains electrons, thereby acquiring a net charge and becoming an ion; occurs as the result of the dissociation of the atoms of a molecule in solution ($\text{NaCl} \rightarrow \text{Na}^+ + \text{Cl}^-$) or of a gas in an electric field ($\text{H}_2 \rightarrow 2\text{H}^+$). (4)

IONIZATION CONSTANT: [PHYS CHEM] Analog of the dissociation constant, where $k = [\text{H}^+][\text{A}^-]/[\text{HA}]$; used for the application of the law of mass action to ionization; in the equation HA represents the acid, such as acetic acid. (4)

ION LASER: [OPTICS] A gas laser in which stimulated emission takes place between two energy levels of an ion; gases used include argon, krypton, neon, and xenon; examples include helium-cadmium lasers and metal vapor lasers. (4)

IONOPHONE: [ENG ACOUS] A high-frequency loudspeaker in which the audio-frequency signal modulates the radio-frequency supply to an arc

maintained in a quartz tube, and the resulting modulated wave acts directly on ionized air to create sound waves. (4)

ION PAIR: [NUCLEO] A positive ion and an equal-charge negative ion, usually an electron, that are produced by the action of radiation on a neutral atom or molecule. (4)

ION PUMP: [ELECTR] A vacuum pump in which gas molecules are first ionized by electrons that have been generated by a high voltage and are spiraling in a high-intensity magnetic field, and the molecules are then attracted to a cathode, or propelled by electrodes into an auxiliary pump or an ion trap. (4)

ISOCHRONISM: Periodical recurrence. (125)

ISOTOPIC SPIN: A mathematical quantity related to the number of different charges in a particle family. (116)

ISOTROPIC SUPPORTS: Rotor support systems that provide uniform restraint in all radial/lateral directions. See **ASYMMETRICAL SUPPORTS**. (100)

ITALIAN SIXTH: The name of a chord containing a bass note accompanied by a major third and a sharp sixth. (125) See **EXTREME SIXTH**

J-K

JINGLES: Disks of tin, brass, or bell metal, fastened at intervals round a tambourine. (125)

JOBEL: [Heb.] A word applied in th Holy Scriptures to certain *trumpets* or *horns*. It is probably equal to the affix *jubilee*; but, *jubilee-horns* were used for other purposes besides that of proclaiming of jubilees. (125)

JOINT LINE: See **INTERFACE**. (102)

JOULE: The unit of energy or work; one joule is equal to one newton-meter, also one watt-second. (75)

JUPITER: "In Jupiter we find the universal consciousness." (2902-1) (2)

JUST INTONATION: The correct sounding of intervals in singing or playing. (125) See **INTONATION**

KABALA: The language of the Kabala is partly Hebrew and partly Chaldee. The 22 letters constituting the alphabet of these 2 languages are interpreted by Kabalists in a manner to greatly interest the many at present who attach much importance to numbers in some mystical and symbolical significance. Letters and numbers are one in these ancient languages. The following table shows at a glance the Roman characters which are the equivalents of the Hebrew and Chaldee:

Hebrew	Roman	Significance	Number
Aleph	A	Ox	1
Beth	B	House	2
Gimel	G	Camel	3
Daleth	D	Door	4
He	H	Window	5
Vau	V	Peg, nail	6
Zayin	Z	Weapon, sword	7
Heth	Ch	Enclosure, fence	8
Teth	T	Serpent	9
Yod	I	Hand	10
Kaph	K	Palm of hand	20
Lamed	L	Ox-goad	30
Mem	M	Water	40
Nun	N	Fish	50
Samech	S	Prop, support	60
Ayin	O	Eye	70

Pe	P	Mouth	80
Tzaddi	Tz	Fish-hook	90
Qoph	Q	Back of head	100
Resh	R	Head	200
Shin	Sh	Tooth	300
Tau	Th	Sign of cross	400

(72)

KABARO: A small drum used by the Egyptians and Abyssinians. (125)

KALUZA-KLEIN THEORY: Prior to 1921, Theodor Kaluza applied Einstein's new general relativity to five dimensions and produced a unified theory of electromagnetism and gravitation wherein the ordinary 4-dimensional gravitational field and the electromagnetic field are but two different aspects of a single more fundamental field: the 5-dimensional gravitational field. Kaluza's theory was published in 1921, on the personal recommendation of Albert Einstein, who had had Kaluza's paper for two years. In Kaluza's model, electromagnetics is the 5th dimensional aspect of the 5-d G-field, while the ordinary 4-d G-field is the intersection of the 5-d G-field with our ordinary world. (132)

KAMA LOCA: An Eastern term. Region of Desire. The soul-sphere (third and fourth principle) of the earth - not necessarily on the earth's surface - where the astral remnants of the deceased putrefy and are decomposed. In this region the souls of the deceased that are not pure, live (either consciously or in a state of torpor) until their Kama rupas (bodies of desire) are laid off by a second death, and they themselves having been disintegrated, the division of the higher principles takes place. The lower principles being disposed of, the spirit, with his purified affections and the powers he may have acquired during his earthly existence, enters again into the state of Devachan. Kama Loca corresponds to the Hades of the Greeks, and to the purgatory of the Roman Catholic Church - the Limbus. (131) See **ELEMENTARIES**

KAMA RUPAS: Bodies of Desire. (131) See **KAMA LOCA**

KAPH: The 11th Hebrew letter, Kaph (K), is the first letter of the 2nd and (in a sense) higher series. This letter means the palm of the hand and specially denotes strength. As *heth* may be connected with a

closed hand containing all potencies unrevealed, *kaph* is the same member opened out and displaying its inwrought possibilities. Here in connection with the mysterious number 11, about which we often hear remarkable stories, we are introduced to all that the opened hand signifies. (72)

KARYOKINESIS: A stage in the development of the nucleus of the cell. (121)

KEELY'S MECHANICAL INVENTIONS AND INSTRUMENTS: The following are excerpted somewhat at random and will serve to give some idea regarding his instruments and his manner of work. It should be understood that he was a very careful man and had no intention of allowing his invention to become the "property" of someone else by pilfering the ideas or plans and arriving first at the Patent Office. It is possible these excerpts are the only satisfying descriptions of his instruments and manner of work, although they are far from being as definite as one would desire, who should intend to reproduce his work.

"The audible has been so conquered in my instruments as to place me in touch with the inaudible. I have only to ascertain the terrestrial chord masses to be able to run sympathetic machinery. When I have mastered these mechanical difficulties I shall be able to control this most subtle force."

12/17/1885: "Am setting up the circles for computing the different lines of etheric chords, used in setting up the vibratory conditions to obtain continuity. My chief trouble is in chording up the masses of the different parts composing the negative centers in the inner one-third volume. This neutral center is only established free from influences of gravity when rotating at 100 revolutions per minute, with the vibratory circuit running at 100,000 per second. January should complete the sympathetic graduation."

"The pressure of the violin bow giving the introductory chord impulse (focalizing chord) vitalizes the whole machine. The chords will all be set in progressive sympathy from the first octave to the fortieth."

To resonate the infinite variety of mass chords that exist, Keely invented what he terms "compound mechanical devices". These seem to have consisted of strong metal spheres, with or without internal or external accessories, depending fundamentally on the laws of sphere resonance. A sphere of the proper size was caused to act as a "sympathizer" with the "dual force" with which Nature works.

It took him eight years to invent the metallic differentiated wire of silver, gold and platinum, which he later used to run his "vibratory disk" and which we call the "Trexar".

By means of etheric vibrations Keely caused a small cannon to fire a lead ball $\frac{1}{2}$ inch in diameter, which passed through an inch board and flattened it-

self to a disk of about three inches in diameter against the wall. The material for this explosion, which made a very loud report, was simply one or two drops of water.

3/22/1885 he wrote: "Details of the present engine are as perfect as possible for the first lead. It is in the form of a sphere about thirty inches in diameter and weighs 800 lbs."

From 1872 to 1882 he pursued the line of invention instead of discovery - constructing and destroying machine after machine. He spent 2 years more attempting to devise an automatic control, which was partially successful in 1884.

His vibraphone, which was probably a telephone transmitter, collected the sound waves when the "wave plate" was struck. Keely claimed that even as the vibrations resembled in its construction, the human ear, his Liberator resembled the human head.

The area of the piston on the special lever constructed to register his enormous pressures, which usually ranged from 20,000 lbs. to 30,000 lbs, per square inch, was only $\frac{1}{2}$ inch. The tube through which he allowed the ether to pass in its way to the piston of the lever, was exceedingly small - about the size of a pin head.

In November, 1884 he demonstrated successfully an experiment which he had worked out theoretically but which had failed on several previous attempts. Two persons took firmly hold of an "iron rod". One person stood on a circular sheet of metal, from which piano wire stretched to, and touched, a plate of glass, which in turn insulated a small globe. The description given, indicates the globe was centered axially on the iron rod. Another glass plate insulated the globe, presumably on the other hand. The globe rotated when both persons, took hold of the opposite ends of the iron rod, and rotation ceased when Keely, who was one of the operators, took hold of the other operator's left hand with his right hand. Keely stated the reason for this to be "The reception flows became independent of the circular chord of resonance set up mechanically. The power of rotation comes on the positive and power of negation breaks it up." He stated the reason the sphere revolved was because of the "receptive concussion of two forces, positive and negative, coming together, seeking their coincidents, producing rotation by harmonious waves, not by harmonious streams in this case." He stated the introductory settings were entirely different from those of the musical sphere and that sound waves had nothing whatever to do with rotation of the globe.

Keely describes another experiment as follows: "The mass for experimentation chords 'B flat.' We first will liberate the negative radiating bar (Probably the power-disk on his magnetic engine. This was probably actuated by a bar running to its center, through which the vibrations were propagated.) on the disk. Then one end of a very fine trexar, the size

of a fine hair, is connected to the resonating sphere (his 'compound mechanical device') and the other end to the mass chording B flat, which is to be experimented upon. When we liberated the negative radiating focalizing bar on the disk from its dampening rod, we associated it with the magnetic defocalizing one (disk or bar). There are seven ranges of bars in all. We next liberate from its dampening rod the second harmonic bar for the sixths - the focalizing chord. Lastly, we liberate or undamp the enharmonic ninths." By his connecting the Trexar with the resonating sphere we understand that intensification of resonance of the mass to be experimented upon was affected by two-directional vibratory transmission occurring through this Trexar.

"We now attach the Trexonar to the magnetic dispersing ring over the negative sevenths cluster (of disks) and the other end to the high polar negative attractor."

"The siren is then rotated until I observe by rotation of the neutral center indicator that concordance is established with the mass - by the sphere resonator. A single tap on the Chladni wave plate produces pure evolution of energy." It would seem that this Chladni wave plate either acts through dissonance, causing disturbance of equilibrium and throwing the experimental mass on the sympathy of the resonator, in which case it is so constructed as to generate a discordant series of vibrations, or it is harmonic and must then be supported by resonators through all the octaves, consisting of either tubular spherical forms, disks or rods. However, he mentioned nothing of this.

"Setting the instrument to the proper triple introductory positions will induce either attractive focalization or positive radiant dispersion, resulting from the relation of these vibrations to the mass chord. This is disintegration induced by intensified oscillations of the combined interatomic and electromagnetic waves."

His Generator was invented to multiply the vibrations under the disturbance of equilibrium by mediums of different specific gravities, air as one - water as the other. From 1882 to 1884 his Generator was six feet long and correspondingly wide and high. Its arrangement was not automatic and therefore not mechanically useful. He was able after this to dispense with complicated mechanisms by fine adjustments.

His next apparatus was the "Liberator" in which no water was used, but the equilibrium disturbed by a medium thoroughly vibratory in its character. His difficulty with the Generator was the humidity of the vapor, which did not give its theoretical value in work. The substance he used in his Liberator was devoid of humidity but the vibrational concussion of the air proved an even greater difficulty so he went back to the use of water. The vapor produced from the Liberator was free of all humidity, of greater tenuity, giving perfect and high lines of action. Its plan was conceived during his desperate struggle to effect a

simultaneous action between the molecular and atomic leads, necessary for continuation of energy release and was suggested by the saying "Nature works with dual force, but at rest she is a unit." Keely says success, to be obtained, only requires "A uniform speed under different velocities and the control of reversions."

It was in 1885 that he invented and constructed the Liberator, which is described as "not so large as a lady's small round work table." In 1886 he is said to have reduced this Liberator in size to "no larger than a dinner plate and only three or four inches in thickness." Up to this time his researches had consisted of liberation of the etheric vapor by sympathetic vibration. By means of later experiments he still further modified this instrument to the "size of an old fashioned silver watch."

At this time he states: "The draughts are nearly completed for the compound vibratory engine for continuous operation. The Liberator is as perfect as possible and if the outside adjuncts are in proper sympathy my struggles will soon be at an end."

The rapid percussion of the atmosphere caused by the action of his Liberator caused him to return to the use of water to avoid the dissipation of energy, which fell short of the theoretical result.

In 1888 he announced that he had proved the uselessness of attempting to build an engine employing the ether as a motive power, such as we use in steam or electricity, stating that it could only be used as a medium for energy. This he later attempted to accomplish in his magnetic engine.

He elaborated a vibratory system of inducing great range of molecular oscillation in metallic masses by means of sympathetic negative attraction thereafter, by periodic change of vibration of their neutral centers, instantly depolarizing them.

Previous to 1888 he had tried in vain to construct an engine that could hold the ether in a "rotating circle of etheric force." At the end of that year he abandoned the idea of his "perfect engine" and thereafter devoted himself to researches. He was then furnished finely made instruments in place of the home made instruments he had heretofore used. Up to 1888 he had not been able to control reversions or obtain continuity of motion. For nearly fifteen years he had constructed engines of different models in attempting to control or use ether as we now use steam before he discovered this was impossible. In his magnetic engine he thereafter sought to use the ether merely as a medium for "sympathetic vibration associated with the polar stream positively and negatively."

Principally by means of differential vibratory settings of silver, gold and platinum (his Trexar) Keely antagonized the polar stream, imitating the readjustment of Nature in equating "sympathetic disturbance" in her "terrestrial ranges" and the "revitalization of

what is continually displaced by negative dispersion."

October 1, 1887 he writes, "I see no possibility of failure as I have demonstrated so far as I have gone, that every one of my theories is correct in every particular. If my 'depolarizer' is perfect I will be prepared to demonstrate the truth of disintegration, aerial suspension and dissociation."

His revolving musical globe, which seems to have been the only successful instrument in continuous operation, which he ever made, he never considered or intended to be used as a source of power. It was only constructed to prove the correctness of his theory regarding sound and for demonstration purposes.

In demonstrating the overcoming of gravity, Keely used an airship model weighing about eight pounds. When the differential wire of silver and platinum (Bixar) was attached, thereby establishing communication with the sympathetic transmitter, it rose, descended or remained stationary midway in the air, floating as gently as thistledown on the air.

On another occasion, using certain appliances and a belt, Keely moved single handed an engine which was so heavy that engineers said it could not possibly have been moved except with a derrick, and that this would have required the removal of the roof.

Illustrating the enormous pressure he was successful at times in producing, on one occasion during disintegration the 'decarbonized compressors' of his lever, the tubing and the sphere, moved as if composed of putty, 'unshipping' the apparatus. The volume of the sphere on this occasion was 15 cubic inches and the weight of surrounding metal 316 lbs.

"The vibrations used by Keely, which rupture the molecular and atomic capsules must remain **THOUGH IN ONE POINT ONLY** a secret with the discoverer until he has completed his system and some one patentable invention has been produced. He has proved to his own satisfaction the actual existence of atoms and their divisibility by his methods." (11)

KEELY'S PHYSICAL PHILOSOPHY:

"The fundamental conception of the Universe is force manifesting itself in rhythmical relations.

"This definition is exhaustive, including both thought and extension, matter and mind. The law for the one is the law for the other. The distinction between them is simply relative, *i.e.*, quantitative, not qualitative.

"The rhythmic relations in which force acts are everywhere, under all conditions, and at all times, the same. They are found experimentally to be universally expressible by the mathematical relations of thirds.

"These threefold relations may be expressed with regard to their results as,

- I. Assimilative
- II. Individualizing
- III. Dominant or Resultant

"From these three actions are derived the three fundamental **LAWS OF BEING**:

I. Law of Assimilation: every individualized object assimilates itself to all other objects.

II. Law of Individualization: every such object tends to assimilate all other objects to itself.

III. Law of the Dominant: every such object is such by virtue of the higher or dominant force which controls these two tendencies.

"Applying these fundamental laws to an explanation of the universe, as it is brought to human cognition, all manifestations of force may be treated as modes of vibrations.

The essential differences give rise to three modes of vibration:

I. The Radiating: called also the "Dispersing", the "Propulsive", the "Positive", and the "Enharmonic".

II. The Focalizing: called also the "Negative", the "Negative Attractive", the "Polarizing", and the "Harmonic".

III. The Dominant: called also the "Etheric", or the "Celestial".

"These, it will be noted, correspond to the three laws of being. It is not to be understood that any one of these three modes of vibration can exist independently. Each by itself is called a "current", and all three must be present in every "stream" or "flow" of force. The relations of the currents in every flow are expressible in thirds, and it is experimentally demonstrable that the relation of the three are in the order named: as $33 \frac{1}{3}$: $66 \frac{2}{3}$: 100.

"The evolution of what is called "matter" from the different modes of vibration is through the action of the second law, that of focalization, or "negative attraction", or "negative affinity".

"Where the vibrations under this mode meet, and are maintained in a state of mutual affinity or equilibrium, there is established what is called a "neutral center", or, as otherwise expressed, "a center of sympathetic coincidence".

"The terms "neutral attraction", "neutral affinity", "negative attraction", or "polar negative attraction", are employed to express the property of a mode of vibration to direct its components towards such center.

"As no current or flow of force can be composed of one mode of vibration only, but must always be composed of three modes uniting in varying thirds, we have $1 \times 2 \times 3 = 6$ as the total possible forms of sympathetic coincidence, or, to speak in ordinary terms, there can be six; and six only, possible forms of individualized being. These are what Keely calls the six orders of atomic subdivision, or orders of vibratory motion, and he names them as follows:

- I. Molecular
- II. Inter-Molecular
- II. Atomic
- IV. Inter-Atomic
- V. Etheric
- VI. Inter-etheric

"In this list forms of matter are arranged in the mathematical sequence of the rapidity of the oscillations of their constituent members; the proportion being proved by experiment to be as follows for the molecular orders:

$$1 : 3 : 9 : 27 : 81 : 243$$

"The arithmetical progression changes in the atomic orders to a geometrical progression as follows:

$$3 : 9 : 81 : 6561 : 43046721, \text{ etc.}$$

"This same method of progression is believed to hold in all the orders of vibrations above the molecular, and soon passes into mathematical infinity.

"Actually, however, all matter of which we are capable of cognition through the medium of our senses is in one of three forms of aggregation:

- I. Molecular
- II. Atomic
- III. Etheric

"In each of which the controlling mode of vibration is respectively:

- I. The Enharmonic
- II. The Harmonic
- III. The Dominant

"But it must be understood that each of these modes is a positive and real constituent of every atom and molecule.

"It will be seen that as every form of material aggregation is to be considered as a "neutral center of attraction", where the vibratory force of all three orders are held in "sympathetic coincidence", that is, in balanced activity or harmonized motion, and not by any means cancelled or mutually destroyed, there is no diminution of force, but only temporary suspen-

sion of its radiating or propulsive activity or expression. **SEE SCALAR**

"This is the foundation of Keely's doctrine of "latent force", and of the indefinite power which can be obtained by breaking up the harmonious balance or equation of forces of every mode, which exists in every "neutral center", that is to say in every mass of matter.

"Insomuch as every mass of matter consists thus, in fact, of vibrations in harmonic equilibrium, related by simple proportions of thirds, it follows that every mass of every description stands in harmonic relation to every other mass. This is, in part, what is meant by the sympathy of all forms of matter and of motion; and it is through the study of the methods of increasing or diminishing this sympathy that we reach practical results in this field of research. At present this is best accomplished by resonance; that is, through the harmonic vibrations created by musical instruments, bringing out the acoustic world as the microscope reveals the hidden visual world.

"Every visible or tangible mass of matter must be regarded as an aggregation of molecules; the molecules being the true centers of the equated forces of "neutralized attraction".

"These molecules have been experimentally proved by Keely to be formed of all three modes of vibration; the proof being that they respond to all three modes when subjected to the tests of compound concordant impulses.

"When in that state of neutral aggregation which we know as matter, each molecule is in perpetual oscillation, the range of the oscillation being one-third of the molecule, and its rapidity 20,000 oscillations in a second.

"It is through the disturbance of this oscillatory equilibrium, by means of resonant impulses, that Keely alters the relations of the vibratory impulses which constitute matter. This he does by striking the same chord in three octaves, representing the third, sixth, and ninth of the scale.

"Of these, the sixth reduces the range of molecular vibrations or oscillations, and by thus bringing nearer to each other the neutral centers, increases solidification.

"The ninth extends the range of molecular oscillation, and thus tends to give greater tenuity to the mass. It induces "trajectile velocity" from neutral centers, or "neutral radiation". Experiment shows that molecular dissociation does not take place until the molecule attains an oscillation approaching, if not fully reaching two-thirds of its diameter. This can be effected by means of the action of the "enharmonic" or "radiating" current applied to the mass, after its molecules have been disturbed by a "introductory impulse"; that is, by the musical note above men-

tioned.

"The third represents the "dominant", and when brought under control of a harmonic resonant impulse induces a complete rearrangement of the modes of vibration and oscillation; in other words, will transform the mass either into its component initial forces, or into some other form of matter.

"It is the study of the dominant to which Keely has devoted his recent researches. He aims to control the power he evolves by altering the dominant or etheric mode of vibration in the triplicate flows of force.

"As all molecules and masses are mere centers of harmonized vibrations, temporarily held in suspension by simple laws identical with those of resonance, it follows that these centers can be broken up or divided by certain orders of vibration impinging upon and disturbing them.

"It is a familiar fact that a cord in vibration tends to produce a similar vibration in a cord placed near it. This property belongs to all vibrations, whether resonant or not, and they exert it in proportion to the "order" to which they belong. The distance in space to which this power extends, or can be extended, is what is called "the sympathetic outreach" of the current or flow.

"In this manner we have "sympathetic negative attraction", and "sympathetic positive propulsion", with reference to the "outreach" of the third or dominant current of the stream, which is allied to the order of etheric vibrations.

"Each molecule of a given mass of matter represents the same harmonic chord or note in its oscillatory motion. The "chord of the mass" is, therefore, the chord of every molecule of mass.

"But as the condition of absolutely stable equilibrium is theoretical only, and does not exist in nature, the chord of the mass is constantly changing. Yet we must learn to control this "chord of the mass" by resonant induction, if we would gain command of the molecular forces.

"Keely believes he has solved this problem, by the invention of a mechanical device which brings the chords of all masses within the conditions of a few simple acoustic tests.

"The range of molecular oscillation is affected differently in different substances when submitted to the same vibratory impulse, and these ranges can be measured.

"In the three metals, silver, gold, and platina, we obtain the proportions--3 : 6 : 9 : - As this is the primary relation of the modes of vibration, a wire made of these three metals is peculiarly adapted to transmit concordant impulses; and nodes made of these substances placed upon a wire, transmitting resonant vi-

brations, indicate, by the different orders of vibration induced in them, the rate of oscillations of the atomic constituents.

"The phenomenon of rotation arises from the harmonic interaction of the dominant and enharmonic elements of the flow; in other words, the first and third, the third and ninth, etc.; those whose vibrations bear the proportions to each other $33 \frac{1}{3} : 100$.

"A practical example of rotation is a wheel in revolution on its axis. This is force in its commercial or economic aspect. To accomplish this result by molecular vibratory action, we must gain control of the "negative attractive" or "enharmonic" current of the triple flow, and the problem is then solved up to any limit of power."

Sympathetic physics teaches that light is an etheric evolution propagated by sympathetic conflict between celestial and terrestrial outflows; solar tensions as against terrestrial condensation. True luminosity cannot be induced in any other way.

The high order of triple vibration, that induces (progressively) molecular and intermolecular separation, shows luminous results which, when thus mechanically produced, are virtually on a small scale, a facsimile of nature's operations. "All such experiments that I have made" writes Keely "resulted in vortex motion invariably, both sympathetically and otherwise. Vortex motion follows nature in all corpuscular action.

"The undulatory theory, regarding light, I have not been able to reconcile myself to, as anything but hypothetical. The conditions which govern electromagnetic radiation disprove the theory in many particulars. The vortex action induced in space, by the differential conflict between the low and high tenuous, shows up results that harmonize with the conditions accompanying the dissociation of hydrogen and oxygen, in disintegrating water; viz., vortex action of the highest order, but peripheral only. It is were not so, the ether could not be held in suspension, neither in the molecular nor atomic envelopes. Undulatory effects are produced by certain conditions of sound; and by other conditions quite opposite effects. In organ pipes, of a certain calibre, very sensitive waves occur at intervals; as according to the character of the sound evolved; but on a combination of resonators composed of brass tubes of more than nine in number, a wave of sound, induced by certain vibration of tuning forks induces alternate conditions of the air that surrounds them, if in open atmosphere; but quite a different action presents itself when the forks are exercised in resonating tubes, set to thirds of the mass chord they represent. Then high vortex action is the instant result. Vibrators cannot be set promiscuously in tubes, and get such results, any more than a musician can render a musical composition on the violin before tuning it. The conditions under which light is evolved negate whatever is associated with undulation, as this word is understood by physicists. Aque-

ous undulations there are, but not etheric undulations.

"The mighty forces latent in corpuscular matter, by which we are surrounded, are all held in oscillating vortex action by the Infinite Designer of workings hidden from us, until the time is ripe for their disclosure. This latent, registered power interchanges sympathetically with the celestial radiating streams, whereby light, heat, electricity, magnetism and galvanic action are propagated in their different orders, vitalizing all nature with their life-giving principals. When this great scientific and religious truth has been made known, and established by demonstration, all controversy as to the source of energy will be forever silenced. If I am the chosen instrument to develop this knowledge, and to make known the conditions which surround this pure truth, it is only that I may hand the key to those who will use it to enter the doorway that opens into the inaudible, and thus gain an insight into the now invisible region of the operation of Nature's most powerful governing forces, in the control over terrestrial matter by celestial mind."

"The flow of electricity, as set down in Keely's system, is governed by triple conditions; 1st. the dominant or high vibratory; 2nd. the sub-dominant or low vibratory; 3rd. the harmonic or undulatory; In combination one flow. Keely writes: "When electrical experts can construct a mechanical device whereby the low vibratory conditions of the sub-dominant can be assimilated to the harmonic undulatory, by thirds, they will be able to run their dynamos without any extraneous appliances. An introductory impulse, on a certain order of vibration, being all that would be required to give the sub-dominant a concordant relation to the dominant; which would more effectually operate the dynamo than any number of steam-engines; allowing the harmonic stream to be the governor. This concordance, as towards the dominant, would only excite its sympathetic action in a way that would divert the ruling conditions of the two, without being submitted to the destructive effects of the dominant current. I think many lives will be lost before such a position is attained. Tesla has reached out almost to the crest of the harmonic wave, leaving all electrical explorers far behind him. It is only when such a condition is reached that the true value of electrical lighting will be understood, and extraneous power dispensed with; but, in my opinion, the present conditions for transferring power will remain unaltered, in the use of electricity, for generations.

"There is but one position to arrive at, that will redeem the many failures of the past decade, in attempts to find an economizing medium for commercial benefit in regard to power; and that position will be attained when the polar sympathetic harness is completed, which will give to the world the control of the polar forces."

"In reply to the question, "What do you include in the polar forces?" Keely answers, "Magnetism, electricity, and gravital sympathy; each stream composed

of three currents, or triune streams, which make up the governing conditions of the controlling medium of the universe; the infinite ninths that I am now endeavoring to graduate to a sympathetic mechanical combination, will, if I succeed, close my researches in sympathetic physics, and complete my system. These sympathetic streams from celestial space, percutting on the dense atmospheric environment of our earth, by their infinite velocities, wrest from their atomic confinement the latent energies which we call heat and light."

Question: And where do these sympathetic conditions or streams of force have their origin?

Answer: "'So God created man in His own image, in the image of God created He him; male and female created He them,' Genesis I:27." All sympathetic conditions, or streams of force, are derived (if we dare to make use of such a term in speaking of Deity) from the cerebral convolutions of the Infinite; from the center of the vast realm of the compound luminous. From the celestial intermediate, the brain of Deity, proceed the sympathetic flows that vitalize the polar terrestrial forces."

"In seeking to solve the great problems that have baffled me, I have, to all seeming, accidentally tripped over their solution. My highest power of concentration failed to attain the results which at last apparent accident revealed. It requires an infinite mind to evolve infinite positions." Keely.

KEELY'S THREE SYSTEMS: "My first system is the one which requires introductory mediums of different gravities, air and water, to induce disturbance of equilibrium on the liberation of vapor, which only reached the interatomic position and was held there by the submersion of the molecular and atomic leads in the "generator" I then used. It was impossible with these mediums to go beyond the atomic with this instrument and I could not dispense with the water until my liberator was invented, nor reach maximum of the full line of vibration. My first system embraces generator, engine and gun.

"My second system of dissociation I consider complete, as far as the liberation of the ether is concerned, but not sufficiently complete, as yet, in its devices for indicating and governing the vibratory etheric circuit, to make it a safe medium.

"My third system embraces aerial and submarine navigation. The experimental sphere intended to test the combination of the positive and negative rotation is nearly completed." (11)

He has determined and written a system of the vibratory conditions governing the aggregation of all molecular masses, as to their relation sympathetically one to another, stating conditions necessary to induce antagonism or repellant action, *etc.*, but cannot yet control the operation of his Disintegrator so as to use it with safety to the operator.

He has demonstrated that the subdivision of matter under different orders of progressive vibration evolves by such subdivisions entirely new and distinct elements, too multiple to enumerate. He has systematized the proper vibratory chords, progressively, from the introductory molecular to the inter-etheric, embracing seven distinct orders of triple subdivision. He has elaborated a system of inducing sympathetic negative attraction on metallic masses, with great range of motion, and instant depolarization of the same by vibratory change of their neutral centers. Keely controls the transmission of these sympathetic streams by a medium of high molecular density, *viz.* drawn wires of differentiated metals, gold, silver, platinum, German silver, *etc.* In some recent experiments he took apart the instrument which he invented for the production of the force cutting the wires operated in sympathetic attraction and propulsion, and distributed the fragments to those who were present.

Keely has discovered that all sympathetic streams, cerebellic, gravital, magnetic and electric, are composed of triple flows, this fact governing all terrestrial and celestial orders of positive and negative radiation. In gravity it would be more correct to speak of triple connective links, as there is no flow of gravity.

Keely has discovered and demonstrated that electricity has never been handled that it is in principle as material as water that is is not merely a force or form of energy, that it is matter, and that what we call electricity is but one of the triune currents, harmonic, enharmonic and diatonic, which are united in pure electricity, that the enharmonic current is sympathetically and mysteriously associated with the dominant current and that the dominant current can no more be brought under control than can the lightning itself. The diversion of the dominant current would mean destruction to any mechanical medium used for that purpose and death to the operator. The intense heat evolved by the electric stream Keely attributes to the velocity of the triple subdivision at the point of dispersion, as each triple seeks its medium of affinity. Sudden union induces the same effect but demonstration shows that the concentration of this triple force is as free of percussion as is the breath of an infant, for the three currents flow together as one stream in the mildest sympathetic way, while their discharge after concentration is as the tornado's force. The enharmonic current of this triple stream, Keely thinks carries with it the power of propulsion that induces disturbance of negative equilibrium, which disturbance is essential to the coordination of its flow, in completing the triune stream of electricity. When this fluid is discharged from the clouds, each triplet or third seeks its terrestrial concordant, there to remain until again disturbed.

"My researches have proved to me" writes Keely, "the subtle and pure conditions of the power of negative attraction and positive propulsive."

These same researches have enabled Keely to pronounce definitely as to the nature of gravity -- an ever-existing, eternal force, coexistent with the compound etheric or high luminous, entering into all forms of aggregated matter at their birth. Keely thinks that gravity is the source from which all visible matter springs, and that the sympathetic or neutral center of such aggregation have preceded it and to all that may succeed it, and that disturbance of equilibrium, like gravity, is an ever-existing force.

All planetary masses Keely calls terrestrial, showing that the beauty of the celestial concordant chords of sympathy forming the harmonious connective link, is what may be denominated "the music of the spheres," and is seen in the alternate oscillating range of motion between the planetary systems, for at a certain range of the greater distance, harmony is established and the attractive forces are brought into action, and then, in the return towards the neutral centers when at the nearest point to each other, the opposite or propulsive force is brought into play.

Keely has constructed instruments by which he is endeavoring to determine the nature of the triune action of the polar terrestrial stream or envelope, as regards its vibratory philosophy. He is seeking to demonstrate its sympathetic association with the celestial stream or luminiferous track, the compound etheric field, from which all planetary masses spring. He considers the electric stream to be one of the triune sympathetic streams which help to build up, in their order of triple concentration, the high vitality of the polar stream, or, more correctly, the magnetic-electric terrestrial envelope, without which all living organisms would cease to exist. He classes the cohesive force or molecular masses as the dominant order of the electrical stream, the molecule owing its negative attractive quality to the magnetic element.

In Keely's experiments in antagonizing the polar stream, recently before men of science, he has copied in his instruments the conditions nature has established in her terrestrial ranges necessary to equate a state of sympathetic disturbance for the revitalization of what is continually displaced by negative dispersion. These mechanical conditions are principally differential vibratory settings on molecular aggregations of the metallic masses of gold, silver and platinum.

He has discovered the range of molecular motion in all quiescent masses is equal to one-third their diameters and that all extended range is induced by sound force, set at chords of the thirds which are antagonistic to the combined chords of the mass of the neutral centers that they represent, and that at a certain increased range of molecular motion, induced by the proper acoustic force, the molecules become repellant, and that when the sympathetic centers are influenced by a vibration concordant to the one that exists in themselves, the molecules become attractive; that the repellant condition seems to take place at a distance of about ten of the diameters of the molecules, this distance of about ten of the diameters

of the molecules, this distance representing the neutral line of their attractive force, or the dividing line between the attractive and the repellant. Beyond this line, perfect triple separation takes place, inside of it, perfect attractive association is the result.

The force he uses in running machinery is the sympathetic attractive, which he says draws the planets together, while in his system of aerial navigation he will use a negation of this force, the same regulating the recession of the planets from each other. It is the sympathetic attractive force which keeps the planets subservient to a certain range of motion between their oscillations. Nature has established her sympathetic concordants from the birth of the neutral centers of the planets, in a manner known only to the Infinite One. This is gravity.

"The music of the spheres" is a reality. Thus, the inaudible atomic, etheric and interetheric sounds, which control and direct the harmony of the movements of the celestial universe, are the most powerful of all sounds. If our hearing were intensified a hundred billion times, we might be able to hear the streams of light as plainly as we now hear the wind.

He has suffered severe physical hardships and accidents in his hand-to-hand fight with the Genii he cannot completely subdue until he has effected the condition of polarization and depolarization necessary for the control of rotation and reversions in his commercial engine. An illness of nine weeks followed his abandonment of water in disintegrating, and he was obliged to return to its use, to avoid the percussion induced by the rapid vibration of the atmospheric air. If a bullet is fired at a man through a vessel of water a foot thick, the bullet is merely flattened on the water while if nothing intervenes the man is killed.

He has written three treatises to explain his system, the titles of which are as follows:

I. *Theoretical Expose or Philosophical Analysis of Vibro-Molecular, Vibro-Atomic, and Sympathetic Vibro-etheric forces, as applied to induce Mechanical Rotation by Negative Sympathetic Attraction.*

II. *Explanatory Analysis of Vibro-Acoustic Mechanism in all its Different Groupings or Combinations to induce Propulsion and Attraction (sympathetically) by the Power of Sound-Force, as also the Different Conditions of Intensity, both Positive and Negative, on the Progressive Octaves to Ozonic Liberation and Luminosity.*

III. *The Determining Principle of Matter, or the Connective Link between the Finite and the Infinite, Progressively considered from the Crude Molecular to the Compound Inter-Etheric, showing the control of Spirit over Matter in all the Variations of Mass-Chords and Molecular groupings, both Physical and Mechanical.* (11)

Keely defines gravity as transmissive Interetheric force under immense etheric vibration, and electricity as a certain form of atomic vibration. Keely's researches in this province have shown that it is neither the electric nor the magnetic flow, but the etheric, which sends its current along our nerves, that the electric and magnetic flows bear an infinitely small ratio to the etheric flow, both in velocity and tenuity that true coincidents can exist between any mediums, cartilage to steel, steel to wood, wood to stone, and stone to cartilage, that the same influence of sympathetic association holds control also over all liquids, embracing the three kingdoms, animal, vegetable and mineral, that the sympathetic flow emanating from the normal human brain comes in the order of the fifth and seventh positions of atomic subdivision, compound interetheric sympathy a resultant of this subdivision, that if metallic mediums are brought under the influence of the sympathetic flow they become organisms which carry the same flow that the nerves do for the human brain, that the composition of metallic and of physical organisms is one and the same, although the molecular arrangements are different, but that the harmonious chords induced by sympathetic positive vibration permeate the molecules of each and bring about perfect equation of any differentiation in one the same as in the other, that the etheric or will-flow, is of a tenuity of the seventh subdivision of matter, of a tenuity so infinitely fine that a magnifying glass which would enlarge the smallest grain of sand to the size of the sun would not make its structure visible. The distance traversed by light in a thousand years could be traversed by the etheric flow in less than a second.

Were it not for the will-force eternally flowing into all created forms, the entire universe would disappear. Omnipotence may be said, in all reverence, to regulate His systems of worlds through and by the vibratory ether. Hertz said, "Soon the question set by modern physics will be 'Are not all things due to conditions of the ether?'" Hertz discovered in 1888 that the ether had been imprisoned and used in every electromagnetic engine (by its use as a fulcrum for electric attraction and repulsion) without having been even so much as suspected by a single scientist. Herbert Spencer says the first condition of success in scientific research is "an honest receptivity and willingness to abandon all preconceived notions, however cherished if they be found to contradict the truth." (11)

Keely says: "The system of arranging introductory etheric impulses by compound chords set by differential harmonies, is one that the world of science has never recognized, simply because the struggle of physicists, combating with the solution of the conditions governing the fourth order of matter, have been in a direction thoroughly antagonistic and opposite to the right one. It is true that luminosity has been induced by chemical antagonism, and, in my mind, this ought to have been a stepping stone towards a more perfect condition ... but the bare truth remains that the conditions were isolated, robbed of their most vital

essentials ... by not having the medium of etheric vibration associated with them.

In order to subdivide the atoms in the atomic triplet, the molecular ether, liberated from the molecule, is absolutely necessary to effect the rupture of the atoms, and so on, progressively, in each order of ether, molecular, intermolecular, atomic, inter-atomic, etheric, interetheric, the ether liberated in each successive division is essential to the next subdivision.

The keynote of Mr. Keely's researches is that the movements of elastic elements are rhythmical and before he had reached his present stage in producing vibrations, on the principle of resonance, he has had problems to solve which needed the full measure of apperception. Hertz has produced vibrations about one meter long, vibrating more than one hundred million times a second. Keely has produced, using an atmospheric medium alone, 519,655,633 vibrations per second, but, interposing pure hydrogen gas between soap films and using it as a medium of acceleration, he asserts that on the enharmonic third a rate of vibration may be induced which could not be set down in figures, and could only be represented in sound colors. He has invented instruments which demonstrate in many variations the colors of sound, registering the number of necessary vibrations to produce each variation. The transmissive sympathetic chord of B flat, third octave, when passing the inaudibility, would induce billions of billions of vibrations, represented by sound color on a screen illuminated from a solar ray. But this experiment is one of infinite difficulty, from the almost utter impossibility of holding the hydrogen between the two films long enough to conduct the experiment. Keely made over 1200 trials before succeeding once in inducing the intense blue field necessary, covering a space of six weeks, for hours at a time daily and should he ever succeed in his present efforts to produce a film that will stand, he anticipated being able to register the range of motion in all metallic mediums. Keely writes: "The highest range of vibration I ever induced was in the one experiment that I made in liberating ozone by molecular percussion, which induced luminosity, and registered a percussive molecular force of 110,000 lbs. per square inch, as registered on a lever constructed for the purpose." (11)

KERAS: A horn. Originally, any instrument made out of the horn of an animal. (125)

KERANA or KERRENA: The name of the Persian horn which is sounded at sunset and at midnight. (125)

KEREN: A Hebrew trumpet. The word is sometimes used in the Bible as synonymous with *sophar*, and to it is sometimes affixed *jobel*, rendered in the English version *rams'-horns*. (125)

KETTLE DRUM: Instruments formed of shells of copper or brass, over the top of which parchment is stretched. Parchment is considered best when most

transparent. (125)

keV: Abbreviation for kilo (1,000) electron volts of energy. (116)

KEY: (1) A mechanical contrivance for closing or opening ventages, as in flutes, clarinets, ophicleides, etc. By means of keys on such instruments, apertures too remote to be reached by the outstretched fingers are brought under control of the player. (2) A lever which brings the pallets of an organ under the control of the hand or foot of an organist. (3) A lever which controls the striking apparatus of a key-stringed instrument. In the harpsichord it acted on the jack, in the pianoforte it acts on the hammer. (4) The wrest or key used for tuning instruments having metal pegs. Its end is hollowed out, so as to fit over the four-sided end of the peg, and the crossbar with which it is surmounted gives leverage to the hand of the tuner, so that he is enabled to tighten or loosen a string, or (in the case of a drum) slacken or strain a parchment. (5) The sign placed at the commencement of the musical stave which shows the pitch of the notes, was originally called a *clavis* or key. This sign is called in modern music a clef. (6) Key, in its modern sense, is the starting point of the definite series of sounds which form the recognised scale. Different starting points require the relative proportion of the steps of the scale to be maintained by means of sharps or flats in the signature. The key of C requires no flats or sharps for this purpose, hence it is called normal key. (125) See **CLEF**; **NORMAL**; **SCALE**; **KEYNOTE**

KEYBOARD: The range of keys upon a piano or organ. Keys played by the fingers are called manuals; those by the feet are called pedals. (125)

KEY-CHORD: The common chord of the tonic, *e.g.*, C, E, G is the key-chord of C. (125)

KEY-NOTE: The note which, according to the signature, forms the starting point of the scale. The tonic. The do. (125)

KEYNOTE: The note from which all other notes of a chord are derived. See **CHORD OF MASS**, (10), **HARMONICS**, **INTER-MOLECULAR VAPOR**

KEYPHASOR: A signal used in rotating machinery measurements, generated by a transducer (usually a proximity probe) observing a once-per-turn gap change event on the rotating shaft. The transducer output signal is represented as one voltage pulse per shaft revolution. This signal can be used for measuring phase angle (*e.g.*, for balancing) and shaft rotative speed, for relating the vibration and rotation frequencies, and as a reference for determining shaft bow and runout. By providing the above information it is used as a general tool in performing analysis of vibration signals to determine machine malfunctions. See **KEYPHASOR TRANSDUCER**, **KEYPHASOR PULSE**, **KEYPHASOR EVENT**. (100)

KEYPHASOR EVENT: a) The location of the shaft

circumference which provides the once-per-turn occurrence to be used with the Keyphasor transducer. In can be a keyway, a key, a hole or slot, a projection, or a change in reflectivity when using an optical transducer; b) That point on the trace of an oscilloscope (vibration waveform or orbit display) which represents the Keyphasor pulse, usually a blank spot followed by a bright spot, or the reverse order. The Keyphasor event on the oscilloscope trace is obtained by using the output signal of the Keyphasor transducer as an input to the Z intensity axis on the scope. (100)

KEYPHASOR PULSE: That change in the output signal of the Keyphasor transducer which represents the passage of the Keyphasor event on the shaft under the Keyphasor transducer. (100)

KEYPHASOR TRANSDUCER: That transducer, usually mounted radially, which observes the Keyphasor event. (100)

KHALIL, CHALIL or HALIL: [Heb.] The fute of the Hebrews. As the word is traced to a root signifying bored through, it is quite possible that it may have been like the aulus, used to describe either a flute or an oboe. (125)

KINETIC ENERGY: Energy of motion; the capacity to do work by virtue of that motion; equal to one half mass times velocity (or speed) squared. (75)

KINETIC ENERGY: Energy at work, or in "motion" (*kinesis*). (121)

KIN: A Chinese musical instrument, the scholar's lute, a sort of dulcimer. (125)

KING: A Chinese instrument of percussion, consisting of metal plates, which are struck with a hammer. (125)

KINK: A twist in a catgut string from close laying, which, by uncoiling and weakening that part of the string in which it occurs, frequently makes it useless for the instrument for which it is intended. (125)

KINNOR: One of the most ancient of the Hebrew string instruments, being the first mentioned in the Bible; Jubal "was the father of such as handle the harp (kinnor) and organ (ugab)" Gen. iv. 21. (125)

KLANG: Sound. Quality of sound. Timbre. (125)
See **PYRAMID**

KLANGFARBE: Literally sound color. Quality of sound. Timbre. (125) See **SOUND COLOR**

KLINGEL: A small bell. (125)

KNELL: A stroke upon a bell made at periodic intervals, at the time of a death or funeral. (125)

KNICKY-KNACKERS: The common instrument

of percussion known as bones. (125)

KOMMA: See **INTERVAL**; **COMMA**

KORMAL: Communal or cenobitic. (121)



LA: (1) The solfeggio name for the sixth degree of the scale. (2) The key-note of the minor scale without a signature. (125)

LAKHOVSKY MULTI-OSCILLATOR: An oscillator of multiple wave lengths. It included all the basic wave lengths from 10 centimeters to 400 meters, that is, all frequencies from 750,000 per second to 3 billion. But each circuit emits many harmonics, which, with their basic waves, their interferences and their effluvia, can reach the scale of the infra-red and even that of visible light. (90)

LAMED: The 12th Hebrew letter, Lamed (L), means literally an ox- goad, an instrument of chastisement intended to force an animal to do its full share of work should it at any time show signs of negligence. Lamech (vide Genesis IV, 18-24) is said to represent a complete personification of the qualities suggested by Lamed. Lamed represents the opening of Spring, the period when Pisces melts into Aries and the reign of the "2 Fishes" is, for that year, at an end. (72)

LATENT FORCE IN INTERSTITIAL SPACES: Latent force is accumulated and held in interstitial space by corpuscular aggregation, otherwise the progressive disintegration of water could not induce increased volume and pressure.

The latent force liberated from liquids and gases differs from that liberated from metals in that it is elastic, giving an infinite variety of pressure, whereas in the metals, vibration simply extends the range of neutral sympathetic attraction without corpuscular rupture as it reaches out for concordance in the sympathizer.

This sympathetic latent power is held by the incalculable velocity of the molecular etheric capsule and the atomic etheric capsule, which rotate at billions of times per second, in interstitial corpuscular aggregation.

Imagine a magnified molecule twelve inches in diameter, having an atmospheric envelope $\frac{1}{16}$ th in. thick, rotating at the same relative velocity as the etheric envelope of the actual molecule. The very lowest estimate of its velocity is 600,000 miles per second which would be impenetrable to a steel pointed projectile moving with the greatest velocity we

can give to it. A rotating envelope such as this would hermetically enclose an internal pressure of several thousands of pounds per square inch, especially when we consider that the ether, unlike the atmospheric film which has inertia and consequently centrifugal force, has centripetal force or neutral attraction in direct proportion to its velocity. This is the explanation of the wonderful pressures evolved by aqueous disintegration, which have been measured on a lever specially built for this purpose, strong enough to stand three times the explosive power of gunpowder. The evolution of power from the latent condition in interstitial space by the proper excitors in all its multiplicity of forms proves the "connecting link" between the celestial and terrestrial, the infinite and the finite. The absence of latent energy in matter would make life an impossibility.

The mighty forces latent in corpuscular matter - and all matter - are held in oscillating vortex action, this latent, registered definite power interchanging sympathetically with the celestial radiating stream (renewing loss in radiation through absorption by receptiveness) whereby light, heat, electricity and magnetism are propagated in their different orders, vitalizing Nature with their life giving principles. (11)

LATERAL LOCATION: The definition of various points along the Z axis (centerline) of the rotor. (100)

LATERAL VIBRATIONS: See **RADIAL VIBRATION, LONGITUDINAL VIBRATIONS, HARMONICS-RATES-OF; ACOUSTICS §15**

LATTICE DYNAMICS: [SOLID STATE] The study of the thermal vibrations of a crystal lattice. Also known as crystal dynamics. (4)

LATTICE ENERGY: [SOLID STATE] The energy required to separate ions in an ionic crystal an infinite distance from each other. (4)

LATTICE POLARIZATION: Electric polarization of a solid due to displacement of ions from equilibrium positions in the lattice. (4)

LATTICE SCATTERING: [SOLID STATE] Scattering of electrons by collisions with vibrating atoms in a crystal lattice, reducing the mobility of

charge carriers in the crystal and thereby affecting its conductivity. (4)

LATTICE VIBRATION: [SOLID STATE] A periodic oscillation of the atoms in a crystal lattice in which atoms oscillate about their equilibrium positions. (4)

LATTICE VIBRATIONS: See **PHONON, BRAGG OSCILLATION**

LATTICE WAVE: A disturbance propagated through a crystal lattice in which atoms oscillate about their equilibrium positions. (4)

LAW OF AFFINITIES: See **LAW OF ASSIMILATION, LAW OF COMPOSITION OF MATTER**

LAW OF ASSIMILATION: "In compiling from his (Keely's) writings, such are selected as seem to be the best, toward elucidating the mysteries which lie in the operation of the laws governing the universal ether, so far as his hypothesis carried him. If matter without form preceded the creation of vitality, "it is only when the principle of life had been given," says Charpignon, "that the intrinsic properties of atoms were compelled, by the law of affinities, to form individualities; which, from that moment, becoming the center of action, were enabled to act as modifying causes of the principle of life, and assimilate themselves to it, to start with, that it will be well to remember; for, as in the hypothesis of MacVicar and the demonstrations of Keely, the law of assimilation is made the pivot upon which all turns, "providing at once for mind and for matter, and placing them in a scientific relationship to one another." This law MacVicar calls the "Cosmical Law," because to it alone, ever operating under the eye and fulfilling the design of the great Creator who is always and in all places imminent to His creation, an appeal is ever made. By this law a far greater number of the phenomena of nature and the laboratory can be explained than have been otherwise explained by scores of laws which are frankly admitted to be empirical. Surely this is no slight claim for this law to be studied, with a view to its acceptance or rejection. To repeat, this law is to the effect that *every individualized object tends to assimilate itself to itself, in successive moments of its existence* (see **PLANCK'S CONSTANT**), and all objects to assimilate one another. The ground of it is, that the simple and pure substance of creation, has for its special function to manifest the Creator; and consequently to assimilate itself to His will and attributes, in so far as the finite can assimilate itself to the Infinite. Hence it is, in its own nature, wholly plastic or devoid of the fixed innate properties, and wholly assimilative, both with respect to its own portions or parts and to surrounding objects, as well as to its position in space, and, in so far as it is capable, to the mind of the Creator. Thus, there immediately awake, in the material elements, individuality and the properties of sphericity, elasticity, and inertia, along with a tendency to be assimilated as to place, or, as it is commonly called, reciprocal

attraction. Hence, in the first place, the construction in the ether, or realm of light, of groups of ethereal elements, generating material elements. Hence, secondly, a tendency in the material elements, when previously distributed in space, to form into groups, in which their ethereal atmospheres may become completely confluent; while their material nuclei, being possessed of a more powerful individuality than ethereal elements, come into juxtaposition merely, thus constituting molecules. By legitimate deductions from cosmical law, the forms and structures of these molecules must always be as symmetrical as the reaction of their own constituent particles, and that of their surroundings, will allow. The law of assimilation gives the same results of mathematics in determining the forms of systems of equal, and similar, elastic and reciprocally attractive spherical forces, or centers of force, when they have settled in a state of equilibrium; proving these forms to be symmetrical in the highest degree. Here, however, MacVicar and Keely differ, in hypothesis, as to the structure of the ultimate element; but in which everything that is cognizable has its own place, is on a solid basis, is harmonious with its surroundings, and is explained and justified by them: - raising chemistry to the level and bringing it within the sphere of mechanics; investing its objects, at the same time, with all the distinctness of the objects of other branches of natural science." See Chapter 2 of (1) See **NODES, NEGATIVE AGGREGATION, RADIAL CENTERS, NEGATIVE ATTRACTION, THEORY-QUANTUM, LAW OF SUPER-POSITION, LAWS OF BEING**

LAW OF ATOMIC DISSOCIATION: "Overtones of high rad-energy pitches produce separation of the atomoles and recombinations among the atomolic molecules of the atoms." (Keely)

LAW OF ATOMIC PITCH: "Atoms have each a different and definite pitch, at which they naturally vibrate.

Scholium: Atomic pitch is determined directly from its simple spectrum.

Scholium: Atomic pitch is determined by computations from its associate spectrum with all atoms, as in known spectra.

Scholium: Atomic pitches are more important working data than atomic weights; tables of atomic pitches must be accurate." (Keely)

LAW OF ATOMOLIC SYNTHESIS OF CHEMICAL ELEMENTS: "Harmonic pitches of atomolity produce association of etheric-atomolic particles to form atoms; the kind of atoms is determinable by the pitches employed." (Keely)

LAW OF ATTRACTION: "As an individual or a group, by the natural law of attraction, sets self, chooses to be a channel that may aid others, it attracts, it draws those that need that which may be given through such a channel." (281-22) (2)

LAW OF ATTRACTION: Juxtaposed coherent aggregates vibrating in unison, or harmonic ratio, are mutually attracted. (Keely) See **LAW OF REPULSION**

LAW OF ATTRACTION AND REPULSION: "As will be and is gradually being understood, each metal, each element even, has its attractions and its repulsions for the other metals or combinations of same in the different degrees, and in different ways and manners."

"There are atomic vibrations, and as there is the breaking up of each element in its forces and forms, there is produced the attraction and repulsion. As an illustration (this you can't use, so we will give it as an illustration):

All of uranium elements are an attractive force for those influences that produce same, you see, - platinum and all mercury products are attracted by uranium.

Uranium, then, will indicate those locations of such pitch-blende as would PRODUCE SOME form of its same elements, - or platinum or platinate. In the one - platinum - this would swing across, see? In the others - of the pitchblende - circular. (2431-1) (2) **SEE TRIPLE FLOWS; NEUTRAL CENTER ATTRACTION; NEUTRAL CENTER RADIATION**

LAWS OF BEING:

"The fundamental conception of the Universe is force manifesting itself in rhythmical relations.

"This definition is exhaustive, including both thought and extension, matter and mind. The law for the one is the law for the other. The distinction between them is simply relative, *i.e.*, quantitative, not qualitative.

"The rhythmic relations in which force acts are everywhere, under all conditions, and at all times, the same. They are found experimentally to be universally expressible by the mathematical relations of thirds.

"These threefold relations may be expressed with regard to their results as,

- I. Assimilative
- II. Individualizing
- III. Dominant or Resultant

"From these three actions are derived the three fundamental LAWS OF BEING:

I. Law of Assimilation: every individualized object assimilates itself to all other objects.

II. Law of Individualization: every such object tends to assimilate all other objects to itself.

III. Law of the Dominant: every such object is such

by virtue of the higher or dominant force which controls these two tendencies.

"Applying these fundamental laws to an explanation of the universe, as it is brought to human cognition, all manifestations of force may be treated as modes of vibrations.

The essential differences give rise to three modes of vibration:

I. The Radiating: called also the "Dispersing", the "Propulsive", the "Positive", and the "Enharmonic".

II. The Focalizing: called also the "Negative", the "Negative Attractive", the "Polarizing", and the "Harmonic".

III. The Dominant: called also the "Ethereic", or the "Celestial".

"These, it will be noted, correspond to the three laws of being. It is not to be understood that any one of these three modes of vibration can exist independently. Each by itself is called a "current", and all three must be present in every "stream" or "flow" of force. The relations of the currents in every flow are expressible in thirds, and it is experimentally demonstrable that the relation of the three are in the order named: as $33 \frac{1}{3} : 66 \frac{2}{3} : 100$.

"The evolution of what is called "matter" from the different modes of vibration is through the action of the second law, that of focalization, or "negative attraction", or "negative affinity".

"Where the vibrations under this mode meet, and are maintained in a state of mutual affinity or equilibrium, there is established what is called a "neutral center", or, as otherwise expressed, "a center of sympathetic coincidence".

"The terms "neutral attraction", "neutral affinity", "negative attraction", or "polar negative attraction", are employed to express the property of a mode of vibration to direct its components towards such center.

"As no current or flow of force can be composed of one mode of vibration only, but must always be composed of three modes uniting in varying thirds, we have $1 \times 2 \times 3 = 6$ as the total possible forms of sympathetic coincidence, or, to speak in ordinary terms, there can be six; and six only, possible forms of individualized being. These are what Keely calls the six orders of atomic subdivision, or orders of vibratory motion, and he names them as follows:

- I. Molecular
- II. Inter-Molecular
- III. Atomic
- IV. Inter-Atomic
- V. Etheric
- VI. Inter-etheric

"In this list forms of matter are arranged in the mathematical sequence of the rapidity of the oscillations of their constituent members; the proportion being proved by experiment to be as follows for the molecular orders:

$$1 : 3 : 9 : 27 : 81 : 243 \dots$$

"The arithmetical progression changes in the atomic orders to a geometrical progression as follows:

$$3 : 9 : 81 : 6561 : 43046721, \text{ etc.}$$

"This same method of progression is believed to hold in all the orders of vibrations above the molecular, and soon passes into mathematical infinity.

"Actually, however, all matter of which we are capable of cognition through the medium of our senses is in one of three forms of aggregation:

- I. Molecular
- II. Atomic
- III. Etheric

"In each of which the controlling mode of vibration is respectively:

- I. The Enharmonic
- II. The Harmonic
- III. The Dominant

"But it must be understood that each of these modes is a positive and real constituent of every atom and molecule.

"It will be seen that as every form of material aggregation is to be considered as a "neutral center of attraction", where the vibratory force of all three orders are held in "sympathetic coincidence", that is, in balanced activity or harmonized motion, and not by any means cancelled or mutually destroyed, there is no diminution of force, but only temporary suspension of its radiating or propulsive activity or expression.

"This is the foundation of Keely's doctrine of "latent force", and of the indefinite power which can be obtained by breaking up the harmonious balance or equation of forces of every mode, which exists in every "neutral center", that is to say in every mass of matter.

"Insomuch as every mass of matter consists thus, in fact, of vibrations in harmonic equilibrium, related by simple proportions of thirds, it follows that every mass of every description stands in harmonic relation to every other mass. This is, in part, what is meant by the sympathy of all forms of matter and of motion; and it is through the study of the methods of increasing or diminishing this sympathy that we reach practical results in this field of research. At present this is

best accomplished by resonance; that is, through the harmonic vibrations created by musical instruments, bringing out the acoustic world as the microscope reveals the hidden visual world.

"Every visible or tangible mass of matter must be regarded as an aggregation of molecules; the molecules being the true centers of the equated forces of "neutralized attraction".

"These molecules have been experimentally proved by Keely to be formed of all three modes of vibration; the proof being that they respond to all three modes when subjected to the tests of compound concordant impulses.

"When in that state of neutral aggregation which we know as matter, each molecule is in perpetual oscillation, the range of the oscillation being one-third of the molecule, and its rapidity 20,000 oscillations in a second.

"It is through the disturbance of this oscillatory equilibrium, by means of resonant impulses, that Keely alters the relations of the vibratory impulses which constitute matter. This he does by striking the same chord in three octaves, representing the third, sixth, and ninth of the scale.

"Of these, the sixth reduces the range of molecular oscillation, and thus tends to give greater tenuity to the mass. It induces "trajectile velocity" from neutral centers, or "neutral radiation". Experiment shows that molecular dissociation does not take place until the molecule attains an oscillation approaching, if not fully reaching two-thirds of its diameter. This can be effected by means of the action of the "enharmonic" or "radiating" current applied to the mass, after its molecules have been disturbed by an "introductory impulse"; that is, by the musical note above mentioned.

"The third represents the "dominant", and when brought under control of a harmonic resonant impulse induces a complete rearrangement of the modes of vibration and oscillation; in other words, will transform the mass either into its component initial forces, or into some other form of matter.

"It is the study of the dominant to which Keely has devoted his recent researches. He aims to control the power he evolves by altering the dominant or etheric mode of vibration in the triplicate flows of force.

"As all molecules and masses are mere centers of harmonized vibrations, temporarily held in suspension by simple laws identical with those of resonance, it follows that these centers can be broken up or divided by certain orders of vibration impinging upon and disturbing them.

"It is a familiar fact that a cord in vibration tends to produce a similar vibration in a cord placed near it. This property belongs to all vibrations, whether reso-

nant or not, and they exert it in proportion to the "order" to which they belong. The distance in space to which this power extends, or can be extended, is what is called "the sympathetic outreach" of the current or flow.

"In this manner we have "sympathetic negative attraction", and "sympathetic positive propulsion", with reference to the "outreach" of the third or dominant current of the stream, which is allied to the order of etheric vibrations.

"Each molecule of a given mass of matter represents the same harmonic chord or note in its oscillatory motion. The "chord of the mass" is, therefore, the chord of every molecule of mass.

"But as the condition of absolutely stable equilibrium is theoretical only, and does not exist in nature, the chord of the mass is constantly changing. Yet we must learn to control this "chord of the mass" by resonant induction, if we would gain command of the molecular forces.

"Keely believes he has solved this problem, by the invention of a mechanical device which brings the chords of all masses within the conditions of a few simple acoustic tests.

"The range of molecular oscillation is affected differently in different substances when submitted to the same vibratory impulse, and these ranges can be measured.

"In the three metals, silver, gold, and platina, we obtain the proportions--3 : 6 : 9 : - As this is the primary relation of the modes of vibration, a wire made of these three metals is peculiarly adapted to transmit concordant impulses; and nodes made of these substances placed upon a wire, transmitting resonant vibrations, indicate, by the different orders of vibration induced in them, the rate of oscillations of the atomic constituents.

"The phenomenon of rotation arises from the harmonic interaction of the dominant and enharmonic elements of the flow; in otherwords, the first and third, the third and ninth, *etc.*; those whose vibrations bear the proportions to each other 33 $\frac{1}{3}$: 100.

"A practical example of rotation is a wheel in revolution on its axis. This is force in its commercial or economic aspect. To accomplish this result by molecular vibratory action, we must gain control of the "negative attractive" or "enharmonic" current of the triple flow, and the problem is then solved up to any limit of power."

LAW, RULE OF ATOMIC HEAT CAPACITIES: The capacity of one gram-atom of an element in the solid state, i.e., the product of the atomic weight of the element and its specific heat under ordinary conditions is approximately a constant whose mean value is 6.2 (specific heat is the quantity of heat

required to raise the temperature of one gram of a substance by one degree). (Dulong and Petit, 1850) (106)

LAW, AVOGADRO'S: Equal volumes of all gases at the same pressure and temperature contain the same number of molecules. (This hypothesis introduces the concept of molecules as the smallest particles of a substance capable of independent existence.) (Avogadro, 1811) (106)

LAW, BODE'S: See BODE'S LAW, GEOMETRY, ASTRONOMICAL CIRCLES

LAW OF CATALYSIS: "The presence of harmonics and discords." (Keely)

LAW, CHARLES': "At a constant pressure the volume of a confined gas varies as the absolute temperature; and, at a constant volume, the pressure varies directly as the absolute temperature. "

LAW OF CHEMICAL AFFINITY: "Atoms whose atomic pitches are in either unison, harmonic or concordant ratios, unite to form molecules.

Corollary: When two atoms are indifferent, they may be made to unite by varying the pitch of either, or both.

Scholium: This necessitates the construction of tables representing variation of atomic pitches by temperature, pressure, *etc.*

Scholium: Tables of all harmonics and concords, and harmonics founded upon a normal harmonic scale, are equally essential.

Scholium: Optical instruments may be made to measure pitches in energy." (Keely)

LAW OF CHEMICAL DISSOCIATION: "If the pitch of either atom, in a molecule, be raised or lowered; or, if they both be unequally raised or lowered in pitch until the mutual ratio be that of a discord; or, if the oscillation amplitude be augmented by heat until the atoms are with the concentric waves of attraction, - the atoms will separate." (Keely)

LAW OF CHEMICAL MORPHOLOGY: "The angle of crystallization is determined by the relation between the molecular pitch of the crystallizing substance to the vibration-density of the liquid depositing it." (Keely)

LAW OF CHEMICAL SUBSTITUTION: "(too complex for brief statement)" (Keely)

LAW OF CHEMICAL TRANSPOSITION: "New molecules must be harmonics of the fundamental pitch." (Keely) SEE TRANSMUTATION

LAW OF CHORD OF MASS: See CHORD OF

MASS

LAW OF COHESION: "The cohesion between atoms diminishes directly as the square root of the pressure and temperature, and as the square of electric intensity." (Keely)

LAW OF COMBINING VOLUMES: In any chemical reaction, the volumes of all gaseous products and reactants measured at the same pressure and temperature may be expressed in ratios of small integers. (Gay-Lussac, 1808) (106) **SEE RATIOS; INTERVALS; NOTATION; RELATIVITY**

LAW OF CONSERVATION OF MASS: In any chemical reaction the initial mass of the reacting substances is exactly equal to the final mass of the products. (Lomonosov, ± 1700) (106)

LAW OF CONSTANT COMPOSITION: Every chemical compound has a fixed and constant composition. (Proust, 1801) (106)

LAW OF CORPOREAL OSCILLATIONS: "All coherent aggregates not isolated from like bodies, oscillate at a period-frequency varying with the tensions that augment and diminish the state of equilibrium." (Keely, 1893) **SEE SYMPATHY; RESONANCE; MODULATION**

LAW OF CORPOREAL VIBRATIONS: "All coherent aggregates when isolated from like bodies, or when immersed or confined in media composed of matter in a different state, vibrate at a given ascertainable pitch." (Keely, 1893) **SEE LAWS OF SYMPATHETIC VIBRATIONS**

LAW OF CYCLES: "Coherent aggregates harmonically united constitute centers of vibration bearing relation to the fundamental pitch not multiples of the harmonic pitch, and the production of secondary unisons between themselves generate pitches that are discords, either in their unisons, or overtones with the original pitch; from harmony is generated discord, the inevitable cause of perpetual transformation." (Keely, 1893) **SEE CHAOS; DISCORD; DIFFERENTIATION**

LAW OF DEFINITE PROPORTIONS: The equivalent weight of an element is the weight which will combine with or displace one part by weight of hydrogen. Elements always combine with one another in definite proportions by weight, depending on their equivalent weights. (Dalton, 1806) (106) **SEE LAW OF COMBINING VOLUMES**

LAW OF DEVOLUTION: "Devolution is the secret of evolution." (440 series) of (2) Devolution always precedes evolution. In a cycle or vibration the last period always precedes the beginning of a new cycle. A given cycle or vibration may be divided into any number of periods depending on frame of reference desired. **SEE PERIODICITY; CYCLES**

LAW OF DILUTE SOLUTIONS: The properties of dilute solutions vary in direct proportion to the number of dissolved particles, i.e., to the molecular (later found to include ions as well) concentration of the solute. (Raoult-Van't Hoff, 1886) (106)

LAW OF THE DOMINANT: "Every object is such by virtue of the higher or dominant force which controls the two tendencies, assimilation & individualization. i.e., Negative & Positive." (1) **SEE LAW OF THE MANIFESTATION OF MATTER, EVOLUTION, LAWS OF BEING**

LAW OF ELECTRIC CONDUCTIVITY: "Electric energy is transmitted through homogenous bodies with a completeness in direct proportion as the atoms are more or less perfect harmonics of the electric pitch, but not at all through substances whose atoms are discordant to the electric pitch; also through molecular substances, when their resultant notes are harmonics of the electric pitch, - the transmissions being inversely as the temperature, directly as the density diminished in proportion to the amount of crystallization, and inversely as the cube of the dyne, also directly as the reciprocal of the local magnetic intensity." (Keely) **SEE SUPERCONDUCTIVITY; RESISTANCE; COINCIDENTAL ACTION**

LAW OF ELECTRO-CHEMICAL EQUIVALENTS: "An atom vibrates sympathetically under the influence of electric energy, such undertones of which are absorbed as are a harmonic or harmony of the electric pitch; the amount of energy absorbed being directly as the arithmetical ratio of the undertone of the fundamental electric pitch.

Scholium: A table of electro-chemical equivalents on the normal basis will indicate the electrical conditions and amount of chemical change." (Keely)

LAW OF ELECTROLYSIS: The same quantities of electricity liberate equivalent weights of elements, and 96,500 coulombs (26.8 ampere-hours) will liberate one gram-equivalent of any element. (Faraday, 1834) (106) **SEE LAW OF ELECTRO-CHEMICAL EQUIVALENTS**

LAW OF THE ENERGY OF AMPLITUDE: The energy of a vibration is proportional to the square of the amplitude. For instance, a vibration which has twice the amplitude of another has four times the energy of the other. **SEE PROPORTION; RATIO**

LAWS OF ENERGY: All manifestations of Energy are modes of vibration:

1: **RADIATING - ENHARMONIC - POSITIVE ATTRACTION - CELESTIAL:** Attracted to the external Universe.

2: **FOCALIZING - HARMONIC - NEGATIVE ATTRACTION - TERRESTRIAL:** The intensification of individuality or materiality of matter.

3: **DOMINANT:** That controlling tendency gov-

erning the ascendancies of the first two.

All three of these must be present in every flow of energy and are always present in the ratio 3:6:9. (11) **SEE MODES; QUATERNION; LONGITUDINAL; TRANSVERSE; RALEIGH; VORTEX; S-WAVE**

LAW OF ETHERIC FORCE: See **SYMPATHETIC VIBRATION, DOMINANT**

LAW OF EVOLUTION: See **LAW OF ASSIMILATION, POLARITY ; PROGRESSION**

LAW; FIRST OF NATURE: Is Order and Motion.

LAW OF FORCE: "Energy manifests itself in three forms: Creative, the vibrating aggregate; Transmissive, being the propagation of isochronous waves through the media in which it is immersed; Attractive, being its action upon other aggregates capable of vibrating in unisons or harmony." (Keely, 1894)

LAW OF GRAVITY: See **REVERSION, LAW OF ASSIMILATION, LAW OF INDIVIDUALIZATION, GRAVITY, GRAVITATION, LAW OF OCTAVE**

LAW OF HARMONIC PITCH: "Any aggregate in a state of vibration develops in addition to its fundamental pitch a series of vibration in symmetrical sub-multiple portions of itself, bearing ratios of one, two, three or more times its fundamental pitch." (Keely, 1894) **SEE PARTIALS; HARMONICS; INTERVALS; RATIOS**

LAW OF HARMONIC VIBRATIONS: "All coherent aggregates are perpetually vibrating at a period-frequency corresponding to some harmonic ratio of the fundamental pitch of the vibrating body; this pitch is a multiple of the pitch of the atomole." (Keely, 1893) **SEE LAW OF ATTRACTION; PITCH; HARMONIC; RATIO**

LAW OF HEAT: "Atoms under the tension of chemical combination oscillate with an amplitude directly as the temperature, inversely as the pressure, and as the square of the specific heat. Diminishing the pitch of oscillation inversely as the square of the distance of the atoms apart, and simultaneously increasing the vibrating pitch of the atom by absorption of overtones and higher harmonics." (Keely) **SEE LAW OF ATTRACTION AND REPULSION; CONCENTRIC RINGS**

LAW OF INDIVIDUALIZATION: "Every such object tends to assimilate all other objects to itself." (Keely) See **LAW OF ASSIMILATION, LAWS OF BEING**

LAW OF INVERSE SQUARE: Radiation passing through a sphere twice as far away as another sphere has spread out so that it covers $2 \times 2 = 4$ times the area, n times farther away it covers n^2 times the area. See **SPHERE**

LAW OF LINEAR DIMENSIONS: "The vibration-

periods of two similarly circumstanced homologous bodies are to each other as their cubical contents, and therefore the vibration-frequencies of homologous metal plates are to each other as the inverse ratio of their linear dimensions." Keely in (9). See **ATOM, DETERMINING THE SIZE; LAW OF INVERSE SQUARE; RATIOS**

LAW OF MANIFESTATION OF MATTER: "It is the action and activity of spirit in the form of adhesion and cohesion, or attraction and repulsion, that causes matter to manifest as it does." See **LAW OF ATTRACTION AND REPULSION; COHESION; ADHESION; NEGATIVE ATTRACTION**

LAW OF MATTER AND FORCE: "Coextensive and coeternal with space and duration, there exists an infinite and unchangeable quantity of atomoles, the base of all matter; these are in a state of constant vibratory motion, infinite in extent, unchangeable in quantity, the initial of all forms of energy." (Keely, 1893) See **LAWS OF SYMPATHETIC VIBRATIONS; DIRAC SEA; VACUUM**

LAWS OF MOLECULAR BEING:

LAW #1 - ASSIMILATION: Every object is attracted to all other objects.

LAW #2 - INDIVIDUALIZATION: Every object attracts all other objects to itself.

LAW #3 - THE DOMINANT: That property by which an object assumes one or other of the first two above phases; in other words, the controlling tendency or Will in Matter deciding assimilation or individualization. (11) **SEE LAWS OF BEING**

LAW OF MOLECULAR SYNTHESIS AND COMBINATION (ORGANIC): "The molecular pitch must be a derived harmony of the radicals.

Scholium: Reconstruction of electric units to represent pitches and amplitudes." (Keely) **SEE TRANSMUTATION; LAW OF CHEMICAL SYNTHESIS**

LAW OF MULTIPLE PROPORTIONS: When two elements combine to form more than one compound, the several weights of one element that combine with a fixed weight of the second are in the ratio of small whole numbers. (Dalton, 1806) (106) **SEE RATIO; INTERVAL; LAW OF DEFINITE PROPORTIONS; PROPORTION**

LAWS OF NATURE: See **NATURE, LAWS OF.**

LAW OF OCTAVE: "To enlarge upon the theory as latent and as changed into a force as usable as a motive force, these may be well illustrated by that same condition as exists in natural law as to why the needle points toward north. In the radial force of the axis of the earth there is seen that the force from which this planet is kept in motion is radiated through, or from, that directive force. Hence the constant draw, pull, in

that direction. Just as is seen in gravitation in its active law in drawing all to the earth according to its capacity of displacement as relative to the elements that go to make up the density of the object; yet each are relativity of forces one with another, employing all of the elements in their various octave of density to combine in their active principle of weight; yet each of these same laws are in the same relative position to that law of the needle point, and that of gravitation to the radius about which the object is radiating or being drawn to the radial center. Hence force, keeping same in direct contact, as does gravitation and the needle or the compass point. So, as was given, that compass point has much to do in the active force, as a relativity; not as to whether it turns north, east, south or west - for, as gravitation - whether north, east, south or west - acts in the same capacity; so as in gravitation active forces, as that of the needle, compass, always in its same relative position or condition, for or through the radial activity of octave force, as is seen in the curves as come about the radial center from which the active principle brings one lead in connection with the next, see? and in their turn the larger radial center brings again that same active force in connection with the elements through which the active principle operates. Hence, that as is given, when each radial center in cam, in leads, are in that same potential relative position of the power in its activity is in accord with those latent forces as are seen and put in motion through the magnification of the synthetic forces, or syncopathic forces, are brought into active principles." (4665-13) (2) See **RULE OF THE OCTAVE, CONCENTRIC, SYNCOPATHIC, SYNCOTHETIC, RADIAL CENTER, FORCE-RADIAL, ACTIVE PRINCIPLE, FORCE-ATOMIC, GRAVITY, OCTAVE, NOUS, ELECTROMAGNETIC SPECTRUM, EIGHT, LAW OF ASSIMILATION**

LAW OF ONE: See **ONE SUBSTANCE; ONE FORCE; LAW OF ASSIMILATION; SCIENCE AND RELIGION ARE ONE.**

LAW OF OSCILLATING ATOMIC SUBSTANCES: "Coherent atomic substances are capable of oscillating at a pitch varying directly as the density, and inversely as the linear dimensions from one period of frequency per unit of time to the 21st octave above, producing the creative force of Sonity, whose transmissive force (Sound) is propagated through the media of solids, liquids, and gases, and whose static effect (Sonism) produces attractions and repulsions between sympathetically vibrating bodies according to the Law of Harmonic Attraction and Repulsion." (Keely, 1894) **SEE SONITY; SONISM; LAW OF ATTRACTION AND REPULSION**

LAW OF OSCILLATING ATOMOLES: "Atomoles oscillating at a uniform pitch (determined by their uniform size and weight) produce the creative force Atomolity, whose transmissive form, Gravism, is propagated through more rarefied media, producing the static effect upon all other atomoles, denominated Gravity." Keely **SEE ATOMOLE; GRAVITY; LAW OF LINEAR DIMENSIONS**

LAW OF OSCILLATING ATOMS: "All atoms when in a state of tension are capable of oscillating at a pitch inversely as the cube of their atomic weights, and directly as their tension from 42 to 63 octaves per second, producing the creative force (Thermism), whose transmissive force (Rad-energy) propagated in solid, liquid, and gaseous ether, produces the static effects (Cohesion and Chemism) on other atoms of association, or dissociation, according to the Law of Harmonic Attraction and Repulsion.

Scholium: Dark radiant heat begins at absolute zero temperature, and extends through light, chemical rays, actinic rays, and infra-violet rays, up to the dissociation of all molecules to the 63rd octave. (Keely, 1894) **SEE RATIOS; INTERVALS, SCALE**

LAW OF PERCEPTION: "No thing exists to us except through vibrations." See **SPEECH, SIGHT, HEARING, DIFFERENTIATION; ONE SUBSTANCE; ONE FORCE; TASTE**

LAW, PERIODIC TABLE: a) The elements, if arranged according to their atomic weights, exhibit an obvious *periodicity* of properties. b) The atomic weight determines the character of the element just as the magnitude of the particle determines the properties of a complex body. Therefore, for example, S and Te, Cl, and I, etc., exhibit very obvious differences as well as similarities. c) We must expect the discovery of many yet unknown elements, for example, elements analogous to Al and Si, whose atomic weight would be between 65 and 75. d) The atomic weight of an element may sometimes be amended if its analogues are known. e) Certain analogues of the elements can be foretold from their atomic weights. (Medelejev, 1869) (106) **SEE LAW OF PROPORTION; LAW OF LINEAR DIMENSIONS; LAW OF OCTAVE; LAW OF ELECTRO-CHEMICAL EQUIVALENCE**

LAW OF PHOTOELECTRIC EFFECT:

I. For light of a given frequency but varying intensity the energy of photoelectrons remains constant while their number increases in direct proportion to the intensity of light.

II. For varying frequency of light no photoelectrons are emitted until that frequency exceeds a certain limit f_0 , which is different for different metals. Beyond that frequency threshold the energy of photoelectrons increases linearly, being proportional to the difference between the frequency of the incident light and the critical frequency f_0 of the metal. **SEE NEUTRAL CENTER ATTRACTION; NEUTRAL CENTER RADIATION; KEELY'S LAWS OF SYMPATHETIC VIBRATIONS.**

LAW OF PITCH OF ATOMIC OSCILLATION: "Atoms not isolated and in a state of tension between forces that oppose and increase the equilibrium oscillate bodily at a pitch that is a resultant of the atomic weight, atomic volume, and tension." (Keely) **SEE HARMONIZATION; EQUILIBRIUM; LAW OF**

LINEAR DIMENSIONS

LAW OF PRIMARY PRINCIPLE: "The Primary Principle back of all Creation is the energy called Spirit." See **FIRST CAUSE; SPIRIT; NOUS; FIRST CAUSE; NEUTRAL CENTER**

LAW OF PROPORTION: "One added to two to make one is equivalent to two added to one to make one; and in adding two to two to make one, or one to three to make one, the same law in its square is maintained by its conformity to the law of three; and every other multiple is a duplication of the original law." (John Dalton) See **LAW OF TRIANGLE**

LAW OF REFRACTIVE INDICES: "A table of the refractive indices of substances indicates their molecular pitch; and in connection with crystalline form the phase of molecular oscillation." (Keely) SEE **FRAUNHOFER; SPECTRA; LIGHT**

LAW OF RELATIVITY: See **E=MC², RELATIVITY OF FORCE, LAW OF OCTAVE, GRAVITATION DIFFERENTIATION, THEORY-QUANTUM**, See also the 195 series of (2)

LAW OF RELATIVITY OF FORCE: "In giving the manifestation of such a law, which does exist, we first must consider that, that is called force, and that force then in its relation, or the relativity of that force to all force.

"There are, as we set in the beginning, as far as the concern is of this physical earth plane, those rules or laws in the relative force of those that govern the earth, and the beings of the earth plane, and also that same law governs the planets, stars, constellations, groups, that that constitutes the sphere, the space, in which the planet moves. These are of the one force, and we see the manifestation of the relation of one force with another in the many various phases as is shown, for in fact that which to the human mind exists, in fact does not exist, for it has been in past before it is to the human mind in existence.

"In this, we see the law of the relations of conditions, space or time and its relation to human mind, as is capable of obtaining information upon the earth plane from a normal force or conditions. Hence, we bring the same word, relativity of force, to prove its own self, and condition, for we have as this:

"The earth in its motion, held in space by that force of attraction, or detraction, or gravitation, or lack of gravitation in its force, so those things that do appear to have reality, and their reality to the human mind, have in reality passed into past conditions before they have reached the mind, for with the earth's laws, and its relations to other spheres, has to man become a past condition. So it is reached only in the further forces as will show, and as is given, for man to understand in this developing, or this evolution from sphere to sphere, or from plane to plane, in this condition.

"Hence, we find to the normal mind, there is no law as to relativity of force, save as the individual may apply same in the individual's needs of them. That is sufficient." (3744-4) (2) SEE **ILLUSION; SPACE; TIME; RELATIVITY**

LAW OF REPULSION: Juxtaposed coherent aggregates vibrating in discord are mutually repelled. (Keely) See **LAW OF ATTRACTION AND REPULSION; DISCORD; POLARIZATION**

LAW OF SOLUBILITY: The solubility of a gas in a liquid is directly proportional to its partial pressure. (Henry, 1803) (106) SEE **LAW OF ELECTRICAL CONDUCTIVITY**

LAW OF SONO-THERMITY: "Internal vibrations of atomic substances and atomic molecules are capable of vibrating at a period-frequency directly as their density, inversely as their linear dimensions, directly as the coefficient of their tension from the 21st to the 42nd octaves, producing the creative force (Sono-thermity), whose transmissive force (Sono-therm) is propagated in solid, liquid, gaseous, and ultra-gaseous media, statically producing adhesions and molecular unions, or disintegration, according to the Law of Harmonic Attraction and Repulsion." (Keely, 1894) SEE **SCALE; SONITY; ADHESION; COHESION; LAW OF ATTRACTION AND REPULSION**

LAW OF SUBSTANCE: The law that matter and force are constant or unchanging in their quantity. (121) SEE **ONE SUBSTANCE; LAW OF RELATIVITY; LAW OF MATTER AND FORCE**

LAW OF SUPERPOSITION: "The LAW is strictly true only when the amplitudes are exceedingly small. When the disturbance of the air by a sounding body is so violent that the law no longer holds good, secondary waves are formed, which correspond to the harmonic tones of the sounding body."

"When two tones are rendered so intense as to exceed the limits of the law of superposition, their secondary waves combine to produce RESULTANT TONES.

"Resultant tones are of two kinds; the one class corresponding to rates of vibration equal to the difference of the rates of the two primaries; the other class corresponding to the rates of vibration equal to the sum of the two primaries. The former are called DIFFERENCE TONES; the latter SUMMATION TONES. See **ROOT, KEYNOTE, LAW OF TRIANGLE, LAW OF PROPORTION, LAW OF ASSIMILATION, HARMONIC & INHARMONIC, POWER OF HARMONICS**

LAW OF SYMPATHETIC ETHERIC FOCALIZATION: See **LAW OF ASSIMILATION, LAWS OF BEING; CENTRALIZATION; FOCALIZATION; HARMONIZATION; NEUTRAL CENTER ATTRACTION**

LAW OF SYMPATHETIC OSCILLATION:

"Coherent aggregates immersed in a medium pulsating at their natural pitch simultaneously oscillate with the same frequency, whether the pitch of the medium be a unison, or any harmonic of the fundamental pitch of the creative aggregate. (Keely, 1893) SEE **RESONANCE; MODULATION; HARMONIZATION; ENTRAINMENT**

LAW OF SYMPATHETIC VIBRATION: "The law which connects radiation with absorption, and at once enables us to read the riddle set by the sun and stars, is, then, simply the LAW of SYMPATHETIC VIBRATION." (1) See **IMPULSE, GRAVITATION, GRAVITY, LAW OF ASSIMILATION, LAW OF OCTAVE, FORCE-ATOMIC, LAWS OF BEING, ATOMIC THEORY-KEELY'S; NEUTRAL CENTER RADIATION; CENTRALIZATION; RADIATION; LAW OF ONE**

LAW OF THE THERMAL EXPANSION OF GASES: If the temperature changes by one degree, the volume of a gas changes by $1/273$ of its volume at zero. (also called Charles' Law) (Gay-Lussac, 1805) (106) SEE **LAW OF CHEMICAL DISSOCIATION; CONCENTRIC RINGS**

LAW OF TRANSFORMATION OF FORCES: "All forces are different forms of Universal Energy unlike in their period-frequency, merging into each other by imperceptible increments; each form representing the compass of 21 octaves. Each form or pitch may be transformed into an equivalent quantity of another pitch above or below it in the scale of 105 octaves. The transformation can occur only through its static effect, developing vibrations of harmonic pitches above and below their fundamental vibrations, or developing with juxtaposed aggregates, resultant and difference, or third order, as the case may be.

Scholium: A table of the intervals and harmonies of the normal harmonic scale will indicate the ratios in which the transformation of forces will occur." (Keely, 1894) SEE **LAW OF FORCE AND MATTER; SCALE OF FORCES; TRANSMUTATION**

LAW OF TRANSMISSIVE VIBRAIC ENERGY: "All oscillating and vibrating coherent aggregates create, in the media in which they are immersed, outwardly propagated concentric waves of alternate condensation and rarefaction, having a period-frequency identical with the pitch of the aggregate.

Scholium: All forms of transmissive energy can be focused, reflected, refracted, diffracted, transformed, and diminished in intensity inversely as the square of the distance from the originating source." (Keely, 1893) SEE **LAW OF ATTRACTION AND REPULSION; RADIATION; CONCENTRIC RINGS; HARMONY; DIFFERENTIATION**

LAW OF TRIANGLE: Same as the **LAW OF SUPERPOSITION; LAW OF PROPORTION**

LAW, UNIVERSAL: "Discord is disease, harmony

is health." (Keely) See **LAW OF ONE; HARMONY; DISCORD; ENHARMONIC**

LAW OF VARIATION OF ATOMIC PITCH BY ELECTRICITY AND MAGNETISM: "Electricity and Magnetism produce vibrations in the atom, which are followed by proportional changes in volume and, therefore, pitch." (Keely) SEE **LAW OF LINEAR DIMENSIONS; MODULATION; LAW OF THERMAL EXPANSION**

LAW OF VARIATION OF ATOMIC PITCH BY RAD-ENERGY: "The higher harmonics and overtones of projected rad-energy are of a pitch sufficiently high to cause the atom to expand; by causing the atomoles to vibrate systematically the same influence will cause the atom to contract, and thus by changing the volume, atomic pitch is varied." (Keely) SEE **LAW OF LINEAR DIMENSIONS; LAW OF ATTRACTION AND REPULSION**

LAW OF VARIATION OF ATOMIC OSCILLATION BY ELECTRICITY: "The electric current destroys cohesion and chemical tension directly as [the] square of current in amperes, inversely as the resistance in ohms, inversely as the chemical equivalent, and conversely as the coefficient of the difference between the freezing and volatilizing temperature of mass acted upon." (Keely) SEE **LAW OF CHEMICAL MORPHOLOGY; RESISTANCE; LAW OF ELECTRO-CHEMICAL EQUIVALENCE; LAW OF ELECTRICAL CONDUCTIVITY**

LAW OF VARIATION OF ATOMIC OSCILLATION BY SONO-THERMISM: "Diminishes the tensions directly as the quantity of heat developed, and in antithetical proportion to the harmonics absorbed." (Keely) SEE **LAW OF HEAT; LAW OF ATTRACTION AND REPULSION**

LAW OF VARIATION OF ATOMIC OSCILLATION BY TEMPERATURE: "The force of cohesion diminishes inversely as the square of the distance the atoms are apart, and the force of the chemical affinity diminishes in the same ratio. Heat increases the amplitude of the oscillations in a direct ratio to the temperature of the natural scale.

Scholium: New thermometers and accurate thermometric tables, on the natural bases, wherein doubling the temperature doubles the pitch of the transmissive energy, are required. Such a table of temperature will bear natural relations to atomic weights, pitches, specific heats, chemical affinities, fusions, solubilities, *etc.*, and will disclose new laws. One table for each must be constructed." (Keely) SEE **LAW OF HEAT; LAW OF ATTRACTION AND REPULSION; LAW OF AFFINITY; COHESION**

LAW OF VARIATION OF ATOMIC PITCH BY TEMPERATURE: "Atoms in chemical combination oscillate with increasing amplitude directly as the temperature, and simultaneously absorb overtones of higher harmonics, producing expansion of volume and diminution of pitch.

Rule: The gradual approach of the temperature of harmonic combination can be observed by mutually comparing superimposed spectra; chemical combination commences when the fundamental lines of each spectrum bear harmonic ratios by linear measurement." (Keely) **SEE LAW OF HEAT; LAW OF TRANSFORMATION OF FORCES; FRAUNHOFER; SPECTRA**

LAW OF VARIATION OF PITCH OF ATOMIC OSCILLATION BY PRESSURE: "The frequency of atomic oscillation increases and diminishes inversely as the square of the pressure." (Keely) **SEE LAW OF LINEAR DIMENSIONS; LAW OF CHEMICAL MORPHOLOGY; POLARIZATION**

LAW OF VIBRATING ATOMIC SUBSTANCES: "Atoms are capable of vibrating within themselves at a pitch inversely as the Dyne (the local coefficient of Gravity), and as the atomic volume, directly as the atomic weight, producing the creative force (Electricity), whose transmissive force is propagated through atomic solids, liquids, and gases, producing induction and the static effect of magnetism upon other atoms of attraction or repulsion, according to the Law of Harmonic Attraction and Repulsion.

Scholium: The phenomena of Dynamic Electricity through a metallic conductor and of induction are identical. In a metallic conductor, the transmission is from atom to atom, through homologous interstices, filled with ether, presenting small areas in close proximity. In crystalline structures, heat, which expands the atoms, by twisting them produces striae, increases the resistance, *etc.* Between parallel wires and through air the induction takes place from large areas through a rarefied medium composed of a mixture of substances, whose atoms are separated by waves of repulsion of various pitches, discordant to electric vibrations; the said atoms sympathetically absorb the vibrations and dissipate from themselves, as centers, concentric waves of electric energy which produces heat and gravism." (Keely) **SEE LAW OF ELECTRICAL CONDUCTIVITY; ELECTRICITY; MAGNETISM; DIFFERENTIATION; LAW OF LINEAR DIMENSIONS**

LAW OF VIBRATING STRING:

- 1) The number of vibrations is inversely proportional to the length of the string. *i.e.*; $\frac{1}{2}$ length = 2 x cps; $\frac{1}{3}$ = 3 x cps, *etc.*
- 2) The number of vibrations is proportional to the square roots of the stretching weights. *i.e.*; 1 lb. = 1 cps; 4 lb. = 2 cps, 9 lb. = 3 cps.
- 3) The number of vibrations varies inversely as the thickness of the string. *i.e.*; 1 dia. = 1 cps; 2 x dia. = $\frac{1}{2}$ cps; 3 x dia. = $\frac{1}{3}$ cps
- 4) The number of vibrations is inversely proportional to the square root of the density of the string. *i.e.*; if

density = $\frac{1}{4}$ of another string it will have 2 x cps, if density is $\frac{1}{9}$ of another string it will have 3 x cps.

5) 3&4 together: The number of vibrations is inversely proportional to the square root of the weight of the string. **See HARMONICS, RATES OF; ACOUSTICS § 14, 15, 16; LAW OF LINEAR DIMENSIONS; LAW OF VIBRATION**

LEADING TONE: Subtonic. The seventh degree of the ascending major scale. It is called leading because of its tendency to rise or lead up to the tonic. It is called sensitive and characteristic, because it forms the essential difference between the modern scale and ancient modes. The Iastian or Ionic mode was the only church scale having a leading note. In consequence of the leading note forming part of the upper of the two tetrachords of which the modern scale is formed, that tetrachord is by some called *characteristic*. (125)

LEE MOTORS, ETC.: The Dennis Lee people have developed many alternative energy sources. They have been making this information available to the public for quite some time now in an effort to inform and educate mainstream America that there are better ways to do the energy business. I recommend as strongly as it is possible that each and every person get and review the three video tapes they are offering to the public - FREE OF CHARGE. These three tapes review the following:

- I. The First 60 Minutes
 - Introduction
 - The Presentation
 - History Leading to Discovery of Free Electricity
 - Technology Explained
- II. The Second Hour
 - Technology Explanations Continued
- III. The Third Hour
 - Explanation of Electric Demand and How LTFC can Satisfy it
- IV. The Fourth Hour
 - Converting Nuclear Power Plants to LTFC Technology
 - Additional Developments Relating to Free Electricity
 - Demonstration of Free Electricity Concept
- V. The Fifth Hour
 - The Fischer Heat Engine Introduced
 - The LTFC Motor Shown and Explained
 - The Fischer Heat Engine in Detail
- VI. The Sixth and Final Hour
 - Solving all Environmental Problems with our Technologies
 - Another Exciting Technology - The ABR Furnace
 - Too Good to be Tolerated - Why we had to make this tape

The Economic Consideration and its Solution

In the last issue of SVP (April, 1992) I detailed a little of the inside technology Lee has tapped into with the Fischer Motor. The principle used is the very same Keely used in his Etheric Vapor motors in the late 1800s. There are, however, significant differences in the various details of each technology. I am uploading a file to "Vibration Physics" the significant article from that issue titled "Carnot/Keely/Lee". Please download a copy for your reference library.

Other materials offered by Dennis Lee:

"The Alternative" Promotional Film
 "The Alternative - Proven and Explained"
 Why does the Alternative get inordinately High BTUs per Horsepower and COPs?
 Super Heat Pump Owners
 Showcase Series
 The Global Sciences Congress & Workshop
 America's Declaration of Energy Independence Series
 The Heat Pump Assembly Package
 The Super Heat Pump Installation Program
 Creative Financing Programs
 Your Declaration of Energy Independence

LEFFAS: Astral bodies of plants. They may be rendered visible out of the ashes of plants after the latter have been burned. (131) **See ASTRAL BODY; PALINGENESIS**

LEGER LINES: Short lines drawn above or below the ordinary stave at the relative distances at which the whole lines would be placed. On and between these lines, notes belonging to passages beyond the extent of the stave are placed. (125)

LEIMMA: (also surplus) excess of the fourth over the double tone. (81)

LEMNISCATA: Figure 8 or motion of a pendulum with 1:2 ratio. **See EIGHT, LAW OF OCTAVE, ANGULAR MOTION**

LEMURES: Elementals of the air; Elementaries of the deceased; "rapping and tipping spirits," producing physical manifestations. (131) **See ELEMENTARIES**

LEPTON: A fermion having a mass smaller than the proton mass; leptons interact with electromagnetic and gravitational fields, but beyond this they interact only through weak interactions. (4)

LEPTON: A particle (like the electron, muon, and neutrino) that participates in the weak, but not the strong, interactions. (116)

LEPTON CONSERVATION: A rule which states that the net number of leptons before and after an interaction must be the same. (116)

LESSER: Minor, as: with the lesser third, in the mi-

nor key; lesser sixth, a minor sixth. (125)

LET: Linear Energy Transfer. **See Stopping Power, Harmonization.**

LEVITATION: "A mechanical device might be constructed where a vacuum even excluding ether could be drawn and maintained, developing thereby a levitating force; this similar to that force which exerts pressure upward when air is pumped into a steel barrel while submerged below surface of a medium such as water. This levitating force will be utilized in many ways, particularly in so called heavier than air ships, with the result that air navigation will be possible without the use of wings or gas. This correct when the elements must be made so condensed in their form as to prevent the ether in its finer sense from being, or escaping through the various elements that are ordinarily used for creating such vacuums. That is, a container in which a vacuum may be made must be of such a CONDENSE element as to prevent ether from going through the atomic forces of the element itself, as is seen in that of an electric bulb - this is not a vacuum, only a portion! To the finite mind this is CONSIDERED as such, but were the same character - or these same conditions produced in a DIFFERENT way - THEN these may be made to BECOME an element that would act in that way and manner, see? As is seen at present, helium becomes the greater usage in containers that may be made; yet these THEMSELVES (This is working from the opposite side, see?) - but were those gases, or those metals used that the supply of helium itself becomes the container FOR the vacuum ITSELF, see? this condensed, see? into a metal form, THEN the vacuum ITSELF, made that would lift without being lifted, see?" (195-70) (2) **See VACUUM, GRAVITY, GRAVITATION, LAW OF OCTAVE, FORCE-ATOMIC, GASEOUS ATOMIC ELEMENT, MOLECULAR DISSOCIATION**

"The eccentric or the levitation as is produced by curve is necessary in the activity as is sought." (4665-10) (2)

"All molecular masses of terrestrial matter are composed of the ultimate ether from which all things originally emanated. They are sympathetically drawn towards the earth's center, as according to the density of their molecular aggregation. In other words, the celestial flow as controlling terrestrial physical organisms.

The sympathetic outflow from the celestial streams reaches the infinite depths of all the diversified forms of matter. Thus it is seen that the celestial flow which permeates, to its atomic depths, the terrestrial convolutions of all matter, forms the exact sympathetic parallel to the human brain-flow and the physical organism, a perfect connective link of controlling sympathy or sympathetic control. Under certain orders of sympathetic vibration, polar and antipolar, the attractive sympathies of either stream can be intensified, so as to give the predominance to the celestial or to the terrestrial.

If the predominance be given to the celestial, to a certain degree, on a mass of metal, it will ascend from the earth's surface, towards the etheric field, with a velocity as according to the dominant concentration that is brought to bear on the negative thirds of its mass chords, by inducing high radiation from their neutral centers, in combination with the power of the celestial attraction.

The power of the terrestrial propulsive and celestial attractive to lift and these conditions reversed, or the celestial propulsive and the terrestrial attractive, to descend. Associating these conditions with the one of corpuscular bombardment, it is evident to me with what perfection an airship of any number of tons weight can, when my system is completed, be controlled in all the varied movements necessary for complete commercial use at any desired elevation and at any desired speed. It can float off into atmospheric space as gentle in motion as thistledown, or with a velocity outrivaling a cyclone. John Keely (11)

Q.: How was this particular Great Pyramid of Gizeh built?

A.: By the use of those forces in nature as make for iron to swim. Stone floats in the air in the same manner. This will be discovered in '58. (5748-6) (2)

Q.: By what power or powers were those early pyramids and temples constructed?

A.: "By the lifting forces of those gases that are being used gradually in the present civilization, and by the fine work or activities of those versed in that pertaining to the source from which all power comes." (5750-1) (2) See **VIBRATORY NEUTRAL NEGATIVE ATTRACTION, GRAVITY, FORCE-ATOMIC, LAW OF OCTAVE, MOLECULAR DISSOCIATION, NIGHT-SIDE, ONE SUBSTANCE**

LEVITATION: "It is my wish to explain in principle the method of antigravity physics. At the same time, I am aware of the immense karma involved, if by my writing they would be produced on your planet prematurely, for they most certainly would be used in a war-like manner. Once the evolution of the Earth and her people has passed through the Transition to the New Age, then all these useful sciences will be passed on. This leaves me with the task of explaining in principle only, leaving insufficient technical detail to enable your sciences to use this knowledge within the next few years. The gravitational field of your planet is a vibration pattern emanating from the Spirit herself on a frequency that is attracting all other vibrations on the physical plane. This attraction causes them to be drawn towards the Earth, forming the effect we know as gravity. If this attraction was reversed to the opposite polarity, then we would have the effect of everything falling off the planet and the planet herself breaking up and disintegrating. In between these two extremes lies a variation of intensity, which in balance would form a situation of no weight. This can be achieved by emitting the correct

frequency wave around an article and in so doing isolate it from the gravitational effect of Earth. No doubt your scientists have studied this line of research. The reason they have been unsuccessful is that when they apply these fields of vibration around an object, they have no way of containing or enclosing such frequencies. They always fly off at linear velocity. The missing link is the ability to form waves of vibrating energy into controllable shapes such as stable spheres. The vibration, once in a sphere, can be increased upon, as there is no loss of energy in space at speeds approaching that of light. This then, is the method of containing such vibrations, which you yourselves do naturally, with the energy field forming your etheric body. The reason light or other energy produced by you travels at such speed, is that when produced, a situation of disharmony is created. It is an opposing vibration, so it travels off with that opposing force exerting such tremendous speed. Now if, when produced, light was not vibrating at an opposing level it would stabilize, but of course it would be unseen to our eyes. What we need is a study of the opposite of light. When light is created, an opposing energy of opposite polarity is produced. This is unseen to our eyes and, at the present time, undetected by your sciences. These rays are of the same frequency as light, only in a negative world, a world of anti-light corresponding to the hypothesis of some of your enlightened scientists, that of antimatter. The key lies in bringing together the anti-light and that of light. If this is done to a maximum degree, then you would only have a reversal of the light source taking place. What is needed is control over these two vibrations, so the light can be controlled by applying in varying degrees the opposing anti-light. Herein lies the secret. Select one of those easier, controllable sources and prevail upon that vibration one of the stronger type. Type for instance, if we are using the energy of heat, superimpose that of light onto the heat vibration, so that a harmony is formed. That harmony is the key vibratory pattern. Isolate the frequency of that harmony. A computer would be needed to find the harmonizing frequency between the two, and a machine would have to be produced to duplicate that frequency. This is all within the scope of your present day technology. With such a frequency emitting, a pattern of energy will form, taking off both of the sources, namely light and heat. That new energy will have the ability to change the characteristics of the behavior of light. The speed will no longer be fixed nor will the direction. The direction or bending of light is experienced when light is passed through a strong gravitational field, due to the effect of the harmonious energies present. However, if that frequency is duplicated and given energy in its own right, instead of only being a harmony of two other energy vibrations, the resulting effectiveness is totally controllable and predictable.

To utilize this frequency in regard to an antigravity machine use the harmony of vibration of gravity and light to take energy from each, and balance that by the taking of the corresponding opposite polarity en-

ergy on the world of antigravity and anti-light. With these energies, create a sphere of energy vibration around the experimental article of matter. The energy field around the object will isolate it from the gravitational field of Earth, and it will have the characteristics of a weightless body. Although it will be weightless, it will still require inertia to move, for it retains its mass. At a more advanced level, the gravitational fields of the moon or sun or other heavenly bodies can be used, by allowing their gravitational fields to act upon the mass, while the stronger vibrations of the Earth field are neutralized. In this lies the basis of most of the travel being done by your Space Brothers. They not only use the gravitational forces applied by the Sun and other planets, but also waves emitting from the Earth. As I mentioned, the anti-gravity force is equal to that of the gravity force, only operating in a different dimension. This force can be used by space craft of a more advanced nature. There are wave patterns of energy formed around your planet in a grid like configuration. They represent the lines or points between these two opposing energies, gravity - antigravity. There exists a pattern of vibration caused by the harmonizing influence of time expressed upon that of your Earth mass. This changes the time-mass configuration at the geometric points around your Earth surface where these two vibrations harmonize. This can be calculated by the use of computers. First feed into the machine a vibration pattern for time, then light, then the gravitational force of Earth. Between these three vibrations will exist a harmonizing vibration, otherwise they could not co-exist in the same field of reality. When this harmonizing vibration frequency is applied to the geometric pattern for the physical world, it will harmonize at certain points, which when connected around your globe will form a grid-like pattern. These points of energy are of great value in many ways. They will be used by your Space Brothers, as they are able to exploit the full potential force from the antigravity vibration and for those entering the Earth space-time dimensions from outside, after travelling from another solar system or time dimension. They are the only locations where they can harmonize themselves and manifest physically." (98)

LIBERATION OF METALLIC ENERGY: The latent force liberated by the same sympathizer as is used in aqueous disintegration, when used with metals, simply extends the range of the neutral sympathetic attraction of the metallic molecule, without rupturing its "corpuscles" with the result that the molecular mass reaches out to link itself with its "harmonic sympathizer" as long as the exciting vibration acts upon it. When its exciter (possibly the resonant sphere or his carbon register) is dissociated, its outreach nestles back again into the corpuscular embrace of the molecular mass of the sphere or disk.

This seems to indicate that Keely used the resonant sphere, filled possibly with some gas, water vapor, water or some unknown chemical vapor, or in his carbon register accomplished the creation of high frequencies, much like Tesla later used an interrupter

to create high electric frequencies. Through this means Keely hoped to produce complex alternating phases which would polarize and depolarize his disks in the magnetic engine.

While the sympathetic neutral flow (from the molecular neutral centers to the mass neutral center) manifests itself in metallic masses only in a negative attractive (neutral attractive) manner, in water this attraction is dispersive, and minerals under like conditions, exhibit the property of disintegration into two constituents, ether and intermolecular dust.

Any metallic molecular mass can be so impregnated with certain orders of vibration that it will manifest the same sympathetic transmissive qualities that exist in the mental forces, that is, it will obey the laws of attraction and repulsion in a self directional manner.

He elaborated a system by means of which he induced great range of motion on metallic masses by induction of sympathetic negative attraction and then, by periodic vibratory change of their neutral centers instantly depolarized them. Elsewhere he is spoken of as controlling the transmission of sympathetic vibration by the differentiated wire composed of "German silver", etc.

He states "The diamagnetic receding action of the metal silver, which it exhibits towards an alternating magnetic flow is caused by "some 800,000 corpuscular percussions" per second - interatomic bombardment or more exactly expressed, "intersympathetic vibrations." (11)

LIBERATOR: (Keely machine) "The Liberator is pure sympathetic concordance in perfect harmony. Any inharmonious or discordant sound will cause it to rotate."

"In the image of man" Keely constructed his liberator. Not literally, but, as his vibrophone (for collecting the waves of sound and making each wave distinct from the other in tone when the "wave plate" is struck after the sound has died away) is constructed after the human ear, so his liberator corresponds in its parts to the human head.

To move suddenly a square inch of air at the velocity of his vibratory circuit, on full line of graduation and at a vibration only of 2,750,000 per second, would require a force at least of twenty-five times that of gunpowder, and at 21,000 lbs. per sq. inch it would be 525,000 lbs. per square inch. The finer the substance the greater the power and velocity under such vibrations.

The vapor from the liberator, registered at 20,000 lbs. per square inch has a range of atomic motion of $1333 \frac{1}{3}$ the diameter of the atmospheric molecule with constant rotary vibratory action. At 10,000 lbs., $666 \frac{2}{3}$, at 5,000, $333 \frac{1}{3}$, at 2500, $166 \frac{2}{3}$, at 1250, $83 \frac{1}{3}$, at 625, $41 \frac{2}{3}$. The higher the range of atomic mo-

tion the greater its tenuity and pressure. The very evolution on the negative shows a vacuum of a much higher order than was ever produced before confounding all theory to analyze. The highest vacuum known is 17.999999, or not quite 30 inches, but Keely produced etheric vacuums repeatedly of 50 to 57 inches ranging down to 30 inches or 57 lbs. All operations of nature have for their sensitizing centers of introductory action, triple vacuum evolutions. These evolutions are centered in atomic triple revolutions, highly radiophonic in their character and thoroughly independent of all outside forces in their spheres of action. No conceivable power, however great, can break up their independent centers. These triple centers are the foundation of the universe, and mathematically considered, the respective and relative motion of these atomic triplets, gravitating to and revolving around each other, is about one and one-third of their circumference. The problem of this action, when analyzed mathematically, (taking it as the quadrature of the circle) would baffle mathematical science to bring it to a numerical equation. Every revolving body is impressed by nature with certain laws making it susceptible of the operation of force, which being applied, impels motion. These bodies never can approach nearer than a certain limit, nor farther than a certain point. They are, at some mean point, made perfectly equal, and may therefore be considered as one force and as one element. It matters not that other and disturbing forces exist outside or inside the space these bodies revolve in, because if this force must be considered as acting uniformly, applying itself to each of these bodies in a way to produce a perfect equation on all, it is as if this outside force were nonexistent.

"My right hand and arm were ... severely strained, but I have not been idle ... have been setting up a key to explain vibratory rotation. I have a plan for a device attached to the Liberator to show when the neutral center is free from its intensification while operating. In this way the dangerous influences will be avoided which present themselves on the extension of the vibratory waves that operate the gun. All ... introductory details of the present engine are as perfect as is possible for the first lead. It is in the form of a sphere, about thirty inches in diameter and weighs 800 lbs. Yesterday saw the pure, positive action of my new Liberator. Mr. Collier and his brother George were present and witnessed thirty expulsions, made by myself after which I had them produce the vapor, by imitating my manipulations which they were unable to do with the old generator. The last three weeks ... I have suffered from accidents, disappointments, *etc.* ... all things seemed to go wrong." Under another date he writes "...Am now preparing new features that are necessary as adjuncts to denote the true condition as regards safety in my different vibratory operations ... I had an accident to one of my registers this morning. It burst with a tremendous report, shaking things up in a lively way but no other damage was done beyond that to the register."

"The draughts are nearly completed for the com-

pound vibratory engine ... the machine for continuous operation. The Liberator is as perfect as is possible, and if the outside adjuncts are in proper sympathy, my struggles will soon be at an end ... Could I have one wish gratified, I would ask to live long enough to be able to appreciate even but one etheric variation in planetary evolution."

May 20th. "Yesterday was a day of trials and disappointments. After laboring six hours to set my safety process, the first operation of the Liberator tore the caps all to pieces. I replaced them with a set of duplicates and set the liberator down to the low octaves, when everything worked to a charm. Night was approaching ... I left the workshop to get something to eat, returning about eight o'clock to discover the cause of the sudden and most unexpected intensification. I followed up with great care the progressive lines until I reached the tenth octave, and then liberated a score of times, yet no variation on liberator. Next, I made an attachment to my safety arrangement and also to my strongest resonator, to experiment on vibratory rotation with my shell when, within two minutes, it attained a frightful velocity then I suddenly retracted to the negative, bringing the velocity down from about 1500 per minute to 150. The operation lasted sixty-four minutes, when a second intensification took place, demolishing two safety shells and one vibratory indicator. I was perfectly dumbfounded and unable to account for such a phenomenon. After an hour's reflection, I set up a new position on the resonating wave plates in the forty resonating circuit on the base of the liberator, and got a result which for uniformity surpassed all experiments I have ever made. I believe I have ... shall be able to ... obtain continuity of action with perfect rotation." (1) (Keely)

August 5th. "I have met with an accident to the Liberator. I was experimenting on the third order of intensification, when the rotation on the circuit was thrown down in the compound resonating chamber, which by the instantaneous multiplication of the volume induced thereby, caused an explosion bursting the metal casing which enclosed the forty resonators, completely dismantling the Liberator. The shock took my senses from me for a few moments, but I was not even scratched this time. A part of the wall was torn away and resonators and vibrators were thrown all over the room. The neighborhood was quite lively but I quieted all fears by telling them ... I was only experimenting. I allowed everything to remain until Dr. Woods and Mr. Collier had seen the effect of the explosion.

The orders of intensification for accelerating dissociation would not be understood by any explanations that could be made, if unaccompanied by the demonstrations witnessed by the late Prof. Leidy, Dr. Brinton and others.

When the ether flows form the tube, its negative center presents molecular subdivision, carrying interstitially (or between its molecules) the lowest order

of liberated ozone. This is the first order of ozone and is wonderfully refreshing and vitalizing to those who breathe it. The second order, or atomic separation, releases a much higher grade of ozone in fact, too pure for inhalation, as it produces insensibility. The third order, or etheric, is the one that has been (though attended with much danger to the operator) utilized by Keely in his carbon register to produce the circuit of high vibration that breaks up the molecular magnetism which is recognized as cohesion. The acceleration of these orders is governed by the introductory impulse on a certain combination of vibratory chords, arranged for this purpose in the instrument, with which Keely dissociates the elements of water, and which he calls a Liberator.

In molecular dissociation one fork of 620 is used, setting the chords on the first octave.

In atomic separation, two forks one of 620 and one of 630 per second, setting the chords on the second octave.

In the etheric three forks one of 620, one of 630 and one of 12,000, setting the chords on the third octave. (11) See **NEUTRAL CENTER, NEGATIVE CENTER**

"The work on the vibratory engine is progressing ... The safety arrangements which I am having attached to my liberator will greatly improve it. Its operation will now be conducted with a gum bulb instead of a violin bow, - the pressure of which gives the introductory chord of impulse that vitalizes the whole machine. The chords will all be set in progressive sympathy from the first octave to the fortieth..."

December 17, 1885. "The setting up of the circles for computing the different lines of etheric chords, in setting the vibratory conditions for continuity requires costly study. I feel convinced that ... perfect solution ... will follow when this ... has been completed ... I find my chief trouble in chording up the masses of the different parts composing the negative centers. The negative center is included in the one-third volume of shell or sphere, starting from the neutral axis or point of suspension. This point of suspension only becomes perfect when the rotation is established on the sphere. One hundred revolutions per minute is all the velocity required to neutralize the gravity of the central third with the velocity of the vibratory circuit at one hundred thousand per second ... The month of January (1886) ought to find all completed ready for sympathetic graduation..."

Norman Lockyer ... "One feels as if dealing with something (molecules) that is more like a mental than a physical attribute ... a sort of expression of free will on the part of the molecules." Herein lies one of the secrets of Mr. Keely's ... "compound secret." Again "The law which connects radiation with absorption, and at once enables us to read the riddle set by the sun and stars is then, simple the law of sympathetic vibration." This is the cornerstone of Mr. Keely's

philosophy his discovery. (8)

LICHANOS: (index finger) The string plucked by the index finger or the sound emanating from the string: the string indicating the type (diatonic, chromatic or enharmonic). Lichanos of the hypates: the same as the one above the hyperhypate. Lichanos of the meses: string below the meses. (81)

LIFE: "It is as the electron that is Life itself." (294-142) (2)

LIFE: "For LIFE is, and its manifestations in matter are of an electronic energy." (440-20) (2)

LIFE FORCE: See **VITAL LIFE FORCE**.

LIFE FORCE: The following discourse comes from my own search to answer "What is life and the universe all about?" "Why is it that way?" and "What can I do with this knowledge to improve my life and that of those around me?" Under no circumstances do I willingly take exception to anyone's beliefs or anything they may hold as sacred. On the other hand I do not accept without qualification any religious dogma or scientific dogma as absolute but as starting points from which a better concept may eventually emerge.

Secondly, I am not trained in formal systems of logic nor do I hold to the belief that adherence to any system should take precedence over original intent. I do however possess a certain amount of "common sense" and what I call a "ruthless honesty" when approaching or using any system of belief or practice.

"Humankind (in its present manifestation and activity) cannot know EVERY thing about any ONE thing much less everything about everything. At best he can know some thing about some things and draw comparative reference values from that which he thinks he knows and make comparisons and inferences thereto."

Premise - The First

"Every THING* in the Universe° vibrates†."

This premise is a common and accepted determination of those things that we know or think we know about. This premise, as near as we are able to make such a determination, is an absolute. From this premise I propose to develop a comprehensive and wholistic paradigm that demonstrates our existence and the probable existence of Immutable Natural Laws that create and govern all that there is ... so far as we are able, as frail humans, to know such things.

* THING means: materialized objects, from organized structures, molecules, atoms and all forms of sub-atomic particles. Since matter is bound up energy and energy is liberated matter a THING can also be all forms of FORCE and ENERGY such as Sound, Light, X-rays, etc.

° Universe means: All those things which are observable, knowable and known. To be "observable" any THING that registers a significance to the mind of Man either through the so-called five standard senses or that registers on his/her instruments designed to detect and display any frequency (or range of frequencies) of vibration or manifestation that lies outside of the range of these five senses.

† Vibrate means: A periodic change of state from an energetic (positive) state through a non-active (neutral) state to a centralising (negative) state. [A sine wave is NOT a vibration but a simple representation, measurement and graphic display of energy levels referenced to the calibration of the detecting and displaying instrument.] A vibration can be infinitely quick such as are active in Light or very slow as in cycles of orbits of planets.

Premise - The Second

"Since every THING in the Universe vibrates it holds that vibration is the connecting (common) link between and within all THINGS."

Premise - 2.1

"Energy = Mass Times Speed of Light Squared"

(This is a gross over simplification of a complex and interwoven state of affairs.)

Premise - 2.2

"Energy manifests itself in periodic changes of state."

Premise - 2.2.1

"Energy assimilates itself to itself in successive moments."

(Aggregation or Crystalization: Forms into matter.)

Premise 2.2.2

"Energy dissociates itself from itself in successive moments."

(Repulsion: Forms other forms of energies.)

Premise - 2.3

"Matter assimilates itself to itself in successive moments."

(Forms ever growing larger bodies of matter.)

Premise - 2.4

"Matter assimilates itself to all other things in successive moments."

(Becomes differentiated in other forms of energies.)

Premise - 2.5

"Matter is capable of infinite subdivision."

Premise - 2.6

"There is no dividing of matter and force into two distinct terms, as they both are ONE, FORCE is liberated matter. MATTER is force in bondage."

Premise - 2.7

"All motion is synchronous; no sound (vibration) or movement can be made but all that moves or sounds (vibrates) does so in harmony with something else."

Via sympathetic association and hence sympathetic vibration.

Premise - The Third

"No THING is or can be anything other than vibration either centralised (negative* polarized), neutral (de-polarized) or decentralized (positive° polarized)."

*negative polarized means: polarized (phase differentiated) in an attraction mode where like attracts like.

°positive polarized means: polarized (phase differentiated) in a repulsive mode where like repels like.

Premise - The Fourth

"Every THING is a whole thing and is a result of its parts."

Premise - The Fifth

"Since the Universe is a WHOLE Universe it is a result of the individualized parts (they themselves being WHOLES)."

Premise - The Sixth

"No THING can be a simple vibration (single frequency) as no THING can exist of and by itself in isolation (every THING is a part of the Universe). THINGS are therefore, in actuality, a combination of many (more than one) vibrations."

Premise - The Seventh

"Therefore if all of the above be true (excepting a narrowing of definitions, conceptual relativities, etc.) then it can be said that God is the causative force(s) or intelligence(s) that causes and regulates whatever a vibration is. Because the only thing there is is a complex and orderly realm of vibratory motions acting, interacting and reacting with and within themselves."

Premise - The Eighth

"These FIRST FORCES (that create and regulate vibratory motions) are Immutable Natural Laws to which all that there is (being vibrations) is subservient to."

Therefore: What are these guiding forces that create and govern vibratory forces? Where do they come from? What governs them? Was there a "first" vibration from which all others materialized? What was it?

ERGO

"That which we call God is none other than that which guides and governs all that there is - Immuta-ble Natural Law - since it is these laws - and no thing else that exists."

Therefore: What are these guiding forces that create and govern vibratory forces? Where do they come from? What governs them? Was there a "first" vibration from which all others materialized? What was it? The answer to these questions will most likely be an expansion of the present discourse.

LIFE'S PURPOSE: Our Purpose in Life:

"What, then, is the purpose of the entity's activity in the consciousness of mind, matter, spirit in the present? That it, the entity, may know itself to be itself and part of the Whole; not the Whole but one with the Whole; and thus retaining its individuality, knowing itself to be itself, yet one with the purposes of the First Cause that called it, the entity, into being, into the awareness, into the consciousness of itself. That is the purpose, that is the cause of being.

In what manner, in what way may I apply myself as an entity, as an individual, to fill that purpose whereunto the First Cause has its influence, its way, its purpose with me?

For thy physical self may only see the reflection of good, while thy spiritual self may be that good in the activities of thy fellow man in such measures that ye bring - what?

Ever, ever, the fruits of the Spirit in their awareness; long-suffering, brotherly love, patience, kindness, gentleness, hope and faith!

Then so live, so act, so think that others seeing thy good works, thy hopes that ye bring, thy faith that ye manifest, thy patience that ye show, may also glorify Him." Edgar Cayce 826-11

"Then what is the purpose of each soul entering a material manifestation? That it may be a witness-bearer for and unto the glory of the Father which has been manifested through the Son, even Jesus; in making then those activities in which such may be the purpose, the desire of the individual entity.

It is not then that there may be the satisfying of the mental or material body, or mind. It is not to the indulgence of, nor to the glory of self alone, but that -- through the very activities of the body and mind -- the fruits of the spirit of truth may be manifested in the material experience.

These truths, these experiences, only find expression in relationships with others. Just as He hath given, "Inasmuch as ye have done it unto the least of these, thy brethren, ye have done it unto me -- inasmuch as ye did not these things unto thy brethren, ye did them not unto me."

Hence in the relationships, the meetings with others in whatever form or manner, such are not coincidental but are rather as purposeful experiences.

Then there must be the filling of the purpose, if there will be the glorifying of His love, His truths, His presence, by that done to and through the activities with the fellow man -- whoever, wherever such may be; in such a way and manner that His glory is made manifest in thy dealings with thy fellow man.

Look then into thine own heart, thine own mind. See thyself, as it were, pass by. What is thy desire? What is thy purpose? What -- and who -- is thy ideal?

What gave He as the whole law? To love thy God with all thy mind, thy body, thy purpose; and thy neighbor as thyself! This is the whole law.

These are the principles, these are the basic truths upon which joy, peace and understanding may be thine; and thy life, thy activities, thy associations with others will ever be beautiful, peaceful, harmonious."

Edgar Cayce 1722-1

LIFE SEALS: See AURA CHART

LIGHT: MacVicar's theory that matter, in being transformed into ether produces phosphorescence, was proved by Keely to be correct. Light is evolved in electric action by corpuscular bombardment induced by sympathetic action between the several neutral centers, solid, gaseous, which are all in a state of unstable equilibrium. Phosphorescence was shown to be produced experimentally when matter is transformed into its constituent ether. In one experiment inducing luminosity, ozone was liberated by molecular percussion and a pressure of 110,000 lbs. per square inch was registered on the special testing lever.

Considering the vibration of a ray of light as 500,000,000,000,000 per second, it is easy to account for the origin of light and heat by the action of sympathetic celestial streams. These two elements belong to the highest orders of the phenomenal, and can be accounted for by considering sympathetic streams under high velocity as being interchangeable both to and from focalized negative centers.

Light and heat do not exist in space. They are evolved from the earth's atmospheric envelope by the percussion of the vibratory sympathetic streams emanating from the neutral center of the sun. Only in this way can we account for the visibility of the planets. The solution of the whole mystery concerning light

and heat which are in a certain sense, one and the same, being interchangeable - is that the sympathetic etheric stream bombards the dense portion of the molecular in seeking the sympathetic concordant focalized neutral center of the planetary or molecular mass.

Light is an etheric evolution propagated by "sympathetic conflict" between the "celestial" and "terrestrial" outflows: solar tensions against terrestrial condensations and true luminosity is induced in no other way. Progressive molecular and inter-molecular disintegration reproduces light in Nature's manner on a small scale. In this regard Keely says "All such experiments invariably resulted in vortex motion, whether induced sympathetically or otherwise. All corpuscular action in Nature is vortex motion. The undulatory theory of light is only hypothetical. The conditions of electromagnetic radiation, on the same plane of matter as light, disprove the undulatory theory in many particulars. The vortex action induced by differential conflict between the low and high tensions shows conditions analogous to those in the molecular dissociation of water into hydrogen and oxygen - in other words, vortex action of the highest order but peripheral only. Were it otherwise, the ether could not be held suspended or enclosed in the molecular or atomic envelopes."

From the velocity of the sympathetic stream from the sun, the earth's standard of light and heat is kept up and is preserved in balance. The velocity of the flow liberates light and heat in varying degrees of intensity, which is proportional to the angle of this sympathetic projectment. The celestial sympathetic streams, percussing on the earth's atmospheric envelope, wrest from atomic confinement the latent energies we call light and heat.

The activity of the "luminiferous ether" or seventh subdivision, is such that by its frequency it evolves self-luminescence. The activity manifested by the ether in self-luminescence indicates a still greater region beyond. "Corpuscular activity" represents the outflow of the ether from the luminiferous toward neutral centers or aggregation, revealing the connecting link between mind and matter. This luminosity has no thermal accompaniment and yet, paradoxically, all thermal conditions evolve from etheric vibration.

If our hearing were intensified a thousand million times, we might be able to hear the streams of light as plainly as we now hear the wind.

Considering the very complicated spectrum of most of the elements, the multiplicity of lines may possibly be caused by an apsidal motion in the molecule by the interaction between high and low tenuous matter. However, the molecule cannot disturb the ether: such conditions fall far below the etheric subdivision.

"I believe the motion to be a series of harmonic el-

liptic movements accompanied by a slow apsidal movement, the combinations of which will produce two circular motions of different amplitudes whose differing periods might correspond to two lines in the spectrum. I believe, however, each spectrum line consists not of two close lines but of compound triple lines. We will have to wait until an instrument is invented as perfect in its parts as the sympathetic field environing matter, before this assumption can be proved." Michelson invented the interferometer several years after Keely's death, which was able to divide the apparently simple lines of the spectrum and proves Keely's idea to be substantially correct.

"Maxwell is correct in concluding that the plane of polarized light is the plane of the magnetic force. (Plane of matter). They therefore "travel in the same path for both are interatomic, assimilating sympathetically in a definite time period to continue in the same ray, although the experimental evolution of the one in my experiments, precedes the other. The sympathetic vibrations associated with polarized light constitute the pure coincident or vibrational ratio of the plane of magnetism."

"Light is induced by electromagnetic percussion from the ether and represents the plane of action of magnetism, in fact, the plane of magnetism under polarization. Light incident to any body does not press upon it. Prof. Crookes' radiometer is rotated by corpuscular bombardment."

"There are aqueous undulations but no etheric undulations. The conditions under which light is evolved make impossible any of the phenomena of undulations."

"Physicists, combating with the problems concerned with the fourth subdivision of matter, are working in the wrong direction to explain the phenomena of luminosity. The conditions they cite in proof of their theories are isolated and robbed of their most vital essentials. They do not consider the vibrations associated with matter. That luminosity can be caused by chemical antagonisms should have proved a stepping stone to a more correct knowledge and consequently they cannot arrive at a comprehension of the functions and properties of matter." (11)

"Light is induced by electro-magnetic percussion emanating from the ether, and in its plane of action represents the plane of magnetism. In fact it is the plane of magnetism when under polarization." (1)

"Light incident to any body that absorbs or reflects it does not press upon it. The radiometer of Professor Crookes' invention is not operated by the pressure of light, but by corpuscular bombardment on the reflecting side of its vanes." Pg 309 of (1). See **MAGNETISM, LUMINIFEROUS ETHER, HEAT, SPECTROSCOPY**

LIGHT: "The nature of light is not difficult to grasp. It is nothing but a vibratory wave disturbance in the

ether. The ether is capable of three basic vibrational states.

The first involves movement of the etheric substance in the direction of wave propagation. This mode is identical to the propagation of sound in the atmosphere.

The second vibrational state involves movement in a direction perpendicular to the direction of wave propagation. This can be compared to vibrations in a mass of jelly when the point giving off the vibratory motion moves back and forth in a direction perpendicular to the wave direction.

The third mode is a vibration in which the medium itself moves in a direction transverse to the line of propagation. This can be compared to the movement undergone by a sheet or film when one edge is caused to move back and forth in the direction perpendicular to the film. It is somewhat like the motion of shaking out a rug, where an edge is grasped and moved rapidly up and down to cause ripples moving along the rug.

These three vibrational modes correspond to different specific phenomena observed in the real world.

The first vibrational mode, involving condensation and rarefaction, is experienced primarily as the longer wavelengths of electromagnetic radiation. These are the waves which are given off by radio and TV transmitting antennae.

The second mode of etheric vibration is experienced as visible and near-visible light.

The third mode of vibration, in which the etheric matrix itself supports vibrational waves which cause the ether to move in the fourth dimension, is experienced as a gravitational field.

Using the Flatland analogy for demonstration purposes, we could compare the first mode of vibration to a wave disturbance in the Flatland skin in which the skin itself undergoes vibration always in its own plane, and in a direction parallel with the wave propagation. Again this would be like the transmission of sound in the atmosphere.

The second mode of vibration in its Flatland counterpart would involve movement of the Flatland skin still within its own plane, but this time in a direction perpendicular to the line of wave propagation.

The third mode of etheric vibration would correspond to a ripple wave passing along the skin of Flatland and causing the skin to move perpendicular to its own plane. It could be compared to the ripples on the surface of a millpond which expand out from where a stone is dropped into the water.

The disturbance perceived as visible light consists primarily of the second vibrational mode, although a

minor part of the disturbance is a first-mode vibration. It will now be understood why light can be polarized. The polarizing filter consists of parallel lines spaced very close together. When these lines are in alignment with the vibrational direction of the ether in its second mode, there is little interference and the vibration is not damped or interfered with. But when the lines on the filter are placed at right angles to the etheric movement in the second mode, that movement is diminished.

Normal light perceived in everyday experience consists of second-mode vibration with the directions of movement being randomly distributed. Thus only some of the light passing through a polarizing filter is damped out. What continues past the filter is largely a disturbance with a single vibrational direction perpendicular to the line of travel. That is why it is possible to block a polarized beam almost completely with another filter in which the parallel lines are arranged transverse to the lines of the first filter. (22)

LIGHT, HEALING POWER: Q-1. What light should be used?

A-1. "Any penetrating light. That of the dry heat, or that that acts the quickest with the blood stream, see? for, as is seen, this is the effect of light - of whatever nature that may be applied to a body: All bacilli or all germs are afraid, as it were, of light - or light is destructive to all.

Some, as is seen, accumulate in heat that is not penetrating. Hence the variations in the quartz light, the ultraviolet light, the blue light, the red light - each one taking out that that filters through the system. Hence for this, that one most penetrating without being destructive to the tissue proper." (140-21) (2)

LIGHT & HEAT: "Light & Heat are not evolved until the force of the vibratory sympathetic stream, from the neutral center of the sun, comes into atomic percussive action against the molecular atmosphere or envelope of our planet." (Keely) See **LAW OF OCTAVE, SPECTROSCOPY, HEAT, FORCE-RADIAL**

Q.: What argument would be most conclusive to prove that sun is not hot at surface?

A.: "The breaking up of the rays, just as has been described, in that it takes BACK as well as gives off, being both positive and negative." (195-70) (2)

Light and heat, theoretically, belong to the highest orders of the phenomenal. They can be accounted for by the velocity of sympathetic streams as interchangeable to and from centers of negative and attractive focalization. In considering the velocity of vibration, associated with a ray of light, to be at least one thousand billions per second, it is easy to account for the origin and demonstration of these two elements by the action of celestial sympathetic streams.

I. Light and heat are not evolved until the force of

the vibratory sympathetic stream from the neutral center of the sun, comes into atomic percussive action against the molecular atmosphere or envelope of our planet. The visibility of the planets can only be accounted for in this way, some in degree, some in less ... Light and heat, in a certain sense, are one and the same, light giving heat, and heat, light. The whole mystery, associated with their evolution is explained by the bombardment of the sympathetic etheric stream on the dense portion of the molecular, in seeking the sympathetic, concordant, neutral center of the planetary mass that surrounds the point of focalization.

The positive and negative interchange of this true sympathetic stream keeps intact the magnetic force of the polar envelope of the earth, making it a great magnet of itself. From the velocity of these sympathetic rays the earth's standard of heat and light is evolved and kept in balance. A ray of heat one billion times greater than the whole volume of the sun represents could not pass through the dark vacuous boundaries which lie between us and the sun without being neutralized and absorbed. (11)

LIGHT & MAGNETISM: "Maxwell's theory is correct that the plane of polarized light is the plane of the magnetic force. The sympathetic vibrations associated with polarized light constitute the pure coincident of the plane of magnetism. Therefore, they both tend to the same path, for both are inter-atomic, assimilating sympathetically, in a given time, to continue the race together; although one precedes the other at the time of experimental evolution. The time is approaching when electromagnetic waves with an outreach of two feet will be produced, having an energy equal to that now shown up on the magnet when it is about to kiss its keeper; and showing a radiating force too stupendous for actual measurement." Keely (1) See **ATOMIC THEORY-KEELY'S**

LIMBUS (MAGNUS): The world as a whole; the spiritual matrix of the universe; Chaos, in which is contained that out of which the world is made. (131) See **NOUS; FORCE, SPIRITUAL**

LIMMA: See **INTERVAL**

LINEAR ACCELERATOR: An accelerator in which the particles move in a straight line as they gain energy. (116)

LINEAR AMPLITUDE and FREQUENCY SCALES: Linear amplitude and frequency scales are used in vibration measurements when a high resolution is needed. A linear frequency scale helps to separate closely spaced frequency components. The linear frequency scale gives the further advantage that equally spaced harmonic components of a vibration signal are easily recognized. (70)

LINEAR ENERGY TRANSFER: LET. See **STOPPING POWER, HARMONIZATION.**

LINEARITY: (CALIBRATION) The closeness of a calibration curve to a specific straight line, expressed as the maximum deviation of any calibration point on a specified straight line, during any one calibration increment. (100)

LINEARITY AND HYSTERESIS (COMBINED): Linearity and hysteresis is defined as the maximum deviation of any combination point from the corresponding point of the best straight line, during any one calibration cycle. (20)

LIQUID PENETRANT: [NDT] Liquid penetrant testing is probably the most widely used NDT method. The test object or material is coated with a visible or fluorescent dye solution. The excess dye is removed from the surface, and then a developer is applied. The developer acts like a blotter and draws penetrant out of imperfections which open to the surface. With visible dyes, the vivid color contrast between the penetrant and the developer makes the "bleedout" easy to see. With fluorescent dyes, an ultraviolet lamp is used to make the "bleedout" fluoresce brightly, thus allowing the imperfection to be seen readily.

LISSAJOUS PLOT: See **ORBIT (100).**

LOAD ZONE: An angular region around a rolling element bearing where there is maximum compressive force between the shaft and the outer race of the bearing. Probes for bearing activity measurement (REBAM) would normally be placed in this zone for best (or most sensitive) measurements. (100)

LOADING METER: See **ACTIVITY METER. (102)**

LOCRIAN: A name sometimes applied to the Hypodorian mode. (125)

LOGARITHMIC AMPLITUDE and FREQUENCY SCALES: Piezoelectric accelerometers are capable of accurate vibration measurements over extremely wide dynamic and frequency ranges. Therefore to obtain convenient interpretation of results the following are often required.

1) An amplitude scale which can accommodate vibration amplitudes from the lowest detectable amplitudes up to shock levels and which can also simplify the comparison of vibration levels.

2) A frequency scale with the same percentage resolution over the whole width of the recording chart. (70)

LOGARITHMIC FREQUENCY SCALE: Frequency is sometimes plotted on a logarithmic scale. This type of scale has the effect of expanding the lower frequency ranges and compressing the higher frequency ranges. The result is equal relative resolution over the frequency axis (on a screen or on paper), and the size of the scale is kept to reasonable proportions. Thus a logarithmic scale is used to cover

a wide frequency scale. (70)

LONGITUDINAL VIBRATION: Vibration in which the principal motion is in the direction of the longest dimension. (75) **ACOUSTICS §14**

LONGITUDINAL VIBRATIONS: A vibrating medium must lengthen and shorten 2 times per each lateral oscillation; so 1 longitudinal equals 2 lateral. Longitudinal frequencies are independent of string tension. (6) See **HARMONICS-RATES-OF; ACOUSTICS §14**

LOUDNESS COMPENSATION: Loudness compensation is a feature found in many amplifiers that compensates for the ear's loss of sensitivity to bass at low volumes. Music reproduced more softly than it would be heard in a concert hall sounds thin. Loudness compensation makes up for this by supplying more bass as the volume is turned down. (103)

LOW FREQUENCY OSCILLATOR: An oscillator which is designed specifically to operate at subsonic frequencies. (69)

LOWPASS FILTER: A filter having a single transmission band extending from zero frequency (or the lower frequency response limit of the transducer or instrument) to some finite upper cutoff frequency (defined as the point where amplitude is attenuated by 3dB). (100)

LOWPASS FILTER: Also known as high cut. The opposite of the high-pass, this filter passes all frequencies below a specified corner frequency and rejects those above.

LOWPASS FILTER: Passes low frequencies, cuts out high frequencies. (69)

LUCIFERIN: A Latin word meaning light-bearing. See **BIOLUMINESCENCE; LUMINIFEROUS ETHER.**

LUCIFERASE: Energy producing compound reacting with luiferin to produce bioluminescent light. See **BIOLUMINESCENCE; LUMINIFEROUS ETHER.**

LUMINIFEROUS ETHER: "The luminous etheric, protoplasmic element, which is the highest tenuous condition of the ether, fills the regions of infinite space, and in its radiating outreach gives birth to the prime neutral centers that carry the planetary worlds through their rages of motion." (1)

The Fourth Order of Sympathetic Condensation.

"Why is this condition of ether always under a state of luminosity of an especial order? Its characteristics are such, from its infinite tenuity and the sympathetic activity with which it is impregnated, that it possesses an order of vibratory, oscillatory velocity, which causes it to evolve its own luminosity. This celestial, latent power, that induces luminos-

ity in this medium, is the same that registers in all aggregated forms of matter, visible and invisible. It is held in corpuscular embrace until liberated by a compound vibratory negative medium." (1)

"What does this activity represent, by which luminosity is induced in the high etheric realm? Does not the force following permeation by the Divine Will show that even this order of ether, this luminiferous region, is bounded by a greater region still beyond? - that is but the shore which borders the realm, from which the radiating forces of the Infinite emanate; the luminiferous being the intermediate which transfers the will force of the Almighty towards the neutral centers of all created things, animate and inanimate, visible and invisible; even down into the very depths of all molecular masses. The activity of the corpuscles, in all aggregations, represents the outflow of this celestial force, from the luminiferous track, towards all these molecular centers of neutrality, and reveals to us the connecting link between mind and matter." Pg 270 of (1)

"These conditions of luminosity have no thermal forces associated with them; although, paradoxically, all thermal conditions emanate from that source. The tenuity of this element accounts for it. It is only when these sympathetic streams come in conflict with the cruder elementary conditions, either the molecular or atomic, that heat is evolved from its latent state, and a different order of light from the etheric luminous is originated, which has all the high conditions of thermal force associated with it; the sun being the intermediate transmitter. Thus is shown the wonderful velocity of these sympathetic streams emanating from the celestial space." Pg 271 of (1)

LUMINOSITY: "Sympathetic physics teaches that light is an etheric evolution, propagated by sympathetic conflict between celestial and terrestrial outflows; solar tensions as against terrestrial condensation. True luminosity cannot be induced in any other way. The high order of triple vibration, that induces (progressively) molecular and intermolecular separation, shows luminous results which when thus mechanically produced, are virtually on a small scale, a facsimile of of nature's operations." (1) See **LIGHT, HEAT, LAW OF SYMPATHETIC VIBRATION, LAW OF OCTAVE, SPECTROSCOPY, ETHER, PRIME NEUTRAL CENTERS, COMPOUND CHORD, ATOMIC THEORY-KEELY'S**

LUTE: An instrument of the guitar family, formerly very popular in Europe. It had five to six pairs of strings, each pair tuned in unisons or octaves. (125)

LVDT: Acronym for Linear Variable Differential Transformer. A contacting displacement transducer consisting of a movable core and a stationary transformer. The core is attached to the part to be measured and the transformer is attached to a fixed reference. The most common application is casing expansion measurement where the core is attached to the casing and the transformer (LVDT housing) is attached to the machine foundation. Also used for

valve position measurements. (100)

LYCHANOS: See GREEK MUSIC. (125)

LYCOPodium POWDER: A fine, light fungus spore sometimes used to sprinkle a Chladni plate to show nodes and anti-nodes when the plate is set in vibratory motion creating beautiful patterns.

LYDIAN MODE: See GREEK MUSIC

LYON CATLINS: Thick spun strings for the basses of lutes or viols. (125)

LYRE: One of the most ancient stringed instruments. (125) See CHELYS



MACHALATH or MAHALATH: [Heb.] This word occurs in the title of Psalms liii, and lxxxviii., the former is inscribed to the "chief musician upon Mahalath", the latter to the "chief musician upon Mahalath Leannoth." Mahalath is by some authors traced (like Machol), to a root meaning *pierced* or *bored*, hence it is thought these Psalms were accompanied by flutes. It is generally thought that the term leannoth refers to antiphonal singing. Other writers consider the titles of these and several other Psalms to be a reference to well known tunes to which they were to be sung. (125)

MACHOL or MAHHOL: [Heb.] A word often found in the Old Testament, associated with "toph" (timbrel), and almost always rendered in the English version by *dances* or *dancing*. But some authorities trace the word to a root meaning *pierced* or *bored*, and therefore consider it to have been a flute. It is not improbable that *Machol* and *toph* may mean "pipe and tabor," but as these two instruments are often associated with dancing, our version, and others which follow it, cannot in any case be said to be incorrect. (125)

MACROCOSMOS: The Universe; the great world, including visible and invisible things. (131)

MADHYAMA: or AXIS moves in two ways:

1) Spanda – "full and perfect-wise" or Pasyanti vak. Then Hiranyagarbha – the source that "shines", unfolds, reveals, illuminates. Symmetrical, superior, harmony.

2) Vaikhari – partial, segmentary, eccentric forms appear. Asymmetrical, inferior, dischord. (126)

MADHU: Disjoins or cripples; ham of hamsah. (126)

MAGADIS: An instrument of twenty strings, on which music could be played in octaves. (125)

MAGIC: Wisdom; the science and art of consciously employing invisible (spiritual) powers to produce visible effects. Will, love, and imagination are magic powers that everyone possesses, and he who knows how to develop them and to use them consciously and effectually is a magician. He who uses them for good purposes practises white magic. He who uses them for selfish or evil purposes is a

black magician. Paracelsus uses the term Magic to signify the highest power of the human spirit to control all lower influences for the purposes of good. The act of employing invisible powers for evil purposes he calls Necromancy, because the Elementaries of the dead are often used as mediums to convey evil influences. Sorcery is not Magic, but stands in the same relation to Magic as darkness to light. Sorcery deals with the forces of the human and animal soul, but Magic with the supreme power of the spirit. (131)

MAGISTERIUM: The medicinal virtue of medicinal substances, preserved in a vehicle. (131)

MAGNET: MOLECULAR DISSOCIATION

MAGNETIC ANTAGONISM: See MOLECULAR DISSOCIATION

MAGNETIC ENGINE: "Any metallic mass can be so impregnated with certain vibrations that it will assume the mental qualities of attraction and repulsion." This is the secret of his magnetic engine.

When he came to the conclusion that it was impossible to use the ether directly as a motive power, as we now use steam and electricity, he decided to attempt to use it merely as a medium for "sympathetic vibration associated positively and negatively with the polar stream."

"Even as the magnet arouses the latent power in iron, the polar sympathetic harness I am now getting under control will, through polarization and depolarization, release the latent energy in iron. By exciting the concordant force in the interstitial corpuscular domain and then after establishing this concordance negatizing the thirds, sixths and ninths of this concordance, high velocities are induced by intermittent negation - cancelling or destroying the attractive vibration. This negation is brought about by vibrational association with the dominant thirds."

"Enough power lies latent in the earth's iron ore, if liberated and applied to proper vibratory machinery, to produce commercial power for the whole world. This storehouse is actually inexhaustible, no matter how our needs may increase."

"I include in the polar forces, magnetism, electric-

ity and gravital sympathy, each stream composed of three currents, which collectively, make up the governing conditions of the One Universal Controlling Medium. The failures of the past decade will be redeemed by one position - control of the polar forces through the polar sympathetic harness. The infinite ninths I am now endeavoring to graduate to a sympathetic mechanical combination will, if I succeed, complete my system and close my researches in sympathetic physics."

"Gravity is polar propulsion the sympathetic concordant of the ninths and but one of the triune combinations. Magnetism is polar attraction, while gravity is polar propulsion. By proper vibrations, the action of both magnetism and gravity can be intensified or accelerated."

"It is only necessary to ascertain the terrestrial chord masses to be able to run sympathetic machinery. When I have mastered these mechanical difficulties I shall be able to control this most subtle force."

"The compound interetheric or seventh subdivision actuates sympathetic polarization to produce action and sympathetic depolarization to neutralize it, in the body as well as in matter. Polar and depolar differentiation result in motion. The compound interetheric is the soul of matter, from which all forms of matter receive their introductory impulse."

"The latent force excited by a sympathizer or resonating sphere, acting both as receptor and generator through the Trexar, in connection with metallic masses, merely extends the range of the neutral sympathetic attraction in the metallic molecules, without corpuscular rupture, and this sympathetic outreach links the neutral center to its harmonic sympathizer as long as its exciter (the primary generator) continues in action. When its exciter (carbon register or aqueous sphere) is dissociated, the outreach returns and again nestles in the corpuscular embrace of the metallic mass. (This would indicate that Keely used a chemical, mechanical or super-chemical "interrupter" such as the Wehnelt, Leyden jar and other forms devised and used by Tesla and others since.) This is the polar sympathetic harness - rotation produced in a steel disk by associating the polar dominant current, which leads the triune terrestrial stream, with vibratory attraction on metallic mediums."

"I have demonstrated scores of times the power within certain limits generated by this radiance - extraordinary induced magnetic outreach - by attaching a rope with a breaking strength of two tons, to the periphery of a 12 inch steel disk, moving at the rate of only one revolution in two minutes, the molecular structure of which was vitalized with 42,800 vibrations per second. When the rope was broken the disk was not retarded and it was not accelerated afterwards."

"I have made computations which show conclu-

sively that, when properly developed, the power of an electro-magnetic wave reaching 10 inches, on a disk 3 inches in diameter, is equal to a lift of 36,000 foot pounds per minute. Ten of such inductors on the periphery of a vibratory disk 36 inches in diameter would represent 360,000 foot pounds at one revolution per minute. Perfect depolarization would represent 360,000 pounds lifted twelve times per minute or 1000 horse power per minute."

"I am devoting all my time and energy to perfect this new system, in which a polar negative disk run by sympathetic polar attraction, will produce electric current. Its construction will be almost as simple as that of a typewriter and dynamos will become a thing of the past."

The vibratory velocity governing the magnetic flow ranges from 300,000 to 780,000 per second and comes under the first interatomic. This is the first order above odor and permeates the molecules of glass in the compass cover as air passes through a sieve. Being governed by the full harmonic chord this flow moves in straight lines free from molecular interference.

"In Trexar vibratory transmission any chord on the dominant will by molecular differentiation, induce sympathetic affinity approaching magnetism in phenomena but without a trace of true magnetism being present."

He describes an experiment in vibratory transmission as follows: "I attach a nodal transmitter to a soft steel mass and the other end to the clustered thirds (3:6:9 in three octaves) of my focalizing neutral concentrator. (The telephone transmitter at the near end of the Trexar.) Another nodal transmitter is attached to the sixth cluster of the same disk, the other end being connected to the resonating sphere of my compound instrument (the resonating sphere) and all are brought to a complete rest. A slight tap on the Chladni wave plate now accelerates the normal 20,000 oscillation per second to 180,000 per second. The nine nodes here touch the extreme end, next to the mass being operated on, silver, gold and platinum coming in the order given, both in the respective wire sections and in the nodes."

"If we shift a gold node along the platinum section the oscillatory multiplication will be $9 \times 9 = 81 \times 20,000 = 1,620,000$ per second. On transmission of the full chord of the three octaves, it requires a frequency of 157,057,552,198,220,000 per second acting through a soft steel mass on the disk, to cause 110 revolutions per second on the neutral indicator. This represents the multiplication of only one gold node."

"If we now use another node of platinum after the gold node, this vibration is raised to the 81st power or $(156,057,552,198,220,000)^{81}$ or infinitely beyond computation. This represents the use of only two nodes."

Up to the time of his death, he was still perfecting his "mechanical conditions" in the belief that on his "infinite ninths" he would establish sympathetic affinity with pure polar negative attraction, minus magnetism. He thought this graduation so nearly completed that he was ready to master the group of "depolar disks" on which he was then working. He had completed twenty-six groups and expected, when the twenty-seventh was under equal control, to be able to establish a vibratory circuit for producing commercial power and for the demonstration of the possibility of aerial navigation through negatization of gravity. (11)

MAGNETIC FLOW: Is of the inter-atomic order. (1) pg 275. "The negative sympathetic polar stream is the magnetic flow proper, and it is in sympathetic coincidence with the second atomic flow, the electric current is the first and second order of atomic vibration, a dual force, the flow of which is too tenuous to displace the molecules." (11) See **RATES OF VIBRATION, LAWS OF BEING**

The action of the magnetic flow is dual in its evolution, both attractive and propulsive. The inclination of the plane on which the subtle stream moves, either to the right or left, has nothing to do with positive or negative conditions. The difference in conditions of what is called, by electricians, positive and negative electricity, is the difference between receptive and propulsive vibrations. They can be right or left receptive, or right or left propulsive. The positive vibrations are the radiating, the negative vibrations are the ones that are attracted toward the neutral center.

The negative sympathetic polar stream is the magnetic flow proper, and it is in sympathetic coincidence with the second atomic flow, the electric current is the first and second order of atomic vibration, a dual force, the flow of which is too tenuous to displace the molecules. It can no more do so than the flow from a magnet can displace the molecules of a glass plate when it is passed under it. The flow from a magnet is too fine to disturb the plate molecules, but passes as freely between them as a current of air would through a coarse sieve.

Like poles do not repel each other, simply because there is a perfect sympathetic equation between them, the same in unlike poles. If a differentiation of $33\frac{1}{3}$ against 100 is established between them, whether like or unlike, they become attractive to each other. They become repellent after differentiating them, $66\frac{2}{3}$ of the one against 100 of the other, by sympathetic vibration.

Taking into consideration even the introductory conditions of the etheric stage, etheric vibration has proved to me that the higher the velocity of its rotating stream the greater is its tendency towards the neutral center or center of sympathetic coincidence. Were it otherwise, how could there ever be any planetary formations or the building up of visible structures? If a billiard ball were rotated to a certain ve-

locity, it would separate in pieces, and the pieces would fly off in a tangent, but if it were a ball of ether, the higher the velocity of rotation, the stronger would be the tendency of its corpuscles to seek its center of neutrality, and to hold together.

It is not a magnetic force that is born on the etheric atom which gives it its power to draw to it streams of coincidence. The magnet is only susceptible to certain aggregated forms of matter, iron, for instance, and its preparations.

All moving bodies of visible matter produce heat as according to their velocity. The flow of gases only induces thermal reduction from molecular friction. By this term it must not be understood that the molecules actually come in contact, and rub against each other. There is no pressure, however great, that can cause molecular contact. The area of the volume of the molecule can be reduced by enormous pressure, and the tension thus brought to bear on their rotating envelopes induces heat. The heat thus induced is a positive proof of the wonderful velocity of the etheric envelope. If the molecules were dead - which is an infinite impossibility - to sympathetic vibration, and without a rotatory envelope, if all the pressure possible to conceive were brought to bear upon them, it would not induce the slightest thermal change. (11)

MAGNETIC MONOPOLE: A hypothetical particle that carries a single magnetic pole. (116)

MAGNETIC PARTICLE: [NDT] Magnetic particle testing is done by inducing a magnetic field in a ferro-magnetic material and dusting the surface with iron particles (either dry or suspended in a liquid). Surface imperfections will distort the magnetic field and concentrate the iron particles near imperfections, thus indicating their presence.

MAGNETIC POLE: See (12)

MAGNETIC RESONANCE: A phenomenon exhibited by the magnetic spin systems of certain atoms whereby the spin systems absorb energy at specific (resonant) frequencies when subjected to alternating magnetic fields. The magnetic fields must alternate in synchronism with natural frequencies of the magnetic system. (3)

MAGNETIC RESONANCE IMAGING: "Unlike X-ray C-T scans, MRIs use no ionizing radiation, but only radio waves and powerful magnetic fields to generate clear, highly detailed images of the body's interior. MRIs create images of the body by using radio waves in a strong magnetic field to energize nuclei of atoms in the body. The energized metallic hydrogen nuclei emit (reradiate) radio signals that are detected by a scanner and converted by a computer into two-dimensional images on a video screen." (23)

MAGNETIC SPECTROMETER: A device that uses the bending of particle flows in a magnetic field to separate out those of a given momentum. (116)

MAGNETIC STREAM: "The continuous flow of the magnet is merely a diversion of that portion of the terrestrial envelope. The third current of the triune stream. The velocity of the vibration governing the flow of the magnetic stream, comes under the head of the first inter-atomic, and ranges from 300,000 to 780,000 vibrations per second; the first order above odor permeating the molecules. The course of this sympathetic flow is governed by the full harmonic chord; and, consequently, moves in straight line; thus transmitting its sympathy free of molecular interferences." (1) See **HARMONIC ATTRACTIVE CHORD, DISSONANCE, DIFFERENTIATION, TRIUNE STREAM, RATES OF VIBRATION, MAGNETISM, LAWS OF BEING**

MAGNETISM: "Magnetism is the mutual attraction of juxtaposed bodies vibrating at unison or harmonic electric pitches." (Keely)

MAGNETISM: "Is not polar negative attraction, any more than polar negative attraction is magnetism; for polar negative attraction shows positive sympathetic outreach, of a high order; which is a condition totally foreign to magnetism. Magnetism is static and has no outreach." (1)

"According to Keely's theories it is that form of energy known as magnetism - not electricity - which is to be the curative agent of the future, thus reviving a mode of treatment handed down from the time of the earliest records, and made known to the Royal Society of London more than fifty years since by Professor Kiel, of Jena, who demonstrated the susceptibility of the nervous system to the influence of the natural magnet, and its efficacy in the cure of certain infirmities." Chapter 7 of (1)

"The attractive power, evolved by a magnet in sustaining its load, is no evidence that it is molecularly attractive; for, under the influence of the dominant current of the electric stream, the range of its molecular mass is not extended; but by the action induced in atomic vibration, the latent, or undisturbed power, that is locked up in its atomic embrace, is put into sympathetic action, and evolves the force that is recognized as magnetic. When its exciter is removed, it returns to atomic recesses to remain perfectly latent, until again brought into action by its proper exciter." (1)

"When a steel unmagnetized bar is associated with a magnetized one, the latent force in the unmagnetized one is sympathetically brought into action, associating itself to the magnetic one, without depreciating the power of it one iota.

"Magnetism is of the atomic order? and not molecular? then it is not electrical in nature; so what then is the influence in an electro-magnetic? The Dominant current of the electrical stream." (1)

"The Dominant (of the Electrical Stream) creates or governs Magnetism on the Atomic Order of Vi-

bration (High Vibratory)." See **HARMONIC ATTRACTIVE CHORD, ELECTRICITY, TRIPLE FLOWS, TRIPLE CURRENTS, FORCE-ATOMIC-HEALING, LUMINIFEROUS ETHER, MOLECULAR DISSOCIATION, LAWS OF BEING**

MAGNETISM: "The nature of magnetism is no more difficult to understand than the topics already discussed. Magnetism is nothing but a current in the ether flowing from one point to another. The flow of the ether arises through several mechanisms. One involves natural magnets like lodestones or the earth itself, of which the nature is such as to promote the flowing current in the etheric substance. Another source of the movement is the flow of electrons through a conductor.

The lodestone effect is too complex to be dealt with here, but the basis of the electron's ability to create a flow in the ether is a simple one to grasp. We have already said that an electron is nothing but a spinning vortex in the etheric substance through which the ether itself spills out into the fourth dimension. The nature of these spinning holes is such that they always tend to spin in the same direction. There are some exceptions but they are not important in terms of the effect under discussion. When electrons are forced to move through a conductor as an electric current, their direction of spin is always the same with respect to the electrical current flow. This causes the ether itself to begin to form a larger vortex of circular movement around the conductor carrying the electrical current. It is this rotary movement of the ether which is detected as the magnetic field around a current carrying conductor.

When such a conductor is wrapped around a central core in the manner of an electrical coil, the promotion of the larger etheric vortex around each one of the turns combines in the center to cause the ether to move in a straight line along the center axis of the coil. This is the reason why magnetic fields of considerable strength can be erected by the use of electricity.

Another effect of magnetic fields is that of altering the direction of movement of a charged particle such as a free electron or free proton. Protons are not normally free in nature, but the combination of several protons known as alpha particles can be projected as a beam in certain kinds of apparatus. Other devices are capable of projecting a beam of pure electrons.

The reason why a magnetic field tends to alter the direction of motion of the beamed electrons has to do, of course, with the spin of the electrons. We have said that virtually all electrons spin in the same direction when forced to travel through the ether as in a beam. When the beam is aimed across the direction of flow of a magnetic ether current, the spin of each electron causes a buildup of etheric substance on one side of the electron, and a decrease in etheric density on the opposite side. This results in a push against the electron toward the less dense region, tending to change its direction of motion. It is not unlike the

reason why a curved "spin-ball" thrown by a pitcher is able to deviate from the original line along which it is thrown.

Protons also have spin, but it is in the opposite sense to that of an electron. It is for this reason that the proton or positively charged beam is deflected in the opposite direction from the deflection of electrons. The deflections are of different degrees, not because of the different "mass" of the two kinds of particles, but rather because of the fact that the proton has some mass in the generally understood sense, while the electron has no mass whatever since it is a location of an opening in the etheric matrix.

The nature of magnetism has been a puzzle to man ever since its discovery. It can be seen from the preceding discussion that it is a simple and easily grasped phenomenon which is directly tied to the nature of the primordial stuff of reality: the ether." (22)

MAGNETOACOUSTIC RESONANCE: "Large amplitude precessions (of interacting electron spins) can also break up into acoustic vibrations, provided the acoustic eigenfrequencies equal the difference between the microwave (pump) frequencies and that of some magnetostatic mode." (4) **See LAW OF SUPERPOSITION, BEATS, LAW OF TRIANGLE**

MAGNETOMOTIVE FORCE: $MMF = \text{Ampere} \times \text{turns} = I \times T$

MAGNETOSTRICTIVE EFFECT: A means of converting electrical energy into mechanical energy based on the magnetostrictive properties of material. (102)

MAGNON: "Is a quantized spin wave." (4)

MAGREPHA: An organ mentioned in the Talmud as having been in existence in the second century. It had ten ventages, each of which communicated with ten pipes, and it was played upon by means of a clarinet. (125)

MAHAT: Buddhi, The Grand Reason. (126)

MAJOR: Greater. A major third consists of four semitones, a minor third of three. A major tone is the whole tone having the ratio 8:9; a minor tone, that having the ratio 9:10. Intervals have had the term major applied to them in a conflicting manner. (125) **See INTERVAL**

MAJOR: In music a system derived from certain primes in ratios ascending. (8) **See MINOR**

MAJOR MODE: The ordinary diatonic scale, having semitones between the third and fourth, and seventh and eighth degree. (125)

MAJOR SCALE: The major scale consists of consecutive tones (half and whole steps) from one letter

name to its repetition above or below, such as C D E F G A B C, in which all are whole steps except those from E to F (3 to 4) and B to C (7 to 8) in succession, which are half steps. This is called a "diatonic" scale, because the scale steps follow the letter names in succession without alteration and include five whole steps and two half steps in a definite pattern. (13)

MANAMA: Influence. (126)

MANDELBROT: **See FRACTAL; MANICEPTION**

MANGONARIA: A magic power by which heavy bodies may be lifted without any great physical effort; magical suspension; levitation. It is usually accomplished by changing their polarity in regard to the attraction (gravity) of the earth. (131) **See LEVITATION**

MANICEPTION: The principle that every manifestation has within itself the seed or germ from which it may reproduce itself. All manifestations have the inherent ability to reproduce itself "in its own image". The Lotus Blossom has symbolized this for centuries. "Like begets Like." **See HARMONIC PROGRESSION, ACCELERATING ASSOCIATION, LAW OF SUPERPOSITION, IMPULSE-CREATIVE**

MARCH: A musical composition so arranged as to be suitable for accompanying troops in walking. There are quick and slow marches in duple and triple times. (125)

MARKS OF EXPRESSION: Certain words or signs used in music to regulate the degrees of accent, power, time, or tone, required by the composer to produce the proper effect of his composition. (125)

MARS: "Mars indicates the ability to hate as well as to love." (2902-1) (2)

"We find that Mars gives the ability of the entity to be almost a tireless worker; especially with things having to do with the mind." (4048-1) (2)

"In Mars we find the body would be very active and not lazy;" (5163-1) (2)

"From Mars we find a tendency for the body-mind at times to be easily aroused to anger." (361-4) (2)

MASS: "The lower the range of molecular motion the greater the attractive force; mass is a function of the rates of vibration." (1) **See COHESION, GRAVITY, NEGATIVE ATTRACTION, COSMIC RAYS, SPECTROSCOPY, LAWS OF BEING, WEIGHT, ATOMIC THEORY-KEELY'S**

MASS: A measure of resistance to change in motion; equal to force divided by acceleration. (75)

MASS: "Discordant conditions, *i.e.*, differentiation of mass, produce negatization to coincident action. By changing the balance of the triune polar flows, one differentiates the mass and disrupts any possibility of

harmonious or "coincident action." The mass is a result of the combination of these flows and not vice versa as is thought in today's physics. It is the negative, vibratory assimilation, or aggregation, of the molecules, acting according to the density or compactness of the molecular groupings on their structures. The differing character of molecular densities, or molecular range of motion, represents differing powers of attraction. The lower the range of motions on the molecular vibrations of these structures, the greater is the attractive force that holds them together; and vice versa." (1) See **COHESION, SYMPATHETIC NEGATIVE ATTRACTION, FISSION, MOTION, GRAVITY, NEUTRAL NEGATIVE ATTRACTION, MAGNETISM, FORCE-ATOMIC, LAWS OF BEING, $E=MC^2$**

MASS ACTION: Reception and dispersion are kept up on the atmospheric envelope of the earth by the atomic and interatomic conflict as "between the dominant and the enharmonic". This is brought about by the reception and dispersion of sympathetic streams, the ruling mode of whose vibration is the dominant, and the density of the coarser grades of matter, whose ruling vibratory mode is the enharmonic.

As every mass consists of vibrations in thirds, balanced inharmonic equilibrium without cancellation or diminution of energy, it stands therefore in harmonic relation to every other mass. All forms of matter and of motion are thus interrelated and interchangeable. Through resonance, increasing this sympathy, we can control the states of matter. (11)

MASS CHORDS: "The mass chord of any mass is that lowest or fundamental vibration to which that mass is resonant.

"As every mass consists of vibrations in thirds, balanced inharmonic equilibrium, it stands in harmonic relation to every other mass. All forms of matter and motion are thus interrelated and mutually convertible, one into the other, and through resonance, increasing or diminishing this sympathy, we can control the states of matter." (Keely)

In his researches Keely discovered a system of obtaining the "chord of mass" or keynote of all substances, whether mineral, vegetable or animal. He does not give or even hint at the method by which this was obtained, and it is supposed this is the "one detail" which he kept secret until his one patentable invention was to have been completed.

"Every molecule in nature represents the same chord. Any variations appearing in the mass chords of different substances are caused by non-uniformity of molecular groupings (non-uniform plus molecular aggregates). If all masses were homogeneous in molecular groupings the mass chords of all substances would respond to the same resonant impulses.

"Every molecule contained in a homogeneous mass has the same harmonic oscillatory motion,

which is the "chord of the mass" governed by the mass aggregation and the mass form. The "chord of the mass" is therefore the fundamental frequency of every molecule of the mass". This means that the molecule of iron in a ball bearing $\frac{1}{16}$ th inch in diameter has a different vibrational frequency than a molecule in a ball bearing $\frac{1}{2}$ inch in diameter. It also has a bearing on crystallization forms and the variation in molecular groupings in bodies of elements, with the resultant differentiation in different masses of any one element due to different plus molecular aggregates, even although perfectly homogeneous as far as chemistry can determine.

"The molecular state of animal, vegetable and mineral matter depends upon the aggregation of their respective chord centers. It is impossible to make two coins from the same die the same in their molecular aggregation. To produce vibratory devices will require instruments more perfect than any now in existence. One of my perfected instruments shows to the eye the 'molecular effects' produced by the chord of harmony between two neutral centers. (Lissajous' figures?) Another, connected with the 'sympathizer' denotes accurately by the color of the sound (or sound combination) the number of vibrations necessary to induce 'certain mechanical combination effects'."

No condition of absolutely stable equilibrium exists in Nature. The chord of the mass changes, yet we must, through induction of resonance, learn to control the molecular forces. Keely claims to have solved this problem by the invention of a device - his "compound mechanical device" - which brings the chords of all masses within the conditions of a few simple acoustic tests.

"If I wish to disturb or bring into action the latent force in any molecular mass, I must first find what the 'harmonic chord' or 'mass chord' (the fundamental note) of its mass represents - and no two masses are alike. It would seem that this necessitates an infinite number of variations (entirely different scale of resonators) for different masses, but this is not the case. All masses can be resonated by the "compound mechanical device" (resonating spheres, each of which acts as a "sympathizer") which I use for the purpose, which fulfill one general condition and resonate all masses."

To illustrate "chord of mass sympathy" Keely filled a glass chamber 40 inches high with water and placed in it three metal spheres each weighing about six ounces, and having the respective mass chords of B flat, first octave E flat, second octave and B flat, third octave, which all rested on the floor of the container.

When B flat, first octave was sounded through the transmitter the positive end of which was attached to the cover, the sphere with the corresponding mass chord rose slowly to the top. Upon changing to the negative it descended as gently as it rose. The other

spheres moved likewise on sounding their respective mass chords.

This indicates that the conclusion reached by the Scholastic school is correct, in that: "WHEN ONE BODY ATTRACTS ANOTHER BODY, THE EFFECT IS AGGREGATE, THE RESULT OF ONE WHOLE OPERATING ON ANOTHER WHOLE, AND NOT THE SUM OF THE EFFECTS OF THE PARTS OF ONE ON THE PARTS OF THE OTHER." (11) See **CHORD OF MASS**.

MASS NUMBER: The mass number of an atom is the integer sum of its neutrons and protons. (5)

MASS VIBRATIONS: There are properties or modes of vibration which can direct the component molecular vibrations of a mass to the neutral center of that mass. These modes of vibration are called "neutral attraction", "neutral affinity", "negative attraction" or "polar negative attraction."

He says "After vain attempts to come more closely to what I term a 'radiophonic vibratory position with microscopic adjustments' I have only been able to reach a few true and standard positions which I can satisfactorily analyze. There is one principle underlying all and this principle is the key."

He announced in 1888 that he had discovered this "sympathetic vibration" to be associated both positively and negatively with the polar stream.

The inaudible vibrations of matter and its higher states, affect the magnetic needle. In Keely's researching instruments, he caused these inaudible vibrations to alter the vibration of light in such a manner as to produce sound colors. (11)

MASTER-NOTE: An old term for the sensible or leading note. (125) See **LEADING NOTE**; **KEY-NOTE**

MATCHED RESPONSE FILTERS: A collection of filters specifically designed with gain and phase-matched responses for multi-channel systems requiring similar channel response characteristics; one matched lowpass filter channel for both noise filtering and anti-aliasing is a standard application.

MATHEMATICAL QUARKS: A term for quarks that might "exist" only in theory, but never be found in the laboratory. (116)

MATRICES: The vehicles of things; elementary bases. (131) See **FEMALE**

MATTER: Coagulation of sound. (125)

MATTER:

**The Ultimate Constitution of Matter and the Action of the Force
Regulating its Phenomena**

by John Keely

"First: Matter is capable of infinite subdivision.

Second: In the aggregation of matter, force or energy is stored up or conserved.

Third: In the dissociation of matter, force is liberated.

Fourth: All matter is in a state of perpetual activity, whether the substance under consideration be inanimate or animated, visible or invisible.

Fifth: There is no dividing of matter and force into two distinct terms, as they both are ONE. FORCE is liberated matter. MATTER is force in bondage.

Sixth: All motion is synchronous; no sound or movement can be made but all that moves or sounds does so in harmony with something.

Seventh: All structures, whether crystalline or homogeneous, have for their unit structures minute bodies called molecules. It is the motion of these molecules with which we have particularly to deal; as in experimental research and demonstration, when we produce an action upon one molecule we do so upon all the molecules constituting the mass operated upon.

Eight: These molecules have an envelope, rotating with inconceivable rapidity, formed of a high tenuous ether, whose place in the order of subdivision ranks third, the three divisions being, -first, molecular; second, atomic; third, atomolic. (Atomolic is the same as Etheric)

Ninth: This atomolic substance has a density approximately 986,000 times that of steel, enabling it to permeate steel as light penetrates glass; this rotating envelope of atomolic substance is in a liquid condition. There are four conditions of matter; viz. solid, liquid, gaseous, and ultra-gaseous. These conditions result from greater or lesser range of oscillation of the composing units individually; this is equally true, whether the units are molecules, atoms, atomoles, planets, or suns. But one LAW governs all matter.

Tenth: This molecular envelope, rotating with such great velocity, holds in its embrace the next subdivision of matter, the atomic. There cannot ever be more or less than three atoms in any molecule. These are placed so as to form a triangle in the interior; they rest in a condition of substance, or matter, we will term intermolecular. In this intermolecular substance we find an enormous energy or force in bondage, held thus by the rotating envelope enclosing it. Were we to rotate a spun brass shell, say nine inches in diameter, at a very much less rate of speed than that at which the molecular envelope rotates, - say nine hundred revolutions per second, - its equator would first

bulge out, then form into an oval disk. A solid block of wood subject to such revolution would swiftly fly to pieces. The rotating envelope of a molecule, unlike these, the greater the velocity of rotation, the greater is its compression toward the center of the molecule. The rotation of this envelope is of such a nature as to produce an internal pressure upon every portion from every point of the molecule as a sphere. Were we to consider a rotating envelope as ordinarily understood, it would be one in which the envelope rotated around an equator having poles of no rotation; i.e., the poles would not possess the compressing force of the equator; the result would therefore be a compressed equator, and the intermolecular substance would pass out without resistance at the poles.

Eleventh: If it be possible let us conceive of an envelope with an equator, but destitute of poles, a number of these rotating over the sphere, this atomolic envelope possessing an almost infinite attractive force toward the center of the molecule, pressing in the intermolecular substance, where it is held until this revolving envelope becomes negatized by a certain order of vibration, when the enclosing matter rushes out to its natural condition of concordant tenuity, as in the case of gunpowder, dynamite, and nitroglycerine. This force, we must see, has been held in the embrace of the rotating envelopes of the unit structures, or where does it come from? This force at the time of an explosion was liberated by shock or fire, both being orders of imparted motion or vibration. How much greater the result would be were we to associate a scientific instrument now completed, and shortly to be given to the world, with such an agent as nitroglycerine; one pound of nitroglycerine would have its destructive force augmented beyond all possible control. These instruments are carefully concealed by wise masters from all persons save the few who are already prepared to study their potency with the exclusive end in view of aiding the real scientific progress of humanity; and, furthermore, it may be truly stated that a ferocious sensualist, however powerful his intellect, would be utterly unable to either comprehend or operate one of these marvelous constructions.

Twelfth: Next in order of consideration is the second subdivision of matter - the atomic. The atom has the same rotating envelope as the molecule, governed by the same laws of rotation and compression. The rotating envelope holds in its embrace the interatomic substance and three atomoles resting in it, the atomoles within the atom being constructed after the same pattern as the atom and the molecule, obedient to the same laws; the atomolic being simply the third subdivision of matter. The threefold order is absolutely universal.

Thirteenth: The atomolic substance is what is termed the ether which fills all space and is the transmitting medium for all celestial and terrestrial forces. This is the liquid ether of occult science.

Fourteenth: The atomoles are made up of atomolini

(singulana tomolinus); the subdivision of matter from this point is beyond man's power, as at this point it escapes all control of apparatus, passing through glass and hardened steel as a luminous flame without heat, which is hardly seen before it vanishes, - a perpetual flame coldly luminous.

Fifteenth: (*Not in book, may have been a mis-numbering. editor*)

Sixteenth: This again, from previous analysis, is made up according to the triple order, and may again be subject to subdivision, even into infinity." (9)

MATTER: Organic matter follows, in its development, the sphere as in a cell. Inorganic matter follows, in its development, the straight line as in crystal formations. See **NEGATIVE, POSITIVE**

MATTER: Manifests according to the triangle, and life according to the idea of the circle. (Lewis) See **LAW OF TRIANGLE, CIRCLE, FORCE-ATOMIC-HEALING, ATOMIC TRIPLETS**

MATTER: "Keely has proved by demonstration that the subdivision of matter under different orders of progressive vibration evolves by such subdivision entirely new and distinct elements, too multiple to enumerate. He has systematized the proper vibratory chords, progressively, from the introductory molecular to the inter-etheric, embracing seven distinct orders of triple subdivision. He has elaborated a system of inducing sympathetic negative attraction on metallic masses, with great range of motion, and instant depolarization of the same, by vibratory change of their neutral centers. Keely controls the transmission of these sympathetic streams by a medium of high molecular density, viz. drawn wires of differentiated metals, gold, silver, platinum, German silver, etc." Bloomfield-Moore. See **MOLECULAR DISSOCIATION, LAWS OF BEING**

MATTER: "The nature of matter is more subtle than that of light (see **LIGHT**). Matter is also an etheric phenomenon, but it is not a wave motion in the same sense.

In the vastness of space are located points of primary vibration (see **NEUTRAL CENTER, NODE, etc.**) which are capable of setting the ether into the third mode of vibration, namely that in which the spatial matrix undergoes motion in the fourth dimension. In effect, these primary points themselves vibrate in a direction transverse to the ether, and this transverse vibration is communicated to the etheric substance to give rise to the transverse motion.

In the Flatland analogy, the primary points could be compared to contacts on a stretched film or sheet, in the direction perpendicular to its main extent. This would cause a series of expanding ripple waves progressing outwardly from each point, much like the waves travelling outwardly on a millpond surface from the point where a stone is dropped into the wa-

ter.

The primary points in the real world thus give rise to traveling transverse wave patterns which cross each other and interact to form a number of stationary waves that include locations of low vibration called nodes, and locations of high vibration called antinodes. The standingwave pattern is similar to that experienced by a stretched string fixed at both ends and struck or plucked at an intermediate point.

When node locations of a number of such patterns are all coincident at a single location, the ether becomes very still at that location with respect to its transverse vibrational mode. If the ether becomes completely stationary for even a fraction of a second at that location, it immediately contracts or condenses into a denser and more solid state. It is this small bit of condensed or contracted ether which has been called the proton.

Surrounding the condensed packet of ether are concentric rings of very high transverse vibration, and it is in these concentric rings that the various electrons take form. The error which scientists have made in regard to the electron is to assume that the electron is something, whereas in fact it is nothing, or even less than nothing. The explanation of this paradox is a simple one. At the concentric rings of high vibration surrounding the contracted proton, the ether is in such an agitated state that small openings or breaches in its texture spontaneously arise. Each "hole" in the ether becomes a spinning vortex through which the etheric substance spins out into the fourth dimension. The ether which passes outwardly through the spinning hole arcs over through the fourth dimension and is drawn back into the etheric matrix at the proton itself. (22) See **SYMPATHETIC NEUTRAL AFFINITY, SYMPATHETIC NEUTRALIZER**.

The constant flow of ether into the proton from the fourth dimension provides sufficient material for the proton to remain in its contracted or condensed state, because the impingement of light against the proton tends to promote the reexpansion of the proton back to the more rarefied condition which the rest of the ether maintains. This in effect causes a bleeding away of the substance of the proton into the surrounding ether which is compensated by the entry of spilled out ether from the fourth dimension.

We have said that the ether is an elastic medium. The arc of ether through the fourth dimension from the spinning electron vortex to the condensed proton attempts to contract with a force inversely proportional to the square of the length of the arc. This contraction tends to draw the electron and the proton together, and it is this force which men have called the electric field.

In the past the electric field has been thought to be a natural phenomenon within three-dimensional space, but its true source was not recognized. With

the addition of the concept of fourth dimension the explanation of this effect-at-a-distance becomes clear.

What we have described so far is a simple atom of Hydrogen, made up of a single proton in the nucleus and a single electron at the distance of the first electron ring. Other elements are also created in the identical manner. The determining factor for the nature of the element created is the particular waveform of the transverse vibration in the midst of which the creation takes place.

There are five primary wave forms for the third mode or transverse vibration. These are responsible in various combinations for the creation of all the known elements, including those which are radioactive. (22). See **LIGHT, VIBRATION MODES, ELECTRON, PROTON, NEUTRAL CENTER**

MATTER EVOLVED AND CONTROLLED BY MIND FORCE: Schopenhauer writes: "The concept of Will has hitherto commonly been subordinated to that of Force, but I reverse the matter entirely and desire that every force in Nature be thought of as Will."

MacVicar writes: "Every individualized object assimilates itself to itself in successive moments of its existence and all objects tend to assimilate one another."

Keely states that were the inherent cohesive sympathy taken away from matter, the Universe would be promptly dissociated into the etheric realm.

"All conditions of dispersion and focalization are accompanied by the "celestial mind force" acting upon "terrestrial matter" - (corresponding to the mind force acting on the brain, which is only its molecular instrument.) This force is the first seal of the Book of Vibrational Philosophy - the first stepping stone toward solution of the Source of Life."

All Nature's forces are mind forces: magnetic, electric, etheric, acoustic, solar. Any metallic mass can be so impregnated with certain vibrations that it will assume mental attributes -attraction and repulsion. We must first understand the triune conditions or laws of that sympathetic medium which interconnects matter with matter, the triune conditions or laws of sympathetic streams and unit resonance of each of the seven subdivisions before we can understand the induction by means of acoustic generators, of magnetic antagonisms in matter and the different forms of energy thereby liberated." (11)

MATTER, UNITY OF: [ALCHEMY] Progress in alchemy was facilitated by the idea about the Unity of Matter according to which all substances consist of the same components in different ratios. (88)

MAXWELL DISTRIBUTION: [STAT MECH] A function giving the number of molecules of a gas under thermal equilibrium whose velocities lie within a

given, infinitesimal range of values, assuming that the molecules obey classical mechanics, and do not interact. Also known as Maxwellian distribution. (4)

MAXWELLIAN DISTRIBUTION LAW: [STAT MECH] Equation relating the statistical distribution of speeds and energies of molecules of a pure gas at a uniform temperature where there are no convection currents. (4)

MAXWELLIAN EQUILIBRIUM: [STAT MECH] Thermal equilibrium of a gas, or of some group of particles, in which the velocity distribution of the particles is the Maxwellian distribution corresponding to the temperature of the object with which they are in equilibrium. (4)

MAXWELL'S THEORY: Maxwell's original theory used quaternions. The resultant scalar component of the interacting quaternions infolds functions of the interacting vectors, even when the vector resultant is zero. What today are called "Maxwell's Equations" are not so: not a one of those vector equations appears in any paper or book by James Clerk Maxwell. Instead, they are due to Oliver Heaviside (and to Hertz and Gibbs). Heaviside simply cut off the scalar component of the quaternion, reducing it to a vector. He wrote a subset of Maxwell's theory – specifically, the subset where EM and G are mutually exclusive. He threw away the part of Maxwell's theory where G and EM are entangled, and where EM can be turned into G and vice versa. (132)

MEAN: The name formerly given to the *tenor* part as being the mean in pitch between the bass and treble. The middle strings of instruments were also called mean. (125)

MEAN: Proportion formed of three numbers so that the excess of the first over the second is to the excess of the second over the third, as the first is to itself, to the second or to the third, or as the second is to the third, or inversely. (81)

MEAN CLEF: The C clef. (125)

MEASURE: (1) A general name for a slow and stately dance. (2) Time, pace. (3) Rhythm. (4) The contents of a bar. (125)

MECHANICAL IMPEDANCE TRANSFORMER: An alternate designation for horn. (102)

MECHANICAL RESONANCE: See **RESONANCE (100)**.

MECHANICAL RUNOUT: A source of error on the output of signal of a proximity probe transducer system; a probe gap change which does not result from either a shaft center position change or shaft dynamic motion. Common sources include out-of-round shafts, scratches, chain marks, dents, rust or other conductive buildup on the shaft, stencil marks, flat spots, and engravings. See **RUNOUT, ELECTRI-**

CAL RUNOUT. (100)

MECHANISM: (1) The instrument which forms the connection between the player and the sound-producing portion. (2) The physical power of performance, as distinguished from the intellect or taste which directs it. (125)

MECHANISTIC SCIENCE: "What was lacking in those who strove to go beyond the mechanistic interpretation of the world was primarily the courage to say to themselves that one who would surmount this mechanism must surmount also the habits of thought which have brought him to this. A confession demanded by the times failed to appear. It is this: that, by taking the direction of the senses, man penetrates into that which is mechanistic. In the second half of the nineteenth century, this orientation had become habitual. Now that the mechanistic has failed to satisfy, one should not seek through the same orientation of attention to penetrate into the higher spheres. The senses in man evolve of themselves. But he will never perceive through what they bestow upon him anything other than the mechanical. If he wills to know more, then he must, *from within himself*, give to the deeper-lying powers of knowledge a form such as Nature gives to the sense. *The powers of knowledge for the mechanical are awake of themselves; those for the higher forms of reality must be awakened.*" (124)

MEDHA: Creative Reason, true insight. (126)

MEDIANT: The third degree of any scale. (125)

MEDITATION: [HEALTH] "...Meditation, then, is prayer, but is prayer from within the inner self, and partakes not only of the physical inner man but the soul that is aroused by the spirit of man from within..." (281-13) (2)

"...there are definite conditions that arise from within the inner man when an individual enters into true or deep meditation. A physical condition happens, a physical activity takes place!" (281-13) (2)

"Attune yourself almost in the same manner as you tune the violin for harmony. For when the body-mind and the soul-mind is attuned to the infinite, there will be brought harmony to the mind and those centers from which impulse arises will aid in the directing of the individual entity to become more sensitive and the material things about the entity may be the better enjoyed." (1861-18) (2)

MELODICON: An instrument made of steel bars in different lengths tuned to the diatonic scale, struck with hammers held in the hand. (125)

MELODY: An agreeable succession of simple sounds, produced by a single voice or instrument, and so regulated as to give a pleasing effect, or to be expressive of some kind of sentiment. (125)

MELODY ORGAN or HARMONIUM: A harmonium so constructed that the upper note of the chords played is louder than the rest of the sounds. (125)

MELOGRAPH: An instrument invented for the purpose of writing down melodies when played upon a pianoforte. It has not yet been brought into use, as its action is imperfect. (125)

MELOPIANO: An invention by which sustained sounds can be produced on a pianoforte. It consists of a series of small hammers set into very rapid vibration by the winding up of a spring. When a note is struck and held down, the constant repetition of the blows of the hammer causes a continuous vibration of the string which is of a most charming character. A beautiful crescendo is obtained by the ingenious device of raising the hammers gradually further from the string, causing them to descend with more force. It was invented by Caldara of Turin in 1870. (125)

MELOSINAE: Elemental spirits of water, usually appearing in female forms, but which may also take the forms of fishes or snakes. They have souls, but no spiritual principle; but they may obtain the latter by entering into a union with man. (The fourth principle uniting with the fifth.) The human shape is their true form; their animal forms are assumed. They are also called Undines. (131) **See ELEMENTARIES**

MEM: The 13th Hebrew letter, Mem (M), means water. It is often called the 2nd of the 3 maternal letters of the Hebrew alphabet (Aleph, Mem, Shin). In its present form, which has been maintained from remote antiquity, it resembles a ripple on the surface of water. The astrological zigzag lines denoting Aquarius have the same origin and significance. Water is occultly significant of the intellectual plane of human existence and the name Moses (Moshe) literally means one who has been drawn up out of water, mystically lifted above the intellectual region to a plane of spiritual consciousness. (72)

MENAEIM: [Heb.] This word occurs once in Holy Scriptures, in 2 Sam. vi. 5, where it is improperly translated *cymbals*. Its derivation points to a root meaning to swing to and fro, to vibrate. It is probable, therefore, that it was a *sistrum*. (125)

MENTAL, DOMINANT: "For, the body and its soul is hinged upon the mental." (2850-1) (2) **See LAW OF DOMINANT, MIND, FORCE-MIND**

MERCURY: "Mercury indicating the high mental abilities of the entity." (2902-1) (2)

MESE: [MUSIC] Middle, string so named because, in the perfect system, it is at the distance of an octave from the extremes (the proslambanomenos and the nete of the hyperbolian). (81)

MESON: [PARTIC PHYS] Any elementary (non-composite) particle with strong nuclear interactions and baryon number equal to zero. (4)

MESON: Originally any particle whose mass is between that of the electron and proton - in modern terms, any particle whose decay products do not include a baryon. (116)

METABOLISM: The circulation of matter in the living organism. (121)

METALLIC GASES: **See HYDROGEN - METALLIC, HELIUM, OZONE, LEVITATION, MOLECULAR RESONANCE, OXYGEN, MAGNETISM, BRAGG OSCILLATION, MAGNETIC RESONANCE IMAGING**

METALS AS CONDUCTORS: Metals carry the different flows, electrical, vibratory, etheric, as well as do the nerves, for although their molecules are differently arranged the composition of both is the same. (11)

METAMORPHISM: The evolution of the species or transformism. (121)

METAMORPHOSIS: Change or transformation. (121)

METAPHYTA: Multi-cellular, tissue-forming plants. (121)

METASITISM: The circulation of nutritive matter in the organism. (121)

METAZOA: Multi-cellular, tissue-forming animals without nerves. (121)

METEMPSYCHOSIS: The transmigration of souls. (121)

METRE: A term used with various significations; (1) A foot, as a subdivision of a bar or measure. (2) The relation between two feet having the same subdivisions of time-units, but in a different order of succession. (3) The proper grouping of a number of consecutive feet.

Authors who use the term in this last sense, consider it as equivalent to rhythm and divide it thus:

Metre (rhythm)
Measures (bars with accents)
Feet (groups of time-units)
Units of Time (short and long)

But it will be seen further on that this division is not good; and also that the incorporation into music of the terms of prosody is not desirable. Before entering on this discussion, it is necessary to give a list of the names and nature of the most important feet.

Dissyllables have two units of time capable of four-fold arrangement:

+ + Spondee
- - Pyrrhic

+ - Trochee or
- + Iambic

Trisyllables or feet consisting of three time-units are of eight kinds:

- - - Tribrach
- + + Bacchic
- + - Amphibrach
- - + Anapest
+ + + Molossus
+ - - Dactyl
+ - + Cretic
+ + - Palimbacchic

There are also tetrasyllables, sixteen in number, which, of course, consist of the possible positions of four syllables of different lengths:

- - - - Proseleusmatic (Double Pyrrhic)
- - + - Third Pæon (Pyrrhic & Trochee)
- - - + Fourth Pæon (Pyrrhic & Iambic)
- - + + Inoic a minore (Pyrrhic & Spondee)

- + - + Diambic (Double Iambic)
- + - - Second Pæon (Iambic & Pyrrhic)
- + + - Antispast (Iambic & Trochee)
- + + + First Epitrite (Iambic & Spondee)

+ + + + Dispondee (Double Spondee)
+ + - - Ionic a majore (Spondee & Pyrrhic)
+ + - + Third Epitrite (Spondee & Iambic)
+ + + - Fourth Epitrite (Spondee & Trochee)

+ - + - Dichoree (Double Trochee)
+ - - + Choriambic (Trochee & Iambic)
+ - - - First Pæon (Trochee & Pyrrhic)
+ - + + Second Epitrite (Trochee & Spondee)

[- = short; + = long]

Feet of more than four "times" or syllables are, strictly speaking, merely compounded of dissyllables and trisyllables. Musical examples of all the above could be easily given if space allowed.

On examination of the musical dissyllables and trisyllables many important questions present themselves.

It will be noticed that long syllables almost invariably fall on the accented part of a bar. Can we conceive of a long syllables in music as *quantity* without *stress*? This question has been discussed over and over again with reference to modern languages. Some authorities say that stress ad non-stress have ejected *quantity* from our poetry. (125)

METRIC SABINS: [ACOUSTICS] See **TOTAL**

ABSORPTION. (85)

METRONOME: An instrument said to have been invented in 1815 by Maelzel, for the purpose of measuring the relative duration of the notes in a piece of music. The machinery is of clockwork, and the various grades of time are measured on a balance-rod serving the purpose of a pendulum, the speed being regulated by a shifting or sliding weight. To be correct the metronome should beat seconds when set at 60. (125)

METZILLOTH, METZILLTHAIM, TZELTZELIM: [Heb.] These words are rendered in our version as *cymbals*, except in Zech. xiv. 20, where they are translated "bells of the horses," which is substantially correct, as little cymbals were formerly used in the trappings of horses. The cymbals used by the Hebrews were probably similar in form to those of the ancient Egyptians. They were found in the tomb of a certain musician-priest named Ankhape, lying close to his side. They are very small compared to modern instruments of the same class, being not more than five inches in diameter. (125)

MeV: Abbreviation for mega (10⁶) electron volts of energy. (116)

MI: (1) A syllable used to indicate E, the third note in the scale of C. (2) In solmisation Mi always indicated the leading note. (125)

MICHAEL, ARCHANGEL: See **RULING MEDIUM**

MI CONTRA FA: The name given by the old contrapuntists to the tritone, which was always to be avoided – "mi contra fa est diabolus". It is not as some suppose, the simultaneous sounding of the tonic with the leading note; but, as the notes of the scale of C in old solfaing were named – fa, sol, la, fa, sol, la, mi, fa – the union or succession of the fa and mi would form the tritone, the leading note in the old scales always being called mi. (125)

MICROCOSMOS: The little world. Usually applied to Man. A smaller world is a microcosmos if compared with a larger one. Our Solar System is a Microcosm in comparison with the Universe, and a Macrocosm if compared with the Earth. Man is a Microcosm in comparison with the Earth, and a Macrocosm if compared with an atom of matter. An atom of matter is a Microcosm, because in it are all the potentialities out of which a Macrocosm may grow if the conditions are favourable. Everything contained in a Microcosm in a state of development is contained in the Microcosm in germ. (131) See **FRAC-TAL; MACROCOSMOS; MANDELBROT; MANI-CEPTION**

MICROINCH: A unit of length or displacement equal to 10⁻⁶ inches or 10⁻³ mils. (100)

MICROMETER: A unit of length or displacement equal to 10⁻⁶ meters. One micrometer equals 0.04 mil.

Also called micron. (100)

MICROMETER: Unit of length = 10^{-6} m (not used: microns). (5)

MICROPROX: A Bentley Nevada Proximitor which may be used to accurately and rapidly measure probe gap changes of a few microinches. (100)

MIDDLE C: The note standing on the first leger line above the bass stave, and the first leger line below the treble stave. (125)

MID-RANGE: Mid-range is a rather arbitrary term for the central portion of the audible range. In current usage, the term refers to frequencies anywhere from about 500 to 7000 Hz. An amplifier (or speaker) that emphasizes the tones in the 2000 to 5000 Hz range makes the soloist seem closer to the listener, but the falsified tone color may lead to listening fatigue. (103)

MIL: A unit of length or displacement equal to 0.001 inch. One mil equals 25.4 micrometers. (100)

MIL: An engineering term meaning onethousandth of an inch, is usually employed to specify stylus size. Common stylus diameters are .7 and .5 mil. The former can be used for all long-playing records (mono or stereo); the latter is best suited for newer stereo records. (103)

MIND: A crystal. (125)

MIND: "The earth and the universe, as related to man, came into being through the Mind - Mind - of the Maker, and, as such, has its same being much as each atomic force multiplies in itself -" (900-227) (2) See **FORCE-LIFE, FORCE-ATOMIC, FORCE-MIND, FORCE-MENTAL, DOMINANT**

"For, of the dust of the earth was the body-physical created. But the WORD, the MIND, is the controlling factor of its shape, its activity, from the source, the spiritual the spiritual entity." (263-13) (2)

"Then MIND, as He, was the WORD - and dwelt among men; and we beheld HIM as the face of the Father." (1567-2) (2)

"Because our mind, the Son, is within us."

"Then with that consciousness of His awareness, we may know even as He has given, "Ye abide in me, as I in the Father - I will come and abide with thee."

"In that consciousness, then, the purposes for which each soul enters materiality are that it may become aware of its relationships to the Creative Forces or God; by the material manifestation of the things thought, said, DONE, in relation to its fellow man!" (1567-2) (2)

"The action of the mind itself is a vibratory etheric

evolution, controlling the physical, its negative power being depreciatory in its effects, and its positive influence elevating." (Keely)

Definition of the word **MIND**:

"That which is the active force in an animate object; that is the spark, or image of the Maker. Mind is the factor that is in direct opposition of will. Mind being that control of, or being the spark of the Maker, the WILL, the individual when we reach the plane of man. Mind being and is the factor governing the contention, or the interlaying space, if you please, between the physical to the soul, and the soul to the spirit forces within the individual or animate forces. We have the manifestation of this within the lowest order of animal creation. These are developed as the mind is developed, both by the action of all of the senses of the body, as we have them developed in man. MIND is THAT that reasons the impressions from the senses, as they manifest before the individual.

"THE ACTIVE PRINCIPLE THAT GOVERNS MAN. MIND a factor, as the senses are of the mind, and as the soul and spirit are factors of the entity, one in all, all in one. We are speaking from the normal plane, of course. As the impressions are reached to the storehouse of the body, the mind is that factor, that principle, that portion that either segregates, correlates or divides the impression to the portion needed, to develop the entity or physical force toward the spark or infinite force, giving the life force to the body. The mind may be classified into the two forces - that between the physical and soul, and that between the soul and spirit force. We see the manifestations of this, rather than the object or the mind itself. We find this always manifested through one of the senses, the same as we find the Psychic force a manifestation of the soul and spirit; the MIND a manifestation of the physical.

"With the division of the mind force as given, we see why in the physical plane individuals become misunderstood and misrepresented. They do not reach the same manifestations from other individuals. Hence the expression, "They are all of one mind." "To DO GOOD, they become of one mind, TO DO EVIL they are many." The nearer approach the mind comes to the divide, between the soul and spirit forces, the nearer we become to that infinite force that guides when it is allowed to the individual's actions day by day."

Definition of "**SUB-CONSCIOUS MIND**":

"That lying between the soul and spirit forces within the entity, and is reached more thoroughly when the conscious mind is under subjugation of the soul forces of the individual or physical body. We may see manifestation in those of the so-called spiritual-minded people. The manifestation of the subconscious in their action. That portion of the body, better known as the one that propagates or takes care of the

body - physical, mental, moral or what not, when it is not able to take care of itself." (3744-1) (2)

MIND FORCE: The sympathetic conditions that we call mind are no more immaterial in their character than light or electricity. The substance of the brain is molecular, while the substance of the mind that permeates the brain is interetheric and is the element by which the brain is impregnated, exciting it into action and controlling physical motion. In order to trace the successive triple impulses, taking the introductory one of sympathetic negative outreach, towards the cerebral neutrals, which awaken the latent element to action, we find that mind may be considered a specific order of interatomic motion sympathetically influenced by the celestial flow and that it becomes when thus excited by this medium a part and parcel of the celestial itself.

The brain is not a laboratory. It is as static as the head of the positive negative attractor, until influenced by certain orders of vibration, when it reveals the true character of the outreach so induced. The brain is the high resonating receptacle where the sympathetic celestial acts, and where molecular and atomic motion exhibits itself, as according to the intensification brought to bear upon it by the celestial mind flow.

The question arises, Why is this condition of the (luminous) ether always under a state of luminosity of an especial order? Its characteristics are such, from its infinite tenuity and the sympathetic activity with which it is impregnated, that it possesses an order of vibratory, oscillatory velocity, which causes it to evolve its own luminosity. This celestial, latent power, that induces luminosity in this medium, is the same that registers in all aggregated forms of matter, visible and invisible. It is held in the corpuscular embrace until liberated by a compound vibratory negative medium.

What does this activity represent, by which luminosity is induced in the high etheric realm, if not to indicate that even this order of ether is bounded by a greater region still beyond? The activity of the corpuscles represents its outflow from the luminiferous track towards the molecular centers of neutrality, revealing the connecting link between mind and matter. These conditions of luminosity have no thermal forces associated with them, although, paradoxically, all thermal conditions emanate from that source. The tenuity of this element accounts for it. It is when the streams come in conflict with crude matter that heat is evolved from its latent state and a different order of light from the etheric luminous is originated, the sun being the intermediate transmitter.

All planets and systems are sympathetic intermediates, the whole of one system, connected in sympathy for each other, the brain of Deity." (11) See **FORCE**, **MIND** also **FORCE**, **THOUGHT**.

MINERAL DISINTEGRATION: The sympathetic

neutral flow from the molecular neutral centers to the neutral center of the mass aggregate manifests latent power in different manners. Keely disintegrated quartz and marble, which left behind an impalpable intermolecular dust, the latent force being dissipated as ether. He discovered this property of vibrations when working on his vibrator for overcoming gravity, when he placed a block of marble on one of his instruments to hold it down - probably on the airship model mentioned under Aerial Navigation. This experiment of disintegration of quartz is said to have been exhibited before quite a number of his friends and several years later he attempted to build two more similar devices from scale drawings without being able to achieve successful results from even accurate linear measurements.

"When disintegrating molecular mineral masses, there is no molecular collision when the component parts are forced asunder from their neutral centers under radiant dispersion. Their atomic neutral centers and interatomic neutral centers seek their medium of corresponding tenuity (similar density) in the far borders of the etheric field leaving all associated metallic masses behind in their virgin form." (11)

MINIKIN: A small sort of gut string formerly used on the lute, viol, and other stringed instruments. (125)

MINIM: A time character of the value of two crotchets. In modern music it is second in value to the semibreve now held to the time standard, but in ancient music it was, as its name implies, of the shortest duration. (125)

MINNIM: [Heb.] This word, which occurs in Ps. xlv. 8, and Ps. cl. 4, is probably a poetical allusion to stringed instruments generally. It is so rendered in the Bible and Prayer-book versions of the latter psalm. "Praise him with *stringed instruments* and organs." (Bible) "Praise him upon the *strings* and pipe" (Prayer-book). In order to bring out its meaning in Ps. xlv. 8, it has been proposed to alter the text thus: "out of the ivory palaces, *stringed instruments* have made thee glad." (125)

MINOR: Less, smaller. (1) Intervals are said to be minor when they contain one semitone less than major. (2) A scale is said to be in the minor mode when its third and sixth are minor. Formerly minor music was described as "with the lesser third." (3) Flute minor, Klein flute, a small flute-stop on the organ, or 4 ft. or 2 ft pitch. (125)

MINOR: [MUSIC] In music a system derived from certain primes in ratios descending. See **MAJOR** (8)

MINOR SCALES: [MUSIC] The minor mode or scale form is actually the Aeolian mode of medieval times; the Aeolian mode and the Ionian mode (our present major scale) are the only medieval modes which have been in general use since the Renaissance. The minor mode creates a different impression from the major, because of the difference in the ar-

rangement of the whole and half steps. There are three forms of the minor scale, and each has its own function. These are the natural or pure minor, the harmonic minor, and the melodic minor. (13)

MINORS: See TRIUNE STREAM

MISHROKITHA or MASRAKITHA: [Chaldaic] This word occurs four times in the book of Daniel, and is probably rightly interpreted in the Septuagint by Syrinx. (125)

MITOGENETIC RADIATION: Form of energy radiating from living tissue. Discovered by Alexander Gurvich, 1937 (90).

MITOS: A thread, a term sometimes used for the string of a lyre. (125)

MITOSIS: The splitting of the cell-nucleus. (121)

MIXED CADENCE: An old name for a cadence, consisting of a subdominant followed by a dominant and tonic chord; so called because the characteristic chords of the plagal and authentic cadences succeed each other. (125) See CADENCE

MIXER: Device that combines signals. (69)

MIXOLYDIAN: See GREEK MUSIC

MIXTURE: An organ stop, consisting of several ranks of pipes to each note. It is only used in combination with the foundation and compound stops, as it consists of high harmonics of the ground tone. (125)

MODE: (1) A scale. (2) A species of scale, as, major, mode, minor mode, Greek modes, etc. (125)

MOLD RELEASE: A lubricant that aids in part extraction from the mold. (102)

MODE SHAPE: The resultant deflected shape of a rotor at a specific rotative speed to an applied forcing function. Note, this is a three dimensional presentation of rotor lateral deflection along the shaft axis. (100)

MODEM FILTER: A filter designed to both pass and properly isolate FSK tone transmissions in MODEM-based (MODulator/DEmodulator) systems.

MODULATION: (1) Movement or graduation of sound. (2) A change of key. (125)

MODULATION: Any periodic change in a waveform. (69)

MODULATION: Modulation, in a broad sense, is the process of altering an electrical signal so that it carries some sort of information - music, speech, dots and dashes, *etc.*. In audio, the intensity of an otherwise steady electric current is varied in accordance with the sound wave patterns of the program. In ra-

dio, modulation refers to superimposing an audio signal on the radio frequency wave (the "carrier wave"). At the radio receiver, a circuit known as a detector then separates the audio signal from the carrier. Once the audio signal is recovered, it is amplified and fed to the speakers for reproduction of the original sound wave pattern. (103)

MODULATION, AMPLITUDE (AM): The process where variation in the amplitude of a vibration signal results in a modulation of the frequency of a carrier signal. AM is sometimes referred to as direct by tape recorder manufacturers. AM is used where high frequency signal recordings are needed (*i.e.*, gear mesh). (100)

MODULATION, FREQUENCY (FM): The process where variation in the amplitude of a vibration signal results in a modulation of the frequency of a carrier frequency. FM tape recordings have a low frequency response down to dc (zero Hertz). This allows recording of dc gap voltages. (100)

MOLAR CONDUCTANCE: (Lm) The molar conductance of an electrolytic solution is the conductance of a solution containing one gram mole of the solute (or electrolyte) when measured in a like manner to equivalent conductance. Seldom used.

MOLECULE: "Each molecule has three envelopes. In the first diagram this is illustrated as a sphere upon which has been traced a number of meridian lines. The next diagram shows the three envelopes. The outer hemisphere of one of the envelopes is removed to show the under envelope, the outer hemisphere of which is removed in still another part of the diagram to show the inmost envelope. The third diagram shows the position of the atoms which the rotating envelopes enclose. The fourth diagram shows the lines of interference of the rotating envelopes. There being three perfect envelopes, these of necessity must have six poles, to which add the neutral center of the sphere itself, comprising the origin of the septenary of mysticism which is universal in nature. The fifth diagram shows the subdivision of matter into atomic, atomolic, and atomolinic. A black disk representing a sphere shows the negative atom; two white disks also representing spheres illustrate the two positive atoms in the triad, completing the tertiary aggregation forming the molecule. Each atom is in turn composed of three atomoles; in the negative atom are three positive atomoles, positive in the sense of activity; in the positive atom are also three atomoles, two of which are negative, *i.e.*, passive, and one positive. The negative is always that which seeks the neutral center; the positive represents the active radiating energy: for instance, the sun is a medium for transmitting radiant energy of positive order, which all the planets receive negatively, *i.e.*, it focalizes upon their neutral centers. This order extends to infinity. The final diagram intends to further illustrate the compressing force of the rotating spherical and the protection of the neutral poles. In the rotating envelopes force acts in the opposite direction to its action in the revolution of the

earth, where the centrifugal action is greatest at the equator; and the greater the speed of rotation, the greater the center-fleeing force. In the case of the etheric envelope, however, the greater the speed of rotation, the more powerful is the centripetal (center-seeking) force which compresses the atoms within; the pressure, therefore, is greatest at the equator and gradually lessens toward the poles. If there were only one envelope, the tendency would be for the atoms to be oblate, to fly out at the poles, where the pressure is least. A beautiful provision of nature obviates this, by providing three envelopes, rotating one within the other, like three shells; the line of greatest internal pressure in each one of which being protected by the equatorial lines, the line of greatest pressure covering the line of least pressure on the others. Each of the three atoms is placed directly under one pole of each of the three envelopes. If the rotating envelope of the molecule were in any way checked in its motion, the enclosed matter would immediately burst forth, producing the phenomenon of disintegration, releasing from its previously pent-up condition a volume of matter many times as great as that before disintegration took place. Sound-force moving at certain rates of vibration negatizes the action of the rotating envelopes, producing conditions which result in their breaking up, followed by the separation of the atoms contained in those envelopes, and also of inter-molecular substance occupying space not taken up by the atoms. By successive orders of vibration the atoms, atomoles, and atomolini are disintegrated, and soon to the luminous order, where all control ceases." (8)

MOLECULE: For more of Keely's definition, See **ELEMENT**.

MOLECULAR: A term used by Keely to designate those rates of vibrations between the first and third octaves of the Electromagnetic Spectrum. See **RATES OF VIBRATION, LAWS OF BEING**

MOLECULAR AGGREGATES: "These are aptly described as solid, liquid and gaseous crystals. Keely does not claim their existence but his data indicates the effects of their combinations. They caused him considerable difficulty during certain stages of his experiments.

The individual molecules constantly oscillate through one-third the molecular diameter, with a frequency of 20,000 per second. The range of oscillation inducted molecular substances by the same initial vibration differs in degree, which can be measured in substances and metals and expressed mathematically. This was actually so done in certain substances and metals by Keely, who called this mathematical ratio of frequency transmission the "coincident of transmission."

All quiescent matter consists of compound molecules of different groupings. These groupings are in simple ratios. Each group is surrounded by an envelope in which occur axes of force, according to the form of

grouping and this form varies with each substance. The variations in form of the crystals are caused by varying attractions between the different internal molecular elements.

The variations in the mass chords of different substances are caused by nonuniformity of molecular groupings - non-uniform plus molecular aggregates. If all molecular groupings were alike, the mass chords of the same form and volume of different substances would be the same. (11)

MOLECULAR ATTRACTION: See **MAGNETISM, VANDER WAAL FORCES**

MOLECULAR CENTER: See **MOLECULAR DISSOCIATION**

MOLECULAR DISSOCIATION: "If our sight could reach into the remote depths of the interstitial spaces which exist between the molecular ranges, and observe their wonderful action, in their oscillating motion, to and from each other, as guided by the Infinite in their sphere of vibrating action could we comprehend the astonishing velocity of their gaseous capsules, combined as it were, paralyzed with amazement. But we would then only be bordering on the still more remote depths of the interstitial atomic realm, stretching far down towards the neutral depths of the interatomic; and again, still farther to the borders of its etheric neutral radiating center.

"If our earth were to be submitted to the force governing the rotative action of the molecule, in its gaseous envelope, and its oscillatory range of motion were in the same ratio to the differential magnitude of each, the force of the vibration induced by its atmospheric surrounding would, in a short time, disintegrate its full volume, precipitating it into a ring of impalpable inter-molecular dust, many thousands of miles in diameter. If brought face to face with such conditions we could better understand the mighty and sympathetic force which exists in the far remote domain of the molecular and atomic embrace.

"The question arises, how and by what means are we able to measure the velocity of these capsules and the differential range of their vibratory action? Also, how can we prove beyond dispute the facts relating to their sympathetic government? By progressive disintegration; this is the only way; and it is accomplished by the proper exciters of vibratory focalization; the introductory acoustic impulses which negatize their molecular, intermolecular, atomic and inter-atomic media of neutral attraction, towards their focalized centers of sympathetic aggregation.

"I hold that the sympathetic neutral flow which exists in this remote region is the latent power that, under the disintegration of water, is liberated; showing immense volume and infinite pressure. The same condition of latent power exists in metallic masses and, paradoxical as it may seem, exerts its force, under the proper exciter, only in a negative attractive

way, while in water in a positive one. In minerals under liberation this latent power seeks its medium of tenuous equilibrium, leaving behind an impalpable dust, that represents molecular dissociation.

"In order to get at the conditions which govern and give introductory impulses to that peculiar force which acts on the sympathetic medium that associates matter with matter, inducing magnetic antagonisms, it will be necessary to explain the triune conditions that govern sympathetic streams; as also the triune conditions of corpuscular association.

"All forces in nature are mind forces: magnetic, electric, galvanic, acoustic, solar, are all governed by the triune streams of celestial infinity; as also the molecular, inter-molecular, atomic, and inter-atomic. The remote depths of all their acoustic centers become subservient to the third, sixth, and ninth position of the diatonic, harmonic and enharmonic chords; which, when resonantly induced, concentrate concordant harmony, by reducing their range of corpuscular motion, drawing them as if towards each other's neutral center of attractive infinity.

"The sympathetic acoustic excitors, or impulses, are; 1st the third diatonic; 2nd the harmonic sixths neutralizing affinity; 3rd the enharmonic ninths - positive acceleration, which induces infinite trajectory velocity from neutral centers; in other words, neutral radiation.

"Every molecule in nature represents, without variation, the same chord. Variations that show up in the mass chord of different visible aggregations, are accounted for by the non-uniformity of their molecular groupings. If all were molecularly homogenous, the chord masses of all structures would be perfectly alike in their resonant impulses.

A computation of the conditions, already shown up in part, proves conclusively that the power of an electric magnetic wave at an outreach of ten inches would be, if properly developed, equal to a lifting force of 36,000 pounds on a disk but three inches in diameter. Ten of such on the periphery of a vibratory disk, 36 inches in diameter, would represent 360,000 pounds actual lift at one revolution per minute. Perfect depolarization at 100 times per minute would represent 360,000,000 pounds, lifted twelve times per minute, or 1000 horse power in the same time. An excess of 100 extra revolutions, under the same conditions, would mean 2000 horse power per minute.

By this new system, to perfect which I am now devoting all my time and my energies, dynamos will become a thing of the past, eventually, and electric lighting will be conducted by a polar negative disk, independent of extraneous power to run it, other than that of sympathetic polar attraction, as simple in its construction almost, as an ordinary typewriting machine.

When the triple introductory impulse is transmitted

towards the mass to be sensitized, it subserves the molecular concordant thirds and antagonizes the discordant sixths extending the range of their oscillating paths; and thus induces the highest order of repellant antagonism towards the center of neutral equilibrium.

"We will now follow out, in their progressive orders, the conditions necessary to give to these acoustic introductory impulses the power, as transmitted through the proper media, to induce molecular dissociation.

"First: If I wish to disturb and bring into action the latent force held in the embrace of any molecular mass, I first find out what the harmonic chord or note of its mass represents; and as no two masses are alike, it would seem to necessitate an infinite number of variations to operate on different masses; but such is not the case. All masses can be subserved to one general condition by the compound mechanical devices which I use for the purpose. We will suppose that the mass to be experimented upon, when chorded, represents B flat. Then, first, the negative radiating focalizing bar on the disk is liberated from its dampening rod, and associated with the magnetic defocalizing one. There are seven ranges of bars in all. (See symbol representing sympathetic transmissive chord of B flat, third octave on third diatonic.)

"The seven assemblings are in this order:

Dominant	Electro- atonic	Di
Harmonic Negative 3rd	Magnetic	
6ths I II IIII	Enharmonic III IIII IIII	7ths

Twenty-eight in number.

"The second step is to liberate, according to symbolic meaning, second harmonic bar on sixths, or neutralizing one, and third, enharmonic ninths, which is the one counting from negative sevenths. Now all is in readiness for the transmissive nodal wire, one end of which must be attached to the magnetic dispersing ring, over the negative sevenths cluster, and the other end to the high polar negative attractor. Then, one end of a transmitting wire, of very fine proportions of gold, silver and platina, is connected to the resonating sphere, and the other end to the mass to be experimented upon. I then give to the siren a rotatory impulse of a velocity to indicate the concordant of the mass attached. If the introductory settings are all right, the neutral center indicator will rotate with high velocity; and a single tap on the Chladni wave plate is all that is necessary to induce pure evolution.

"Either attraction or dispersion can be induced on any mass by setting the instrument to the proper triple introductory positions, towards the mass chords it represents, either positive or negative.

"This system of evolution might be expressed as disintegration induced by the intensified oscillations of interatomic electro-magnetic waves.

"How plainly this principle of harmonic sympathetic evolution indicates the structural condition of the atom as one of wonderfully complex form; as also is the progressive step toward it in the molecular and inter-molecular field.

"During the effect induced by disintegration of molecular mineral masses, there is no molecular collision when forced asunder from their radiating centers of neutrality. Their atomic and inter-atomic centers seek their media of tenuous affinity in the far borders of the etheric field, leaving all metallic masses, that are associated with them, behind in their virgin form.

"Keynote of electro-magnetic sympathy, transmissive combinations, 3rds, on the subdivision of first octave B flat, diatonic, 6ths, on same subdivision of 3rds, octave harmonic; and 9ths, on the same subdivision of 6ths, octave enharmonic.

"I find that there is no medium in the range of vibratory philosophic research, that is as unerringly exact, towards the center of sympathetic attraction, as the negative attractive influence of a certain triple association of the metallic masses of gold, silver and platina. In fact they are as accurate indicators of the earth's terrestrial sympathetic envelope, and its triple focalized action towards the earth's neutral center, as the magnet is an indicator of the diversion of the attractive flow of the dominant current of the electrical stream. Although much has been written on the subject, the conditions attending the continuous flow of the magnet remains a problem that has never been solved by any other theory. Yet the solution is very simple when harmonic vibratory influence is brought to bear upon it.

"The harmonic attractive chord, thirds, induces a nodal interference on that third of the triune combination of the terrestrial envelope, that is immediately associated with this medium of interference, and moves towards the negative pole of the magnet, then flows through it to reassociate with the full triune combination, through the positive, thus:

Dominant
Harmonic
Enharmonic

"The triune stream; one current of which is diverted from the Dominant, flowing in at the Negative end of the magnet; and out to join the triune terrestrial stream at the Positive end.

"The continuous flow of the magnet is merely a diversion of that portion of the terrestrial envelope that electricians have never controlled. This third current, of this triune stream, has never been subdivided and only slightly diverted towards the negative pole of

the magnet, flowing unbrokenly back to associate sympathetically with the full triune combination of the earth's neutral force. Thus the problem is solved of the continuous and never ending force of the magnet, in carrying its load without any diminution of its energy. There is no influence, as yet known, that can break up its line of sympathetic flow as associated with the triune combination. Polarization and depolarization, in its action, is nodal negative interference, intermittently excited, inducing differential disturbance of polar sympathetic equilibrium.

"The attractive power, evolved by a magnet in sustaining its load, is no evidence that it is molecularly attractive; for, under the influence of the dominant current of the electric stream, the range of its molecular mass is not extended; but by the action induced in atomic vibration, the latent, or undisturbed power, that is locked up in its atomic embrace, is put into sympathetic action, and evolves the force that is recognized as magnetic. When its exciter is removed, it returns to atomic recesses to remain perfectly latent, until again brought into action by its proper exciter.

"When a steel unmagnetized bar is associated with a magnetized one, the latent force in the unmagnetized one is sympathetically brought into action, associating itself to the magnetic one, without depreciating the power of it one iota. Dissociation and association between the two bars can go on indefinitely with the same result.

"The suspension and propelling of an atmospheric navigator of any number of tons weight, can be successfully accomplished by thus exciting the molecular mass of the metal it is constructed of; and the vibratory neutral negative attraction evolved, will bring it into perfect control, commercially, by keeping it in sympathy with the earth's triune polar stream. There is enough of this latent power locked up in the embrace of the iron ore, that is contained in our planet, which, if liberated and applied to proper vibratory machinery, would furnish force enough to run the commercial power of the world; leaving millions of times more to draw upon, as the needs increase. The velocity of the vibration governing the flow of the magnetic stream, comes under the head of the first inter-atomic, and ranges from 300,000 to 780,000 vibrations per second; the first order above odor permeating the molecules, of the glass plate of the compass (with the same facility that atmospheric air would go through an ordinary sieve through which it passes), to arouse sympathetically in the needle the concordant condition that harmonizes with its own. The course of this sympathetic flow is governed by the full harmonic chord; and, consequently, moves in straight lines; thus transmitting its sympathy free of molecular interferences.

"The order of vibration associated with the transmission of odor acts by sympathetic negative interference; and, consequently, moves in circles, with a velocity of 220,000 per second, at least.

"If in any way the circle of its rotatory diameter could be reduced to that of its corpuscular structure, then a bottle containing an odorous substance, though sealed as hermetically as an Edison light bulb, could no more confine its corpuscles than an open chimney the smoke ascending from the fire burning at its base.

"The sympathetic influence of the terrestrial envelope gets its introductory impulse from the infinite depths of the earth's neutral center. This impulse radiates in undulating lines far enough into etheric space to become sympathetically associated with the etheric (or Infinite) under the same conditions that associate the mental with the physical organism of man. We can define man's molecular condition in its physical organism as the earth, and its connective link with the convolutionary cerebral centers as the Infinite etheric domain. Thus, we have, represented in the planetary masses moving in etheric space, the same conditions of governing rule as exists between the mental and physical forces.

"With this medium it is plain to see how simply God works, as well as mysteriously, His wonders to perform; the mental forces kept vitalized from the great storehouse of the etheric realm, and, in controlling the physical, the deficit caused thereby renewed and kept balanced by the power of its sympathetic concordant receptiveness.

"Any visible molecular mass of metal can be so impregnated by triple orders of sympathetic vibration as to give it the same sympathetic transmittive qualities that exist in the mental forces, which make such mass subservient to either the attractive or repulsive conditions of terrestrial sympathy.

"Gravity is nothing more than a concordant attractive sympathetic stream flowing towards the neutral center of the earth. This force is inherent in all visible and invisible aggregated forms of matter, from the very birth of a planet, around whose center the molecules cluster by the sympathetic affinity which is thus induced. If these conditions had always maintained a neutral position in etheric space, no planet would ever have been evolved. These conditions have been fixed by the Infinite. These rotating neutral centers, set in celestial space, have been endowed with the power of rotation to become their own accumulators. It is through the action of these sympathetic forces of the Infinite etheric realm that planets are born, and their volume of matter augmented.

"If we pick up an object we feel a resisting power in it which physicists call gravity; but they do not explain what gravity is. It is simply a sympathetic flow, proceeding from the molecular centers of neutrality; which flow is concordant with the earth's neutral center of same, seeking this medium of its affinity with a power corresponding to the character of its molecular mass. There is no actual weight in the molecules of the mass of which the earth is composed. If the sympathetic negative polar stream that

flows towards the neutral center of the earth were cutoff from it, the earth's molecular mass would become independent, and would float away into space as would a soap bubble filled with warm air.

"The gravital flow comes, in this system, under the order of the sympathetic concordant of the 9ths, and belongs to that third of the triune combinations called polar propulsive.

"Magnetism is polar attraction.

"Gravity is polar propulsion.

"Both magnetism and gravity can be accelerated by the proper medium of sympathetic vibratory influences." John Keely in (1) Chapter 19 See **LAWS OF BEING, ATOMIC THEORY-KEELY'S**

MOLECULAR DISSOCIATION: "One fork of 620, is used, setting the chords on the first octave." (1) See **WATER, MASS, ACCELERATING DISSOCIATION**

MOLECULAR DISSOCIATION: He has discovered the range of molecular motion in all quiescent masses is equal to one-third their diameters and that all extended range is induced by sound force, set at chords of the thirds which are antagonistic to the combined chords of the mass of the neutral centers that they represent, and that at a certain increased range of molecular motion, induced by the proper acoustic force, the molecules become repellant, and that when the sympathetic centers are influenced by a vibration concordant to the one that exists in themselves, the molecules become attractive; that the repellant condition seems to take place at a distance of about ten of the diameters of the molecules, this distance representing the neutral line of their attractive force, or the dividing line between the attractive and the repellant. Beyond this line, perfect triple separation takes place, inside of it, perfect attractive association is the result. (11)

MOLECULAR EQUATION: "The principal difficulty rests in equating the thirds of the thirds of the transmitters (*i.e.*, the gold, silver, and platina sections, of which the transmitting wires are composed) to free them of molecular differentiation. The full control of this force can never be accomplished, until pure molecular equation is established between the nodal interferences (that result in their manufacture) and the chord mass of their sectional parts. When this has been done, the chasm between the alteration of the polar forces, which now exists, preventing the inducing of polar and depolar conditions, will be bridged over and commercial benefits at once established as the result. The devices for inducing these conditions, primarily, are perfect; but the pure, connective link on transmission has to be equated, before continued mechanical rotation and reversion can be attained." Keely in (1) pg 334

MOLECULAR ETHER: See **UNIVERSAL FLUID**

MOLECULAR FIELD: See Chart section

MOLECULAR FLOW: See Chart section

MOLECULAR FOCALIZATION: See INTRODUCTORY IMPULSE, FOCALIZATION, CENTRALIZATION, LAWS OF BEING

MOLECULAR INTERFERENCE: See MOLECULAR DISSOCIATION, ODOR, MASS, MAGNETIC POLAR STREAM

MOLECULAR MAGNETISM: Is the same as COHESION.

MOLECULAR MASS: See MAGNETISM, SYMPATHETIC OUTREACH, VIBRATORY NEUTRAL NEGATIVE ATTRACTION, GRAVITY

MOLECULAR MOTION: "Keely has discovered that the range of molecular motion in all quiescent masses is equal to one-third of their diameters, and that all extended range is induced by soundforce, set at chords of the thirds which are antagonistic to the combined chords of the mass of the neutral centers that they represent, no two masses being alike, and then at a certain increased range of molecular motion, indeed by the proper acoustic force, the molecules become repellant, and that when the sympathetic centers are influenced by a vibration concordant to the one that exists in themselves, the molecules become attractive; that the repellent condition seems to take place at a distance of about ten of the diameters of the molecules, this distance representing the neutral line of their attractive force, or the dividing line between the attractive and the repellant. Beyond this line, perfect triple separation takes place; inside of it, perfect attractive association is the result." Bloomfield-Moore

"The lower the range of motions on the molecular vibrations of these structures, the greater is the attractive force that holds them together, and vice versa." (11) See COHESION, NEGATIVE ATTRACTION, MASS, MOTION, LAWS OF BEING, ATOMIC THEORY-KEELY'S, WAVE MOTION

MOLECULAR MASS: See MOLECULAR DISSOCIATION, LAWS OF BEING, ATOMIC THEORY-KEELY'S

MOLECULAR MOVEMENT: Keely believed the molecular movement to be a series of harmonic elliptic movements accompanied by a slow apsidal movement, the combination of which would produce two circular motions of different amplitudes, corresponding to two lines in the spectrum. He states also his belief that each spectrum line, apparently simple, really consists of two or more lines, "probably compound triple" (9) lines. (11)

MOLECULAR OSCILLATING FREQUENCY: The molecules of all quiescent masses oscillates with a frequency of 20,000 per second, through one-third

their diameters. Every molecule in Nature represents the same chord. Any apparent non-uniformity is caused by different forms of crystal groupings. Although the frequency of molecular oscillations is the same, the range differs. (11)

MOLECULAR SYMPATHETIC TRANSMISSION: In setting the conditions of molecular sympathetic transmission by wire," writes Keely, "the same law calls for the harmonious adjustment of the thirds, to produce a non-intermittent flow of sympathy. Intermission means failure here. That differential molecular volume is required of sympathetic flow, seems at first sight to controvert the very law established by the great Creator, which constitutes harmony, a paradoxical position which has heretofore misled physicists who have propounded and set forth most erroneous doctrines, because they have accepted the introductory conditions, discarding their sympathetic surroundings. The volume of the neutral center of the earth is of no more magnitude than the one of a molecule, the sympathetic condition of one can be reached in the same time as the other by its coincident chord." See SYMPATHETIC TRANSMISSION, TREXAR, TREXNONAR

MOLECULAR VIBRATIONAL RANGE: The normal intermolecular oscillatory range in the molecules of a quiescent mass is one-third the intermolecular diameter. When the intermolecular oscillations are accented by antagonistic vibrations having the relative frequencies of thirds, the molecules change from a self-attractive condition to a self-repellent state. This change occurs at a radius of oscillation of about ten normal intermolecular diameters. Separation of the intermolecular triplets occurs outside this boundary and inside it the neutral center assumes control. Conversely, when a vibration concurs with the intermolecular oscillating frequency, self-attraction is intensified with all the attendant phenomena.

Keely states that when the oscillating molecular range exceeds 50% of "their" diameters, molecular subdivision takes place.

Silver represents the third, gold the sixth and platinum the ninth, in ratio of molecular range of oscillation, when submitted to vibratory induction. (11) See GOLD, SILVER

MOLECULE: All quiescent matter which can be sensed is molecular, of the first subdivision, and when solid, liquid, or gaseous, exists in the plus-molecular or crystalline state, held together in varying degrees of affinity.

The molecule itself is a world ruled by the same sympathetic forces that govern the planets of our solar system. Its three component intermolecules, each like a small sphere, oscillate within its shell-like etheric envelope with a frequency of 20,000 per second, and the molecular etheric capsule rotates about them with inconceivable velocity. Within the mole-

cule no intermolecule ever comes in contact with even its nearest attendant. Each is held by its gravital neutral center within its proper sphere of action. Molecular dissociation by intermittent vibration does not disturb in the next higher, the atomic subdivision, the fixed neutral center of the atomic triplets. Centripetal and centrifugal forces rule the orbits and revolutions of the components of the molecule in the same manner as interplanetary forces of the same type rule the elements of the solar system.

No pressure, however great, can cause molecular contact. Molecules never actually come in contact with each other. Enormous pressure can reduce the molecular volume and the tension thereby created on the molecular etheric capsule, which is rotating at an infinite velocity, induces heat or "thermal reduction". Heat from molecular friction is produced by all moving bodies whether solid, liquid or gaseous. (11)

MOLECULE, COMPLEX: "Complex molecules are unions of molecules with other molecules or atoms." (Keely)

MOLECULE, COMPOUND: "Compound molecules are unions of two atoms of dissimilar kind." (Keely)

MOLECULE, FORMATION OF: MacVicar, says of the creation of matter: "In the ether are constructed groups of ethereal elements generating material elements. The ethereal atmospheres tend to become confluent or spherical and the individualized nuclei seek juxtaposition, thereby forming molecules." (11)

MOLECULE, SIMPLE: "Simple molecules are formed by the union of two atoms of the same kind." (Keely)

MOLECULES: "All molecules of visible matter vibrate at 20,000 cps, across one third their diameters." (1) pg 305

MOLECULES: "In the same way that the mind flow induces motion on the physical organism, sympathetic flows on molecular masses induce motion on the molecular. The motion of the molecules in all vegetable and mineral forms in nature are the results of the sympathetic force of the celestial mind flow, or the etheric luminous, over terrestrial matter. This celestial flow is the controlling medium of the universe, and one of its closest associates is gravity...The molecule is a world in itself, carrying with it all the ruling sympathetic conditions which govern the greatest of the planetary masses. It oscillates within its etheric rotating envelope with an inconceivable velocity, without percussing its nearest attendant, and is always held within its sphere of action by the fixed gravital power of its neutral center, in the same sympathetic order that exists between the planetary worlds. The dissociation of aggregated molecules by intermolecular vibration does not disturb even to an atomic degree these fixed neutral points. Each even to an atomic degree these fixed neutral points. Each

molecule contributes its quota to the latent electrical force, which shows up by explosion after its gathering in the storm clouds, and then it returns to the molecular embrace it originally occupied. You may call this return, absorption; but it gets there first during corpuscular aggregation, and comes from there, or shows itself, during sympathetic disturbance of equilibrium." Keely in (1) pg 275-276 See **LAWS OF BEING, ATOMIC THEORY-KEELY'S, CORPUSCLES**

MONISM: The system which holds that the ultimate reality is one (*monon*). (121)

MONISM: Monism recognises one sole substance in the universe, which is at once "God and Nature"; body and spirit (or matter and energy) it holds to be unseparable. (121)

The different ideas of *monism* and *materialism*, and likewise the essentially distinct tendencies of theoretical and practical materialism, are still very frequently confused. As this and other similar cases of confusion of ideas are very prejudicial, and give rise to innumerable errors, we shall make the following brief observations, in order to prevent misunderstanding:

1. Pure monism is identical neither with the theoretical materialism that denies the existence of spirit, and dissolves the world into a heap of dead atoms, nor with the theoretical spiritualism (lately entitled "energetic" spiritualism by Ostwald) which rejects the notion of matter, and considers the world to be a specially-arranged group of "energies", or immaterial natural forces.

2. On the contrary, we hold, with Goethe, that "matter cannot exist and be operative without spirit, nor spirit without matter." We adhere firmly to the pure, unequivocal monism of Spinoza: Matter, or infinitely-extended substance, and Spirit (or Energy), or sensitive and thinking substance, are the two fundamental attributes, or principal properties, of the all-embracing divine essence of the world, the Universal Substance. (121) See **ONE FORCE, ONE SUBSTANCE**.

MONO: Monaural or monophonic refers to any record or sound reproducing equipment designed for only one channel, as contrasted to stereo, which employs two separate channels. (103)

MONOCHORD: A single string stretched across a board or sound-board, under which a moveable bridge can be moved at pleasure. By placing under the string a diagram of proportionate lengths of string required for the production of just intervals, the ear can be trained and experiments can be made. It was anciently called, or rather, the results obtained from experiments with it, the harmonic canon. (125)

MONODY: A song for a single voice, generally of a plaintive character. The term was originally applied to vocal solos in the church service. (125)

MONOTONE: To recite words on a single note without inflections. (125)

MONOTREMES: The lowest order of mammals. (121)

MONSTRA: Unnatural - usually invisible - beings, that may spring from corruption or from unnatural sexual connection, from the (astral) putrefaction of sperma, or from the effects of a morbid imagination. All such and similar things may pass from the merely subjective into the objective state; because "objective" and "subjective" are relative terms, and refer rather to our capacity to perceive them, than to any essential qualities of their own. What may be merely subjective to a person in one state of existence may be fully objective to one in another state; for instance, in delirium tremens, insanity, subjective hallucinations appear objective to the patient. (131)

MOON: "The moon has a polarizing effect, on the electrical nature of the nervous energy. It affects the delicate balance of the psychic aura. The moon on its part most affects the psychic self and the mind of man. When it waxes from new moon to full moon, it reflects at that time the maximum light of the sun. At that time it is most visible to man, and has the greatest influence on living things. In the last fourteen days of its cycle, from the full moon to the new moon, its light begins to wane. But it is in its first cycle, the ascending cycle, that the effects on man are the most positive. The second cycle, from the full to the new moon, is more or less negative in its effects on humanity. In the course of the positive period, the harmony between the moon and the Cosmic rays and the Cosmic forces is the greatest." (Lewis) See **NODES, THREE REVOLVING BODIES, FORCES-RADIAL, THREE REVOLVING BODIES, ASTRONOMICAL CIRCLES, AURA CHART**

MORPHOLOGY: Comparative anatomy, the science of organic form. (121)

MORTE: The death note of any hunted animal sounded upon a bugle. (125)

MOTETT: A vocal composition in harmony, set to words generally selected from the Scriptures, or to paraphrase of the sacred writings. (125)

MORULA: A stage of embryonic development when a mulberry-like (*morula*) appearance is presented. (121)

MOTHERING MEANING: Veda or Eternal Wisdom. (125)

MOTION: (1) The movement of a single part with reference to intervals taken by it. *Conjunct motion* takes place where the sounds move by single degrees of the scale, e.g., C, D, E, F; *disjunct motion* is when they move by skips, e.g., C, F, D, G. (2) The movement of two or more parts with relation to each other. *Similar* or *direct motion* is when parts move in the same di-

rection either by single degrees or by skips; *contrary motion* is when parts move in opposite directions; is when one part remains stationary while another moves. (125)

MOTION: Is the first aspect of positive polarity.

"All motion is thought, and all force is mind force." Keely pg 252 of (1)

"Macvicar foreshadowed the teachings of this new philosophy when he wrote, "All motion in the universe is rhythmical. This is seen in the forward and backward movement of the pendulum, the ebb and the flow of the tides, the succession of day and night, the systolic and diastolic action of the heart, and in the inspiration and expiration of the lungs. Our breathing is a double motion of the universal ether, an active and a reactive movement. This androgyne principle, with its dual motion, is the breath of God in man." The writings of the ancients teem with these ideas, which have been handed down to us from generation to generation, and are now flashing their light, like torches in the darkness, upon mysteries too long regarded as "lying outside the domain of physical science." Bloomfield-Moore

Every body capable of rotation or revolution is susceptible to the operation of force, which, applied, impels motion.

The hypothesis that motion can only be effected mechanically by pressure traction or contact is utterly useless and inefficient to properly explain even familiar movements, such as planetary oscillation, planetary revolution, nebular evolution, etc.

Polar and depolar differentiation result in rotatory motion. Inflowing sympathetic streams with expression of radiant energy, also give rise to rotation. From the seventh subdivision, the "compound interetheric" or "Soul of Matter" all forms of matter receive their introductory or first impulse. (11) See **LAW-FIRST PRINCIPLE, FIRST CAUSE, SPIRIT, POSITIVE, LAWS OF BEING**

MOTION, ATOMIC: "The higher the range of atomic motion the greater is its tenuity, and the range is according to the registered pressure." Keely (1) See **MASS, FORCE-ATOMIC, SPIN WAVE, LAWS OF BEING, MOLECULAR MOTION**

MOTION, MATTER: See **MASS, FORCE-ACTIVE**

MOTION, ROTARY: See **ATOMIC ENERGY RADIATION ANGLE, ACTIVE PRINCIPLE, CIRCLE, FORCE-RADIAL, VORTEX MOTION, ATOMIC THEORY-KEELY'S**

MOTION, TIME: "Motion, when measured and proportioned by Time, manifests rhythm." (Lewis) See **INTER-MOLECULAR VAPOR, RHYTHM, TIME & SPACE**

MOTIVATIVE FORCE: See **FORCE, MOTIVA-**

TIVE

MOTIVE ENERGY: See **STABILIZATION**

MOTOR: See **CONVERTER.** (102)

MOUTH: The speaking part of an organ pipe, as opposed to the foot, through which the wind enters. (125)

MOUTHPIECE: That part of a wind instrument which is put into the mouth of the performer. (125)

MOVEMENT: (1) Motion of melody, or of parts. (2) A division, or definite portion of a work, as *first movement, slow movement, etc.* of a sonata or symphony, or other extended composition. (3) A portion of a musical piece separated from the rest by a complete change of time or key. (125)

MUKHYA PRANA: Fourfold. (126)

MULTICELLULAR: Organisms which consist of many cells. (121)

MULTIPLEX: Multiplex is a method of broadcasting in which two or more separate signals are broadcast simultaneously at the same frequency and from the same FM transmitter. This technique now forms the basis of stereo broadcasting, as it makes it possible for one station to send out both the left and the right channel of a stereo program. (103)

MULTI-PROBE WELDER: Assembly units having more than one welding head or converter horn combination. (102) See **GANG WELDER.**

MULTISUPERPARTIAL: Fractionary number in the form of $a^{+1}/_m$. (81)

MUMIA: The essence of life contained in some vehicle. (Jiva, Vitality; clinging to some material substance.) Parts of the human, animal, or vegetable bodies, if separated from the organism, retain their vital power and their specific action for a while, as is proved by the transplantation of skin, by vaccination, poisoning by infection from corpses, dissection wounds, infection from ulcers, etc. (Bacteria are such vehicles of life.) Blood, excrements, etc., may contain vitality for a while after having been removed from the organism, and there may still exist some sympathy between such substances and the vitality of the organism; and by acting upon the former, the latter may be affected. A case is cited in which a plastic operation was performed on a man's nose by transplanting on it a piece of skin taken from another person. The artificial nose answered its purpose for a long time, until the person from whom the piece of skin was taken, died, when the nose is said to have rotted. Cases are also known in which persons have felt a pain caused by the pressure of a stone upon a recently amputated leg, that without their knowledge had been buried, and the pain instantly ceased when the stone was removed. This sympathy existing be-

tween man's consciousness and his body is the cause that the astral form of a dead person may keenly feel any injury inflicted upon his corpse. The "spirit" of a suicide may feel the effects of a post-mortem examination as severely as if he had been cut up while alive. (131) See **RADIONICS; SYMPATHY; FORCE, LIFE**

MU-NEUTRINO: The neutrino given off in the decay of the mu-meson. (116)

MUON: [PARTIC PHYS] Collective name for two semistable elementary particles with positive and negative charge, designated u^+ and u^- respectively, which are leptons and have a spin of $1/2$ and a mass of approximately 105.7 MeV. Also known as mu meson. (4)

MUONIC ATOM: [PARTIC PHYS] An atom in which an electron is replaced by a negatively charged muon orbiting close to or within the nucleus. (4)

MUONIUM: [PARTIC PHYS] An atom consisting of an electron bound to a positively charged muon by their mutual Coulomb attraction, just as an electron is bound to a proton in the hydrogen atom. (4)

MURKY: A piece of harpsichord music having a bass consisting of broken octaves. (125)

MUSARS: Ballad singers of the troubadour period. (125)

MUSIC: "For music alone may span the space from the realms of the divine to the spheres of activity." (3509-1) (2)

"Hence, as the attuning of music... arouses emotions in the body to an unusual degree, well that there be choices made as to what the emotions are that are aroused by the character of music...choose that which is constructive in the experience, and know it must partake of that which brings peace to the soul and not gratifying of body or of an emotion of the body alone." (1406-1)(2)

"For remember, music alone may span the space between finite and infinite." (3659-1) (2)

"Music is the one element which may span the distance between the sublime and the ridiculous." (5253-1) (2)

"For it is not strange, that music, color, vibration are all a part of the planets, just as the planets are a part and a pattern of the whole universe." (5755-1) (2) See (6)

"For this is the manner... MUSIC... in which distances may be spanned; in which all realms of thought may find a greater outlet of expression; and in which the heart may be raised to a comprehension of the relationships. For, as is oft expressed, the angels seeing --- and the music of the spheres, as in

color and relationship -- this becomes the means or manner that is universal in its activity in its activity upon the minds and souls of men" (1938-1) (2)

"When illness or the like were to come about, soft music and the lighter shades or tones will quiet where medicine would fail... but the developing will come for the soul, for the spiritual portion, through the music." (773-1) (2)

"that the material expression in the music may find that which may be as from the spheres..." (5265) (2)

"music, - that is of the nature that brings into association those forces of the celestial as well as the mental and spiritual..."

"Then, give particular attention to the music in the experience of the entity; not only as the channel, but as an outlet for itself in its desires for expressions in the mental and the spiritual. For, hath it not been said that only music may span the space between the finite and the infinite? The entity's music maybe the means of arousing and awakening the best of hope, the best of desire, the best in the heart and soul of those who will and do listen. Is not music the universal language, both for those who would give praise and those who are sorry in their hearts and souls? Is it not a means, a manner of universal expression? Thus may the greater hope come." (2156-1) (2)

"..the entity was among those who first set the chants of the various peoples to any form of music... that establishing of the chants that aided in HEALING.." (2584-1) (2)

"Remember that music is the one element which may span the difference between the sublime and the ridiculous. It may arouse violent passion, yet it may soothe the beast of passion. It may bring up thoughts of home, of heaven, of loved ones; of the laugh of a baby, or the tears of a beautiful woman, or the arms of a loved one, or the jeers of a crowd." (7053-1) also (5253-1) (2)

"Music itself is a means or a manner of expressing the harmonies of the mental self in relationship to spiritual ideals and spiritual concepts. Hence as is the very nature of rhythm or harmony in the expression of tone or sound ... it is to arouse, does arouse the natures of the hearer to activity, either for uplifting the soul or the mind to activity or otherwise ... in the directions that are indicated by the harmony itself." (949-13)(2)

"For unless the activity of every individual is as the music of the surf, the rippling waters, the sky, the birds, the very nature itself, it has not accomplished and does not accomplish that as an uplifting experience for the individual soul or entity." (949-13) (2)

"Music ... because this may be only the basis: not as something to be practiced but as the basis of harmony in the life. As every expression is a means of

giving out the emotions, music is the greater manner of same." (2648-1) (2)

"The violin here. We see ... the entity gets the color rather than what is ordinarily called the tonal vibration, see? Though, of course, the tonal vibration is that which produces color. For, of course, color and tone are just different rates of vibration. (2156-1) (2)

"(She) supplied the music that would span the distances between loneliness and crowds, that would make for lifting the soul even in those periods when operations were performed under the soothing strains of (music). The entity perfected the stringed instruments. And when there was the roll of the organ, with the ecstasies reached in the Temple Beautiful, again the entity supplied same." (3234-1) (2)

Do learn music. It is part of the beauty of the spirit. For remember, music alone may span the space between finite and infinite. In harmony of sound, in harmony of color -- even in harmony of motion itself -- all beauty is akin to the soul-self's expression of harmony of the mind. That is, if all these are used properly in relationship to body.

Not that music is to be made the major portion of thy life. But let much of thy life be controlled by the same harmony which is in the best music -- yea, in the worst music also, for it too has its place. But cling to that which you experience by listening and watching a mother sing the lullaby of Brahms. Catch something that is shown in the love and emotion of the body as it sings the Song of Songs, or in the pure, true notes of Songs My Mother Taught Me." (3659-1) (2)

"For as you pour yourself out into music, in a way helpful to others, you are helping yourself also." (5253-1) (2)

"Then without music there cannot be found the complete expression sought; whether it be music by instruments, or the music of doing good, or the music found when just being quiet in themoonlight, or listening to the voices of the night. That is music of the soul..." (5164-1) (2)

"Music is what appeals to the latent and the creative force within the entity. For music alone may span the sphere from the sublime to the ridiculous -- from the finite to the infinite -- from the spheres of activity to realms of the divine. Music is like color, like tone, in that it is a destructive or a creative force -- depending upon that to which it appeals, in its influence upon individuals." (622-2) (2)

"As has been indicated, in the interpretation through the dance or through the athletic forces or dramatic forces that may bring to the mind and experience of others the glory of expressing the rhythm and the music of the inner self." (1207-1) (2)

"The entity was among those who added music to

the service (in an early Christian incarnation) that brought the oneness of mind; not only by the song, but by the music of the instrument. For then the stringed instruments were used, but the piano -- which should be used in the present -- is also by nature a stringed instrument. The entity, then, added to that hope and that faith which would span the varied realms of thought." (4099-1) (2)

"For the entity was a student under Saint Cecilia, who attained to the realms close to infinity; or was able to interpret the music of the spheres, which is as the voices of the night, therhapsody of the moon upon the water, and the voice of a sunrise." (5056-1) (2)

"It (the study of music) gives (a knowledge of) a rhythm that is as necessary as law, in making any success in a material experience. Some knowledge of music and some knowledge of law are necessary in the experience of every male individual." (903-3,4) (2)

The entity then was among those who supplied music in the Temple Beautiful, as well as (supplied) in the dance; or in the activities of the body to bring to the consciousness of individuals the change being wrought in the mental being, as physical change was wrought in the body, during temple service ... Hence the musical ability; the dancing ability come from this experience. Yet time -- or the activity of the feet in keeping time or beating time -- will be seen -- particularly with the right foot." (314-1) (2)

"Do keep the music of the spheres, the light of the stars, the softness of the moonlight upon the water or upon the trees. For nature in its song -- as of the birds, as of the bees -- makes music to the Creator, and this is contributed to man." (5265-1) (2)

Q-7: Are music, poetry and art only worldly and illusory?

A-7: "Know that they are of the realms of Creative Energies, which are of the Maker." (5265-1) (2)

"Music should be a part of each soul's development." (2780-1)(2)

Music should be life-giving flow: the interpretation of the emotions both physical and mental. A little later we should find these interpretations taking forms other than piano music; but this is the basis ... So begin with this ... and we will come into symphonies, to be sure. For music is that upon which the greater interpretation of the soul and mind may be based, in attuning the body to the Infinite." (3053-1)(2)

"As indicated, music is what appeals to the latent and the creative force within the entity. For music alone may span the sphere from the sublime to the ridiculous -- from the finite to the infinite -- from the spheres of activity to realms of the divine. Music is like color, like tone, in that it is a destructive or a

creative force -- depending upon that which it appeals, in its influence upon individuals." (3509-1) (2)

"Music! History of it, activity in it -- all such varied forms. If you learn music, you learn history. If you learn music, you'll learn mathematics. If you learn music, you'll learn almost all there is to learn -- unless something bad!" (3053-1)

"The music of a pastoral nature; that is, as attuning to the vibrations of flowers, the song of birds, the wind, the hail, the sleet, the snow; these in their roughness, yea in their quietness - all of these are appealing." (3374-1) (2)

"These (the reeds) are those that appeal more to the emotions in the body-forces of individuals, groups or masses ... They don't play the piano in battle; not because they can't carry the piano along to march by, but because it is the martial music from reeds and horns that rouses the emotions in these directions." (3407-1)(2)

Human individuals will not function in such cumbersome fashion as they do today. They will go about their tasks with the grace of dancers, performing to a music that each will hear on his or her own channel, the music of his or her own soul. Through melodies, God will sustain each of His contextual identities in supreme fulfillment. Specific melodies will change with each environment, with each moment, with each task. Yet a consistent overall pattern of musical relationship will constitute the new identity of Mankind. The song of the moment will be what each individual is in that moment, translated into an ever-changing musical score.

Music will be the informational medium through which the Totality of Consciousness informs each individual cell of its specific functional duties within that Totality. Individuals will participate in this music as well as listen to it. All humanity will be involved in Conscious Creation, immensely fulfilled in the capacities they serve. When an individual is not required in a functional capacity, he or she will be free to compose the score that will specify a route of musical travel within the body of Creation. (82)

MUSICAL CHORDS:

Dominant	Electro- atonic	Di
Harmonic Negative 3rd	Ma gn eti c	
6ths I II IIII	Enharmonic III IIII	7ths IIII IIIIII

III IIII etc. probably pertain to octaves as well as intervals.

He systematized the proper vibratory chords progressively from the introductory molecular to the interetheric, in seven distinct orders of triple subdivision. He writes "The introductory chord vitalizes the

whole machine. The chords will all be set in progressive sympathy from the first octave to the fortieth." And on 12/17/85 writes "Am setting up the circles for computing the different lines of etheric chords, used in setting up the vibratory conditions to obtain continuity. My chief difficulty is in chording up the masses of the different parts composing the negative centers, in the inner one-third volume of the sphere. This neutral center is only established when the rotation exceeds one hundred revolutions per minute, which is sufficient to neutralize gravity on the neutral third with the vibratory circuit running at 100,000 per second."

The sympathetic acoustic impulses are: the DOMINANT - adiatonic third - the HARMONIC - the connective "sixth" - and the ENHARMONIC - or diminished seventh - which Keely calls a ninth - inducing "infinite trajectory velocity" or "neutral radiation" from neutral centers.

The relations of the components of the electric streams are: Dominant E flat, harmonic A flat, enharmonic C double flat.

The keynote of electro-magnetic sympathy in "transmissive combinations" is:

THIRDS ON FIRST OCTAVE SUBDIVISION B FLAT DIATONIC

SIXTHS ON SAME SUBDIVISION OF THIRDS OCTAVE HARMONIC

NINTHS ON SAME SUBDIVISION OF SIXTHS OCTAVE ENHARMONIC

Through concordant disturbance of molecular oscillations, the relations of the component vibrations of matter may be altered by sounding the third, sixth and ninth of the scale.

Of these the third or DOMINANT, acting on a harmonically resonant mass, completely rearranges the modes of oscillation, either transforming the mass into its component initial forces or into some other form of matter.

The sixth or HARMONIC, through reduction of the range of molecular oscillation increases concentration or solidification.

The ninth or ENHARMONIC accelerates and extends molecular oscillation, causing molecular dissociation. This takes place when oscillation approaches, if not fully reaches, two-thirds of the molecular diameter.

The properties of the third and ninth are only displayed after use of the harmonizing concentrative chord of the sixth.

He states the "full harmonic chord" governs the magnetic flow and he infers from this that the mag-

netic flow moves in straight lines, free from molecular interference.

"In trexar vibratory transmission, any chord on the dominant will induce sympathetic affinity by molecular differentiation, the phenomena of which are similar in many ways to magnetism, but without a trace of true magnetism being present."

By means of the ninths, of which he was constructing an "infinite series" he believed he could perfect his "mechanical conditions" so far as to establish sympathetic affinity with pure, polar negative attraction minus magnetism. He writes "The infinite ninths I am now endeavoring to graduate to a sympathetic mechanical combination (his magnetic engine) will, if I succeed, complete my system and close my researches in sympathetic physics." (11)

MUSICAL GLASSES: A series of goblets of graduated sizes fixed in a case. The tone is produced by the friction of the fingers of the player on the edge of the glass. The instrument has been recently revived under the name of Copophone. (125)

MUSICAL SOUND: A musical sound is one which remains steadily at a definite pitch. A musical sound originates in the periodic motion of some body. A periodic or regular vibratory motion will always give rise to a musical sound, if the vibrations recur with sufficient, but not too great rapidity (frequency), and provided they are extensive enough. Musical sounds have three elements: Pitch, Intensity, and Quality. (68) See ASSOCIATED SOUND WAVE, PITCH.

MUSICI: A name given to the followers of the Aristoxenian system as opposed to the Pythagorean system. (125) See CANONICI

MUTATION: Change. (125)

MYSTERIUM MAGNUM: Original matter; the matter of all things; the ultimate essence; essentiality of the inner nature; specific quality of the semi-material part of things. All forms come originally from the Mysterium magnum, and all return to it in the end; the Parabraham of the Vedantins. (131) See COMPOUND INTER-ETHERIC; ETHER; MATTER

N

N-RAYS: Discovered by Professor Blondot, 1903. N-Rays demonstrate the following characteristics:

1. High refractibility
2. Great penetration
3. Exciting to luminescence
4. Increasing but not initiating phosphorescence
5. Reflectable
6. Polarizable
7. Focusable (90)

NAKED FIFTH: The interval of a fifth without a third. (125)

NANOMETER: Unit of length = 10^{-9} m (not used: millimicron). (5) **NARF:** Acronym for Natural Axial Resonant Frequency; usually refers to axially compliant couplings. (100)

NATURAL: A sign which restores a note to its place in the normal scale of C. It has the effect of sharpening a note previously flattened, or of flattening a note previously sharpened. It is an accidental, that is, it does not occur in the signature of a piece of music, unless at a sudden change of key. (125)

NATURAL HARMONICS: The sounds given off by any vibrating body over and above its original sounds. Overtones. (125) **See ACOUSTICS**

NATURAL FREQUENCY: The frequency of free vibration of a system. The frequency at which an undamped system with a single degree of freedom will oscillate upon momentary displacement from its rest position by a transient force. The natural frequencies of a multiple degree of freedom systems are the frequencies of the normal modes of vibration. **See RESONANCE.** (100)

NATURAL KEY: Key of C. (125)

NATURAL MODULATION: Diatonic modulation, as opposed to Chromatic. (125) **See MODULATION**

NATURAL PITCH: The pitch of a pipe before it is overblown. (125)

NATURE, LAWS OF: Natural Laws are those laws that govern even the rock that falls. This is called the Law of Gravity by science. The Law of Gravity is

formulated by man in an attempt to quantify and qualify "that which causes the rock to adhere to the earth" or words to that effect as we witness when the rock is released from a distance from the earth's surface (center). So in this instance, and there are many others, man's definition of this law is approximating that of Nature's. In the end, when we more fully understand Gravity, these two laws (man's interpretation and the actual law) will become one and the same law.

Every thing in the universe is born of other things and develops along certain lines and in certain forms. All this happens according to Natural Law or the operation of those forces (DNA, chemical, quantum mechanical, Newton's Laws of Motion, thermodynamic, etc.) in operation within the sphere and confines of the "thing" as it develops. Stars become stars born of the nebulous gases of the interstellar spaces. Dogs beget dogs and not cats. An oak tree begets little oak trees (from acorns) which in time, according to the rules (natural laws) that govern the genetics, chemical assimilations, thermodynamics, etc. through which such a tree grows, becomes a big oak tree and not a pine tree or some other aberration.

So in the end it is this collection of natural laws to which I referred to as a concept of "God" and not as many hold - a supernatural anthropomorphized being. One wonders what then created and regulates these laws - I have no idea. Can this be even known? Maybe - maybe not. A review of the entry **SYMPATHETIC VIBRATORY PHYSICS - FOUNDATION PREMISE** will cast more light on this expanding subject area.

This again is one of the aims of Philosophy - to find, learn & understand and then correlate scientific findings with those things we perceive and experience as parts of nature (life) into a meaningful and more complete understanding of everything so that eventually we can find a more harmonious and balanced life possessing greater meaning to each of us - personally. In other words: any philosophy must (should?) be a personal philosophy - one that helps each individual find hope, love, substance and reason for life.

I hold that to philosophize as points of conversation or a demonstration of logic sequences or for any oth-

er purpose than that of finding and determining a greater meaning and understanding of life is foolish and becomes as naught. (Excepting for the purposes of perfecting such techniques.) With no good being rendered to anyone in such an enterprise what good is it? Not much.

In the past few decades there has been and still is a tendency to de-personalize science, religion and philosophy to such an extent that we seem to be isolated and separate from nature going on around us. This is patently untrue and leads to many of the problems we are now facing such as pollution, hate/war, persecutions, injustices, etc. This concept of separateness has carried over into society and government such that most of us feel alienated from those very things that effect us to such a great degree.

Through analysis of the work of "great" scientists, philosophers, etc. we can eventually reach a better understanding of life and life's activities by looking through their eyes as it were. Not all of us can experience all the experiences of life in one lifetime and should (must?) look to the experiences and teachings of others to gather a fuller vision or experiential awareness. Thus the old philosophers have bequeathed an enormous gift of insight, experiences, theories, summaries and studies of their lives and works of yet others to us for our benefit should we take the time to review such work and correlate what we read to what we experience in our day-to-day activities.

It is through correlating (thinking) that knowledge and experience become synthesized into wisdom or useful awareness of and for our own lives. Without thinking there can be no meaningful assimilation into one's own personal life - which has been and is the stated goal of Philosophy. Dale Pond

NAVAZ: See **NIGHT-SIDE, SUN, SUN & HEAT, ONE SUBSTANCE** for complete description of these forces.

NEAPOLITAN SIXTH: A name, apparently without much reason, given to a chord occurring on the subdominant of a minor key, and consisting of a minor third and minor sixth. (125)

NEAR FIELDS: [Acoustics] Locations close to the sound source, between the source and the far field. The near field is typically characterized by large sound pressure level variations with small changes in measurement position from the source. (85)

NEAR-FIELD WELDING: Welding occurring within $\frac{1}{2}$ in. from the point of horn-part contact. (102)

NEBEL: One of the most important of the stringed instruments of the ancient Hebrews. It was not as ancient as the kinnor, but was probably of more elaborate construction. In all probability the nebel was a harp. It was portable because Saul met a company of

prophets "coming down from the high place with a nebel." (125)

NEBEN-DOMINANT: [Ger.] The dominant of the dominant, as D is in the key of C. (125)

NECK: That part of instruments of the violin and guitar class, which lies between the peg-box and the belly. To its upper surface is attached the finger-board or fret-board. (125)

NECROCOMICA: Visions of future events in the air. (131)

NECROMANTIA: Sorcery; witchcraft; the art of employing the unconscious Elementaries of the dead by infusing life into them, and employing them for evil purposes. (131) See **MAGIC**

NECTROMANTIA: The perception of the interior (the soul) of things; psychometry; clairvoyance. (131)

NEFER: Egyptian guitar, called also Nofre. (125)

NEGATIONS: See **SPACE**

NEGATIVE: See **FORCE-ONE, FORCE-ATOMIC, LAWS OF BEING**

NEGATIVE: "The positive may be considered as the active forces in their activity and the negative as those tending to keep the balance." (195-70) (2) See **POSITIVE, FORCE-ACTIVE**

NEGATIVE: The Negative, Terrestrial, Earthy polarity manifests as:

Harmonic
Red
Rigidity
Light
Linear
Crystalline
Odd number
Submissive
Nurturing
Receptive
Mother
Ma
Female
Concave
Hollow
Dark
B
Second Point
Destructive
Diminutive
Assimilative

NOTE: Negative *does not* mean opposite of good in any sense of the word. Negative is simply the opposite of positive. See **POSITIVE, VACUUM**

NEGATIVE AFFINITY: See **LAWS OF BEING**

NEGATIVE ATTRACTION: "Success was guaranteed when Keely changed his field of experiment from positive attraction to negative attraction." (1) See **IMPULSE-CREATIVE, LAWS OF BEING** "NEGATIVE ATTRACTION is the ENHARMONIC THIRD." (1) pg 364 See **ENHARMONIC, SYMPATHETIC NEGATIVE ATTRACTION, TRIUNE FLOW, LAW OF ASSIMILATION, FEMALE PRINCIPLE, NEGATIVE CENTER, IMPULSE-CREATIVE**

NEGATIVE CENTERS: "The negative center is included in the one-third volume of shell or sphere, starting from the neutral axis or point of suspension. This point of suspension only becomes perfect when the rotation is established on the sphere. One hundred revolutions per minute is all the velocity required to neutralize the gravity of the central third with the velocity of the vibrating circuit at one hundred thousand per second." (1) See **NEGATIVE ATTRACTION, AGGREGATION, NEUTRAL CENTERS, GRAVITY, COHESION, BARYCENTER, LAW OF ASSIMILATION, INTRODUCTORY IMPULSE, LAWS OF BEING, GEOMETRY**

NEGATIVE DISCORDANTS: See **RULING MEDIUM**

NEGATIVE POLAR STREAM: See **MOLECULAR DISSOCIATION, LAWS OF BEING**

NEGATIVE SYMPATHETIC OUTREACH: See **SYMPATHETIC OUTREACH**

NEGATIZATION: "Differentiation of mass, *i.e.*; discordant conditions produce negatization to coincident action." (1) Also is the act of imparting or imposing a negative influence or that which is inharmonious or disruptive to coincident action. See **DIFFERENTIATION**

NEGENTROPY: Reverse of entropy where entropy is made orderly or where discordance is made concordant, harmonic versus enharmonic. Order from chaos. An aspect of negative electromagnetism and negative time. (132) SEE **HARMONIZATION; COINCIDENCE; HARMONIC; SYNCHRONIZATION**

NENUFARENI: Elementals of the air. Sylphs. (131)

NEOVITALISM: A revived and modified belief in a specific vital principle in organisms. (121) SEE **VITAL FORCE; LIFE FORCE; BIOENERGETICS**

NEST: A holding fixture for locating and holding workpieces in position for assembly. (102)

NETE: Last string, in going up, of each of the two last tetrachords of the perfect system. (81) See **GREEK MUSIC**

NEUMES: The musical notations employed from the eighth or ninth to the twelfth century. Their origin is doubtful. Word derived from the Greek *pneuma*, a breath. (125)

NEURIC ENERGY: See **NEURICINESIS.**

NEURID ENERGY: See **NEURICINESIS.**

NEUROCINESIS: Discovered by Dr. E. Barety, Neuric energy or Neuricid emanates from the eyes, the finger-tips, and with the breathing. It penetrates dense materials but is absorbed by certain colors and water. (90) See **BRAIN, ETHER, DIFFERENTIATION, FORCE-MENTAL, FORCE-MIND**

NEUROLOGY: The science of nerve. (121)

NEUROPLASM: The material of the nerve-tissue. (121)

NEUTRAL CENTERS: "All the dominant conditions of nature represent the focal centers towards which like surrounding ones become sympathetically subservient." (1) pg 179

"Neutral centers are the focalized seat of sympathetic concordance for controlling any differentiation that may exist outside, or in the mass that surrounds them." (1) pg 255

"Neutral centers are the center of sympathetic coincidence." pg 220 of (1)

"Certain orders of vibration can reach these centers and establish a concordant flow of sympathy, and thereby equate differentiation that may exist." (1) See also **SYMPATHETIC TRANSMISSION, GRAVITY, NEGATIVE ATTRACTION, PRIME NEUTRAL CENTERS, BARY-CENTERS, LAW OF ASSIMILATION, DOMINANT, MOLECULAR DISSOCIATION, LAWS OF BEING**

NEUTRAL CENTER: "A center of introductory action is necessary in all operations of Nature." All structures require a foundation. This neutral center is the foundation.

"Every molecule, every mass, every moving body in space, every solar system, every stellar system, EVERY ROTATORY SYSTEM, is built about a NEUTRAL CENTER. It is the indestructible unit around which all that we recognize as matter is built. Immovable itself, it moves all things. Indestructible itself throughout infinity of time, it creates all things. It produced and preserves the incalculable energy of motion of the entire Universe. It bears the unthinkable burden of the mass of the Universe. It is the most wonderful thing Man has discovered in the Universe since he discovered fire.

"If we should take a planet of say 20,000 miles diameter and should displace a portion of the interior so as to have a crust of say 5,000 miles thickness, and at the center of the planet, place a billiard ball, that small mass, immeasurably smaller than the bulk of the earth, would bear the entire burden of the mass of the crust 5,000 miles thick and would keep it equidistant from itself. No power, however great, could possibly displace this central mass so as to bring it into contact with the crust. Furthermore, to move this central mass in any direction, would require a force

sufficient to move the entire mass of the planet, and in propagating or continuing any such motion the neutral center, this billiard ball, will at all time periods remain still in the exact center, bearing the same equidistant relation to its hollow shell. The mind staggers in contemplating the burden borne by this neutral center, where weight ceases." No less wonderful are other properties of the neutral center.

"It is the cause of the physical Universe. Its attraction condensed that which we recognize as substance. Matter was evolved from the affinity of this neutral center for sympathetic streams and since it is immovable, it caused, through negative attraction the formation of nodes in these streams, where the vibrations thereafter continued to meet in a center of sympathetic coincidence causing the permanence of form and matter. Every nebula, an embryonic world, is acted upon, created and preserved by this neutral center, and at the termination of its cycle, it is ultimately also destroyed by it, causing its absorption into the Unknown from whence it came.

"The actual neutral center of the earth is, in fact, even infinitely smaller than the billiard ball referred to above. It consists of a compound interetheric point in space, so small that were we to magnify a pin head to the size of the sun, and from that substance take a particle of matter the same size, again magnifying it to the size of the sun, the neutral center would still be invisible, even though the structure of this last substance was examined through the highest powered microscope ever created, or to be created. For the neutral center is INDIVISIBLE. Its attributes do not belong to matter, and pertain in no way to matter, which is but its exterior manifestation.

"Every aggregate mass consists of molecules, each of which has its neutral center where the three modes of vibration, dominant, harmonic, and enharmonic, meet in a center of sympathetic coincidence and are equated without cancellation of their energy." The proof of this assumption is that all matter responded to Keely's disintegratory process and must therefore consist of these fundamental modes of vibration.

"The fixed neutral center of the earth is the concentration or totalized power of all the several molecular neutral centers in the earth's mass. This neutral center, which is absolutely WITHOUT WEIGHT, an interetheric point in space, communicates direct by means of its outflow of sympathy, with every planetary mass in the Universe. Through its inflow of sympathy, through the solar intermediate, the sun, it receives the life flow from the SUPREME NEUTRAL CENTER that enables it to perpetuate its existence. Thus through the outflow from this Supreme Neutral Center that pivoting point of the Universe controls the existence and motion of not only every stellar, solar and planetary mass in space, but also the rotatory vibration, in every individual molecule, intermolecule, *etc.* through all the subdivisions of matter, thereby sustaining their existence and motion with the life flow.

"All foundations must be sufficient to bear their burden. Conceive then the Universe centered upon and resting the burden of is incalculable mass and kinetic energy on a vacuous interetheric point in space, so minute that it is actually INDIVISIBLE. This conception can only be fully comprehended by an infinite mind. Independent of time, because indestructible in its unity, independent in space, because through its properties space itself exists and without it would not exist, independent of matter because its properties in an external direction created all that we know as matter and gave it seeming permanence, the neutral center is that protean, uncreated, indestructible, forever-existing FIRST CAUSE. Without hands, without tools, without thought, without emotion, without love, without form, without substance, it, of itself, created all these. All that we see or can see in the objective Universe exists because of and by means of the properties and powers of the NEUTRAL CENTER.

"No machine heretofore constructed has been made with a neutral center. This conception of mechanics has never before dawned on man's thought field. Had this been done, perpetual motion would have become a demonstrated fact. Were a machine so constructed as to use its properties, an introductory impulse would suffice to run it for centuries. However, this would not be a useful mechanical contrivance for no more energy could be obtained from it than was originally given, and its only value would be as a timekeeper." Keely did not seek to invent, nor did he claim to have invented, perpetual motion.

His actual achievement was the forming within a sphere of a neutral center made independent of gravity and all outside influences. He writes (12/17/1885): "The neutral center is only established when rotation exceeds 100 revolutions per minute, which is sufficient, with the vibratory circuit running at 100,000 per second, to neutralize the influence of gravity on the volume of the neutral third of the sphere." The neutral center controls its sphere of operation, whether that mass controlled by it be homogeneous or complex. All differential mass antagonism is equated on the induction of certain orders of vibration. The structural conditions can be entirely adverse, even of unlike states --- gases with liquids, liquids with solids, solids with gases, its control will be as complete in one case as in the other.

"Besides the attractive quality in the neutral center which manifests itself in the law of individualization, of the attraction to itself of all other masses in space, is another and kindred phenomena, the opposite of the first, called by Keely "disturbance of equilibrium."

"The condition of unstable equilibrium was born in each neutral center, that by means of this arrangement, the neutral center might become the connective link or controlling tendency, holding these two properties in balance and assuming either phase at will.

Between the dispersing positive and the attractive negative it stands, the deciding factor, the Universal Will. Keely says: "The action that induces this property I call the connective link is sympathetic planetary oscillation." (11) **SEE QUATERNION; TRIPLE FLOWS; UNDIFFERENTIATION; ONE FORCE; CENTRALIZATION**

NEUTRAL CURRENT: The uncharged object exchanged when a neutrino scatters from a hadron. (116)

NEUTRAL EQUILIBRIUM: [MECH] or INDIFFERENT EQUILIBRIUM This results when the center of gravity of a body which is in equilibrium is in the central portion of the body, and cannot therefore arise into a higher or descend into a lower position. A sphere is always in neutral equilibrium. (84)

NEUTRAL NEGATIVE: See **VIBRATORY NEUTRAL NEGATIVE, MOLECULAR DISSOCIATION**

NEUTRAL NEGATIVE AGGREGATION: Same as **GRAVITY**, See also **MOLECULAR DISSOCIATION; QUATERNION**

NEUTRAL NEGATIVE ATTRACTION: See **GRAVITY, NEUTRAL CENTERS, FEMALE PRINCIPLE, MOLECULAR DISSOCIATION**

NEUTRAL NEGATIVE CENTER: See **NEUTRAL CENTER**

NEUTRAL MOLECULAR CENTERS: See **GRAVITY, COHESION, MOLECULAR DISSOCIATION**

NEUTRAL POINT: See **MOLECULES**

NEUTRAL RADIATION: See **MOLECULAR DISSOCIATION, LAWS OF BEING**

NEUTRAL SYMPATHETIC ATTRACTION: See **SYMPATHETIC OUTREACH**

NEUTRINO: A zero-mass uncharged particle emitted in the process of beta decay. (116)

NEUTRON: [PHYS] An elementary particle which has approximately the same mass as the proton but lacks electric charge and is a constituent of all nuclei having mass number greater than 1. (4)

NEUTRON: A particle of approximately the same mass as the proton, but uncharged. (116)

NEUTRON, "COLD": The adjective "cold" has been applied to neutrons with an average energy less than that of thermal neutrons. The quotation marks indicate that these neutrons are not produced by refrigeration but by a device which depends on the coherent scattering of slow neutrons. From the Bragg law

$$n = 2d \sin \theta$$

It is apparent that when L , the neutron wavelength, exceeds $2d$, where d is the grating spacing of the crystal, the value of $\sin \theta$ becomes greater than unity, which is impossible mathematically. Therefore there is no reflection. If a beam of thermal neutrons traverses a column of polycrystalline graphite, the neutrons which have wavelengths less than $2d$ will be reflected and ultimately be removed from the column. Thus the neutrons with the higher energies are not transmitted. Since $2d$ for graphite is 6.7 \AA the computed maximum energy of the transmitted neutrons is 0.002 ev . This is well below the average energy of thermal agitation for neutrons at room temperature. (67)

NEUTRON, EPITHERMAL: Consider an arrangement in which neutrons are being produced at energies much greater than thermal - say, by a source of fission neutrons. Also assume that the source of fission neutrons is surrounded by a moderator which slows the neutrons down until eventually they have energies in thermal equilibrium with the molecules of the moderator. At any location where complete thermal equilibrium has not been established, the distribution of neutron velocities will contain velocities which exceed any permitted by a Maxwell distribution for the temperature of the moderator. Such a distribution is called epithermal and the neutrons in it are called epithermal neutrons. (67)

NEUTRON, HIGH-ENERGY & ULTRA-HIGH-ENERGY: In the region of higher energies, neutron classifications based on energy are somewhat less sharply defined. Ordinarily, high-energy neutrons are assumed to have energies in the region from 0.5 to 10 Mev . Accelerator for producing particles of 50 Mev and above, often called the very-high-energy range, are not yet numerous. Relatively few sources of neutrons with this range of energies are available. Therefore much remains to be learned regarding the properties of very-high-energy neutrons. As efforts multiply in the development of accelerators to generate charged-particle radiations of energies greatly exceeding 50 Mev , the production of neutrons in the ultra-high-energy range becomes impossible. It is impossible to predict the ultimate limit of the upward extension of neutron energies. Enough exploratory work in the $1\text{-to-}5 \text{ Bev}$ region has been done to indicate the general tendencies of interactions of ultra-high-energy neutrons with nuclei. Fission and spallation of nuclei with atomic numbers below bismuth, as well as above it, are produced in this region. Also most nuclei appear to be relatively transparent to neutrons in the Bev range of energy. The cosmic radiation is also a source of neutrons with energies well above those which are likely to be produced by accelerators. However these cosmic-ray neutrons are not as accessible for study as neutrons generated by accelerators. (67)

NEUTRON, INTERMEDIATE: The region of energy between 1000 ev and 0.5 Mev is often considered the intermediate range of neutron energies. Less

information has been accumulated about intermediate neutrons than about neutrons of lower energies because of finding efficient detectors for the intermediate neutrons. In addition, sources of neutrons with energies in this intermediate range are not plentiful and there has been until recently little progress in studying their interactions. (67)

NEUTRON OPTICS: [PHYS] The study of certain phenomena, for example, crystal diffraction, in which the wave character of neutrons dominates and leads to behavior similar to that of light. (4)

NEUTRON-PROTON INTERACTION: This interaction is of basic importance to nuclear reactions induced by neutrons. Because the deuteron consists of a neutron bound to a proton by nuclear forces, it offers a natural system for the investigation of the mutual interaction between the neutron and the proton. The manner in which the proton and the neutron split apart in the disintegration of the deuteron is particularly significant. The binding energy of this combination is known from a variety of observations to be approximately 2.23 Mev. Any reaction which can introduce an amount of energy greater than 2.23 Mev offers the possibility of disintegrating the deuteron. The fact that the spin of the deuteron is equal to the numerical sum of the spin of the proton plus that of the neutron also shows that the spins of the proton and the neutron must be aligned parallel to each other in the deuteron. Of the possible ways of splitting the deuteron, that offered by the (y,n) reaction, sometimes called the photo effect, is most attractive. The only particles involved are the proton and the neutron. Consequently the disintegration of the deuteron has been investigated extensively both in theory and in experiment. This disintegration is, in principle, a dual process in which both the electric and magnetic fields of the photons play a role. The electric field reacts with the instantaneous dipole moment to split the neutron from the proton, leaving the spins parallel. At photon energies a few Mev above the threshold, the magnetic field of the photon radiation reacts with the magnetic dipole moments of the neutron and the proton to produce anti parallel spins. This spin-flop, originally pointed out by Fermi, is called the photomagnetic process. It becomes important at photon energies in excess of 20 Mev. The electric separation of the proton and neutron involves properties of the neutron-proton potential in the triplet state (parallel spins) and the photomagnetic process involves the singlet state (antiparallel spins). (67)

The radioactive capture of neutrons by protons is the inverse process to the photodisintegration of the deuteron, and theory applicable to one also fits the other. Because the theory predicts a vanishingly small cross section for the photoelectric process of slow neutrons, some other explanation is required for the observations which proved that neutrons have a measurable cross section for capture by hydrogen. It was the search for the explanation which led Fermi to the development of the theory of the photomagnetic process. With only S states ($l = 0$) involved, instead

of P state ($l = 1$), infrequent for slow neutrons, Fermi could show that the cross section should follow the $1/v$ law. Furthermore the photomagnetic process was adequate to explain the observed cross section of hydrogen for thermal neutrons. In spite of the theoretical as well as practical interest in the value of the absorption cross section of hydrogen for thermal neutrons, no very precise values have become available. The absence of information arises mainly from the difficulties in measuring such a small effect in a nuclear reaction which leads to a nonradioactive product. The best current values have been obtained by using pile oscillators in which the absorption of neutrons is detected by a decrease in the reactivity of the reactor and by measurement of the diffusion length of thermal neutrons in water. (67)

NEUTRON, RESONANCE: In the approximate range of energies between 1 and 100 electron volts, various nuclei exhibit strong absorption of neutrons at fairly well-defined energies. These absorptions are called resonance absorptions, and the neutrons having the corresponding energies are known as resonance neutrons. (67)

NEUTRON, SLOW: Neutrons with energies from zero to about 1000 ev are usually included in the category of slow neutrons. In this range a number of subclassifications occur. (67) See **NEUTRON, COLD; NEUTRON, THERMAL; NEUTRON, EPITHERMAL**

NEUTRON, THERMAL: When fast neutrons have been slowed down until the average energy of the neutrons is equal to the average thermal energy of the atoms of the medium, the neutrons are called thermal neutrons. The energies and corresponding velocities of the neutrons then depend upon the temperature of the medium. The distribution of the velocities approaches the Maxwell distribution $dn(v) = Av^2 e^{-Mv^2/2kT} dv$ where v is the neutron velocity, M its mass, k is Boltzmann's constant and T the absolute temperature. The maximum number of neutrons will have the energy kT . The value of kT at 20°C is approximately 0.025 ev. (67)

NEWTON: The unit of force. (75)

NEWTONIAN PHYSICS: (The Physics of Effects) Newtonian Physics are the descriptives of what humankind perceives or thinks it perceives. Undoubtedly his perceptions are based on sensorial witnessing of molecular, compound molecular (aggregate matter) and some atomic and a little sub-atomic phenomena (light, electricity). *Officially*, Man's perception does not include quantum (supra-photon) phenomena. Since it cannot be denied that an aggregate molecular substance (any *thing*) is a result of its quantum particles' characteristics - the study of aggregate matter is therefore a study of the effect(s) of these particles and not of the causes of its being what it is. Therefore, the concepts some people now consider such as Weight, Mass, Gravity, Force, Energy, etc. are the *net effects* of other sub-quantum causes and rightfully should be considered as human percepti-

bles (illusions) and not causative agents. In other words, Weight and Mass are not intrinsic attributes of aggregated matter but are created resultant attributes subject to some parameter of that which brings these phenomena into manifestation to our senses. For instance, a mirage in the desert is a *real* sensual perception but the *actuality* of the mirage is caused by vibratory iterations between heat, air and light. No one in their right mind would conclude that this humanly sensorial phenomena is actually in existence, it is an illusion - the mirage is an *effect* of subtler causes none of which are perceptible to our human senses but one - logic of the intellect.

•**MASS:** The quantitative or numerical measure of a body's inertia, that is, of its resistance to being accelerated.

•**WEIGHT:** The gravitational weight of a body is the force with which the Earth attracts the body. This force is proportional to the body's mass and depends on the location (distance from the center of the attracting body).

•**GRAVITATION:** The mutual attraction between all masses and particles of matter in the universe.

•**ENERGY:** The ability of one system to do work on another system.

•**FORCE:** Force may be briefly described as that influence on a body which causes it to accelerate. The acceleration of a body is proportional to the resultant force exerted on the body and is inversely proportional to the mass of the body.

•**RELATIVITY:** Encapsulates the above phenomena as referenced through sensorial perception.

Principle of Equivalence: On a local scale the physical effects of a gravitational field are indistinguishable from the physical effects of an accelerated coordinate system.

Questions unanswered in the above, which when answered totally destroys the above concepts and premises:

- 1) What causes attraction especially in particles smaller than an electron and not subject to electronic charge?
 - a) If it is not electronic charge that binds these small particles together, how is matter caused to be grouped together in the first place, from the inside out?
- 2) What causes repulsion or the opposite of attraction in these sub-electronic particles?
- 3) If superconductivity is resistance free motion of electrons, and electronic flow is governed by the above (energy or force overcoming mass or inertia) then how can superconductivity be accounted for?
- 4) The same question applies to radio transmitters and receivers. Is the explanation real-

ly energy overcoming inertia - the transmitted electron energy pounding the receiving electrons into resonance?

Answers to these questions can be found under **SYMPATHETIC VIBRATORY PHYSICS.**

NIGHTSIDE: "High grade explosives were known to us, but our employment of them was of much wider range than thine. If thou should cause these substances gradually to yield up their vast imprisoned force without fear of an explosion, thinkest thou that thy machinery would long be propelled by clumsy, because ponderous, steam or electric engines? If a great steam ship could dispense with its coal bins and boilers and, instead have dynamite in an absolutely safe compound form yielding, from what a man could carry in a handbag, force sufficient to drive the ship from England to America, or to send a train six thousand miles, how long wouldst thou see steam engineery? Yet this was a power and a least valued one at that, which we - possibly you certainly I - knew in the Atlantean life. It will be again with thee, because Our Race is coming again from devachan to earth."

But not alone this resource of power was ours; indeed, it was to our forces of the Night-side as an alcohol-vapor motor is to thy steam engines. The Night-side forces - what are they? At this place I will answer only by a counter-question, namely: The force of Nature, of gravitation, of the sun, of light, whence is it? If thou wilt answer me, "It is of God," so then will I make answer that, likewise, Man is the Heir of the Father, and whatsoever is His, is also the Son's. If Incal is impelled by God, the Son shall find how his Father doeth this thing, and shall presently do likewise again, even as Man did so once in Poseid. But greater things than these which we did might ye do; ye are now, ye were then; ye are Poseid returned, and on a higher plane!" "I have said that the Atlans recognized nature in its entirety to Deity externalized. Their philosophy asserted that force moved, not in straight lines but in circles, that is, so as always to return into itself. If the dynamism operating the universe acts in circular progression, it follows that an infinity of increase in vibration possible to One Substance would be an untenable concept. There must be a point in the circle where extremes meet and run the round again, and this we find between cathodicity and magnetism. As vibration brought substance into the realm of light, it must carry it out. It does so. It conveys it into what the Poseidi termed "Navaz, the Night-Side of Nature," where duality becomes manifest, cold opposing heat, darkness light, and where positive polarity opposes negative, all things antipodal. Cold is as much a substantial entity as heat, and darkness light. There is a prism of seven colors in each white ray of light; there is also a septuple prism of black entities in the blackest gloom - the night is as pregnant as the day. The Poseid investigator thus became cognizant of wondrous forces of nature which he might bend to the uses of mankind. The secret was out, the discovery being that attraction of gravitation, the law of weight, had set over against it the "repulsion by levitation"; that the first belonged to

the Light-Side of Nature, and the second to Navaz, the Night-Side; that vibration governed the darkness and the cold. Through this wisdom Atlantis found it possible to adjust weight (positiveness) to lack of weight (negativeness) so evenly that no "tug of war" was manifest. (24) See **POSITIVE VIBRATIONS, LEVITATION, ONE SUBSTANCE, SUN, SUN & HEAT**

NINETEENTH: An organ stop. (125)

NINTH, Interval of: A compound interval, equal to a second in the superior octave. It may be major, minor, or augmented. (125)

NINTH, Chord of the Major: A chord formed by a combination of thirds starting with the dominant or fifth of the scale, called by some writers the "added ninth", because it consists of a chord of the dominant seventh, with the addition of the ninth; by others the "dominant ninth", because it occurs on a dominant bass. It is composed of five sounds, and, therefore has four inversions. Like all chords of the ninth, in its inversions, the root or ground-note is seldom heard. (125)

NINTH, Chord of the Minor: One of the most important ingredients of modern music. Not only is it exceedingly beautiful to the ear, but from its peculiar form it gives the greatest possible facilities for modulation from key to key, whether closely related or not. It consists of a dominant, its major third, major (perfect) fifth, minor seventh, and minor ninth. In its inversions the dominant, that is, the root or ground-note, is nearly always omitted. The chord is as often found in music in a major key, as in that in a minor. The beauty of the inversions no doubt arises from the fact that they consist practically of a combination of minor thirds. The alteration of the notation of the inversion of this chord gives scope for rapid enharmonic modulation. Without altering the sound of a chord (ninth) it may be made to lead into any key. Such a change of notation as this, without a change of sound, is termed an enharmonic modulation. It has already been shown that the chord may resolve either into the major or minor mode; therefore the tonic minors of the chord, and also the keys related to them, may be reached with equal facility. (125)

NINTH, Chord of the Suspended: A name given to the chord of the ninth on the tonic, as opposed to that of the ninth of the dominant, owing to the fact that the former is more often used as a prepare discord than the latter. The ninth may or may not be accompanied by the seventh. The ninth and seventh are both used with the fourth, or, as it is more properly termed, the eleventh on the tonic; under "Suspension". The division of discords into discords of suspension, discords of retardation, discords by addition, and fundamental discords, is purely arbitrary, consequently hardly any two authors apply these names in the same way. It is hardly desirable that a simple and consistent method of arranging chords should be generally adopted. (125) **DISCORD; INTERVAL**

NINTHS: "At present (1892) Keely is concentrating his efforts on the perfecting of his mechanical conditions to that point where, according to his theories, he will be able to establish, on the "Ninths", a sympathetic affinity with pure polar negative attraction minus magnetism. In his own opinion he has so nearly gained the summit, or completion of his system, as to feel that he holds the key to the infinitely tenuous conditions which lie before him to be conquered, before he can gain control of the group of depolar discs that he is now working upon. Twenty-six groups are completed, and, when the twenty-seventh group is under equal control, he expects to have established a circuit of vibratory force for running machinery both for aerial navigation and for terrestrial use. If this result be obtained, Keely will then be in a position to give his system to science and to demonstrate the outflow of the Infinite mind as sympathetically associated with matter visible and invisible. In commercial use he asserts that when the motion has been once set up, in any of his machines, it will continue until the material is worn out. It is this claim which has caused him to be classed with perpetual-motion seekers." Bloomfield-Moore See **LAWS OF BEING**

NINTHS: The interval of an octave and a second, (21) See **INTERVAL**

NOBLE GAS: [CHEM] A gas in group 0 of the periodic table of the elements; it is monatomic and, with limited exceptions, chemically inert. Also known as inert gas. (4) See **INERT GAS**

NOBLE METAL: [METALLURGY] A metal, or alloy, such as gold, silver, or platinum having high resistance to corrosion and oxidation; used in the construction of thin-film circuits, metal-film resistors, and other metal-film devices. (4) See **GOLD, PLATINUM, SILVER**

NODAL INTERFERENCE: See **MOLECULAR DISSOCIATION, LAWS OF BEING**

NODAL LINE: See **ACOUSTICS**

NODAL MOUNTED PRESSURE ROD: A plunger secured to the nodal area of the horn and engaging the workpiece to dampen undesirable vibration manifest at the surface or interface of the workpiece. (102)

NODAL NEGATIVE INTERFERENCE: See **POLARIZATION & DEPOLARIZATION, MOLECULAR DISSOCIATION**

NODAL POINT (NODE): A point of minimum shaft deflection in a specific mode shape. May readily change location along the shaft axis due to changes in residual imbalance or other forcing functions, or due to changes in restraint, such as increased bearing clearance. This is often a location of minimum shaft absolute displacement. Motion immediately on each side of the node is 180 degrees out of phase. (100)

NODE OR NODE LINE: A point or line where minimal motion takes place. (75) *See* **ACOUSTICS**

NODES: "Nodes are warmer than the areas in motion of a vibrating medium." (6) pg 139

NODES: "When nodes are exact they will aggregate all matter within reach." (6) pg 235 *See* **SYMPATHETIC NEGATIVE ATTRACTION, NEGATIVE ATTRACTION, COHESION, LAW OF ASSIMILATION, SYMPATHETIC OUT-REACH, LAWS OF BEING**

NOISE: [Old Eng.] Music, or a performance of music. (125)

NOISE: Random signals which contain all audio frequencies. (69)

NOISE: Any component of a transducer output signal which does not represent the variable intended to be measured. (100)

NOISE: [ACOUSTICS] Unwanted sound which may be hazardous to health, interfere with communications or is disturbing. (85)

NOISE BANDWIDTH: The range of frequencies within which the output noise of a filter is specified or calculated. Important because measured noise is a function of bandwidth.

NOISE FLOOR: The residual level of filter or amplifier output noise, the lower bound on low level signal resolution.

NOMENCLATURE: In music the terms applied to the various signs employed to stand as the representatives of time, sounds, pitch, pace, and expression. (125)

NONIONS: Having no attraction - has ability to mingle with solvents of similar nature and not with solvents of dissimilar natures. *See* **NEUTRAL CENTER**

NONUPLET: A collection of nine notes to be played in the time of eight, or six. (125)

NORMAL MODES: Independent ways in which a system can vibrate. (75)

NORMAL PITCH: *See* **Pitch**.

NORMALIZED RESPONSE PARAMETER: A parameter expressed as the ratio between a fixed reference and a variable value of the same fundamental physical unit; this provides a convenient way to graphically display the response of a family of filters by, for example, plotting GAIN versus the ratio F_c/F , where the available fixed center frequency F_c might range from 0.01 Hz to 20 kHz.

NOTA: (1) In general, any musical sign. (2) In particular, the signs placed upon the stave which show

by their shape and position the duration and pitch of sound. (125) *See* **NOTE**

NOTATION: Early Systems of Musical notation, down to the invention of Notes. (125)

NOTCH FILTER: A filter which has a single rejection band extending from a finite lower cutoff frequency greater than zero to a finite upper cutoff frequency. Frequencies within the rejection band are eliminated or attenuated while frequencies outside the rejection band are retained. The opposite of band-pass filter. (100)

NOTCH REJECTION: The maximum rejection a manufacturer specifies for a notch filter at a specified frequency, but NOT necessarily the extreme (but poorly defined) attenuation that occurs in the notch.

NOTE: A sign of a sound made of various shapes to denote relative duration. Hence, the term is used generally for the sounds of which notes are signs, as when we say of a singer that his high notes are good, or that a player plays wrong notes. (125) *See* **NOTA**

NOUS: *See* **LIMBUS; SPIRIT; ONE SUBSTANCE**

NUANCES: Shades of musical expression. (125)

NUCLEAR DEMOCRACY: The idea that every particle is equally "elementary". (116)

NUCLEAR INTERACTIONS: Using a source of neutrons consisting of radon sealed in a glass tube with some beryllium powder, Fermi discovered that strong radioactivity was induced in such common elements as phosphorus, iron, silicon, and iodine when exposed to this source. The list of elements which showed some radioactivity after exposure to neutrons was considerably longer. These experiments marked the beginning of an entirely new method of producing so-called artificial radioactivity. The irradiation of stable isotopes with neutrons to produce radioactive isotopes was ultimately developed into the most prolific means of manufacturing radioisotopes in use today. In early investigations no mention was made of a moderator to slow down the relatively fast neutrons from the source. However, within a short time, it was realized that neutrons do not require kinetic energy to overcome Coulomb forces in penetrating the nucleus. Hence the chance of a reaction should increase as the transit time through the force-field of the nucleus became longer. In the original experiments in which neutrons were identified, the transfer of kinetic energy from neutrons to protons played an important role. Collision with protons is also the most effective means available for slowing neutrons. (67)

NUCLEAR PRECESSION: *See* **GYROMAGNETIC RATIO**

NUCLEONS: Because neutrons and protons within an atomic nucleus have similar properties, especially from a theoretical point of view, the term nucleon is

often applied to both. The characteristic of neutrons by which they are able to transform into the proton state inside and outside the nucleus, and the ability of protons to transform into neutrons within the nucleus, ties these two particles together as different aspects of a more basic structure. The investigation of the nucleon structure is now one of the most challenging problems of nuclear physics. (67) **SEE PROTON; NEUTRAL CENTER; NEUTRAL NEGATIVE ATTRACTION**

NUCLEON: A term referring to both the proton and neutron. (116)

NUCLEUS: The heavy positively charged center of the atom, composed of protons and neutrons. (116)

NULLING: Vector compensation at shaft slow roll speed for 1X electrical/mechanical runout amplitude and phase that would otherwise distort vibration measurements at higher shaft speeds. (100)

NUMBERS: See **QUANTUM ARITHMETIC, GEOMETRY, FORCE-ATOMIC-HEALING**

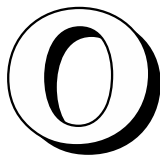
NUMEROLOGY: "The more the entity would comprehend [numerology], the more [it] may be used as [a] stepping stone in the application of self in its own entity and soul development. In an experience in the earth's plane each soul should gain the knowledge of those forces, conditions or experiences that may influence...a soul, the more...know that the influences are as guides, signposts, conditions. And the use of them may enable a soul to develop the more." (476-1 (2))

NUN: The 14th Hebrew letter, Nun (N), means a fish, a living creature born and intended to live in water. Fish have always been closely associated with divine activities in some peculiar manner, which accounts for the similitude employed in the story of Jonah, an ancient Hebrew poem fraught with extremely profound spiritual instruction and alluded to in the Christian gospels as containing a sign of permanent value to warn all who may ever be inclined to stray from the path of divine direction. Every student of comparative religion and philosophy must be impressed with the persistent frequency with which fish and processes pertaining to fishing are mentioned in close connection with the life and conduct of great spiritual teachers. Joshua, who succeeds Moses and actually conducts the Children of Israel into the Land of Promise, is styled in Exodus, Son of Nun. The name Joshua signifies a guide, a leader, deliverer, emancipator, and is the Hebrew equivalent of Jesus. (72)

NUT: The fixed bridge formed by a slight prominence or ridge at the upper end of the strings of instruments of the violin and guitar family. (125)

NYQUIST PLOT: A type of plot used to determine stability of servo design. This term should not be used when describing a polar plot presentation of rpm, amplitude, and phase angle of the 1X vibration

signal. The correct term for this presentation is polar plot. (100)



OATEN-PIPE: The simplest form of a reed pipe, a straw with a strip cut to form the reed, at the end closed by the knot. (125)

OBLIQUE MOTION: When one part moves and the other remains stationary. (125) See **MOTION**

OBOE: One of the most ancient, as also one of the most charming instruments of music. (125)

OBSERVATION: "With the limitations imposed by Nature on our vision, which cannot perceive time periods of less than one-tenth of a second, and the relative crudity of light, the wave length of which is many molecular diameters, we are not and never shall be, able to follow the molecules or intermolecules by means of light waves, in their nature frequency of oscillation. The finest researching instruments now in existence will never be able to calculate the time periods of propagation and transmission of the sympathetic vibratory processes. Direct observation can never establish a foundation in this line of research, for independent of the impossibility, the results would also be unreliable." (11)

OCCULTISM: The science that deals with things that transcend sensual perception and are generally little known. It deals especially with effects that cannot be explained by the universally known laws of Nature, but whose causes are still a mystery to those who have not penetrated deep enough into the secrets of Nature to understand them correctly. What may be occult to one person, may be fully comprehensible to another. The more the spirituality and intelligence of man grows and the more it becomes free of the attractions of sense, the more will his perceptive power grow and expand, and the less will the processes of Nature appear occult to him. What is occult is a mystery hence mysticism or the search to understand mystery or that which is occulted to view or understanding. (131)

OCTACHORD: [MUSIC] Eight-stringed lyre commonly attributed to Pythagoras. It includes two distinct tetrachords (that is, tetrachords separated by one tone). (81)

OCTAVE: (1) The interval of an eighth. It may be major, minor, or augmented. (2) The first note of the harmonic scale. (3) An organ stop of 4 ft. pitch on the

manuals, or 8 ft. on the pedals. (4) The eight days following a great festival of the Church. (125) See **SMALL OCTAVE; SHORT OCTAVE**

OCTAVE: [Vibration Analysis] The interval between two frequencies with a ratio of 2 to 1. Starting from a given frequency, one octave higher is twice that frequency; one octave lower is half that frequency. (100) See **SMALL OCTAVE; SHORT OCTAVE**

OCTAVE: [MUSIC] A doubling or halving. Usually applied to frequency, *i.e.*, a gain rolloff rate of 6dB per octave for each doubling or halving of frequency. See **SMALL OCTAVE; SHORT OCTAVE**

OCTAVE: [MUSIC] "For, as has been given respecting the various applications of conditions as respecting light or sound, force, power, or these radiations of this - these in forming the eight makes again the octave end, as given." (195-52) (2)

"Now we have that in this motor as is seen in varied elements that are as octaves in music. There are forces or pitches above and below the scale, as are applied to the human voice. There are colors above and below the spectrum, as applied by man in a nominal manner. There are the same octaves of force seen or applied in the various elements as go to make up the forces as applicable to elements in any generative force. Many, as seen, have been placed and given a name - without yet having been separated or brought into being by man as a used force. The same condition applies here in the operative element of the force as applied in mechanical means to the generative force in and through the (4666) motive force." (4665-8) (2) See **FORCE-CREATED, EIGHT, LEMNISCATA, SPECTROSCOPY, LAW OF OCTAVE, LIGHT, HEAT, SOUND, RATES OF VIBRATION; SMALL OCTAVE; SHORT OCTAVE**

OCTAVE BANDS: [ACOUSTICS] Frequency ranges in which the upper limit of each band is twice the lower limit. Octave bands are identified by their geometric mean frequency, or center frequency. (85)

OCTAVE OF DENSITY: See **LAW OF OCTAVE, GRAVITATION DIFFERENTIATION, MASS, MOLECULAR MOTION**

OCTAVE OF FORCE: See **FORCE**

OCTAVE, LAW OF: See **LAW OF OCTAVE**

OCTOCHORD: An instrument with eight strings. (125)

OCTUPLET: A group of eight notes which are to be played in the time of six. (125)

ODIC FORCE: "Seek then, ye, in understanding as to where, why, from what source, there may be gained the experiences of an entity, a soul, through its journeys in this the odic sphere, or through that known as this solar system." (254-68) (2)

ODOR: "For, there is no greater influence in a physical body...- than the effect of odors upon the olfactory nerves of the body." (274-7) (2)

"For odor is gas, and not of the denser matter that makes for such activity in individuals' lives as to make for the degrading things." (274-10) (2)

By considering the very large atmospheric volume that can be impregnated by a single grain of musk, we may gain some idea of the wonderful tenuity of Odor. The grain of musk gives off its odor for years and years, ever distributing its fragrance and yet no loss in weight can be detected.

That is atomic substance, Odor, with an atomic rotative velocity and frequency, can actually be confined in a molecular substance such as glass, is a great paradox. It is as strange a phenomena as it would be should we place fine sand in a sieve coarse enough in mesh to pass marbles, and not a single grain of sand would be found to slip through.

The unit atoms of Odor vibrates in a circular oscillating mode, with a frequency of at least 220,000 per second and its action is through sympathetic negative interference. Its rotatory diameter is so much larger than the Odor atom itself and even larger than the molecular inter-distance that it is held captive by molecular matter through interference with the molecular neutral centers, which it seeks to avoid. If its rotatory diameter could be reduced to its corpuscular diameter a bottle could no more contain Odor than an open chimney could contain smoke. The coarse glass molecules could not in that event prevent the Odor atoms from passing between them.

But fine as are the particles of Odor, they are very crude compared to the tenuity of that substance which acts as the governing medium for a sympathetic or magnetic flow. That subdivision is so attenuated that it comes to and above sound. (11) See **SYMPATHETIC NEGATIVE INTERFERENCE**, **SMELL**, **MAGNETIC STREAM** See also pages 271, 316 of (1)

ODYLE: 1. Odyle is a universal property of all matter in variable and unequal distribution both in space and time.

2. It interpenetrates and fills the structure of the universe. It cannot be eliminated or isolated from anything in nature.

3. It quickly penetrates and courses through everything.

4. It flows in concentrated form from special sources such as heat, friction, sound, electricity, light, the moon, solar and stellar rays, chemical action, organic vital activity of plants and animals, especially man.

5. It possesses polarity. There is both negative odyle, which gives a sensation of coolness and is pleasant; and positive odyle, which gives a sensation of warmth and discomfort.

6. It can be conducted, metals, glass, resin, silk, and water being perfect conductors.

7. It is radiated to a distance and these rays penetrate through clothes, bed-clothes, boards and walls.

8. Substances can be charged with odyle, or odyle may be transferred from one body to another. This is affected by contact and requires a certain amount of time.

9. It is luminous, either as a luminous glow or as a flame, showing blue at the negative and yellow-red at the positive. The flames can be made to flow in any direction.

10. Human beings are odyle-containers, with polarity, and are luminous over their whole surface, hence the so-called aura surrounding the physical body. In the 24 hours a periodic fluctuation, a decrease and increase of odylic power, occurs in the human body. (90)

OFFSET: The (typically) millivolt level residual output voltage with the filter input grounded. Many designs provide for externally nulling the offset, which will have a temperature coefficient expressed in microvolts/degree Celsius.

OIL WHIP: Occurs when the frequency of oil whirl approaches with a rotor natural frequency, usually a balance resonance. Oil whip has a nearly constant frequency independent of rotative speed. (100)

OIL WHIRL: A vibration of the self-excited (sometimes called free) vibration category occurring in rotor/fluid lubricated bearing/seal systems. This malfunction causes the shaft centerline dynamic precessional motion to be forward, and usually circular, and at a frequency proportional to the shaft rotative speed and in the range of 40-49 percent of the shaft rotative speed. The whirl mechanism is not limited to oil-lubricated bearings but can occur when any fluid (steam, process fluid, air, etc.) is between two rotating concentric cylindrical surfaces. (100)

OIOUEAE: The vowels of "World without end, Amen". an imitation of the *Evovae*, the vowels of "seculorum amen", used to designate the ending of a mode. (125) See **VOWEL**

OLIPHANT: The name of an obsolete species of horn, so-called because it was made of ivory (olifaunt, olivant, olyfaunce, being old forms of the word

elephant). (125)

OMBI: A harp used by negroes in Western Africa, the strings of which are made of fibrous root or creepers. (125)

ONÁGON: A Chippawa drum. (125)

ONE, SCIENCE AND RELIGION ARE: See **SCIENCE AND RELIGION ARE ONE; MONISM.**

ONE SUBSTANCE: "The one substance vibrates in different dynamic degrees, and sound, heat, light, electricity, are the effections of the one substance by specific degrees of the One Energy, and there is no difference between anything such as electricity and, say iron, save in rate of effection." (195-70)(2) See **RATE OF VIBRATION, FOURTH DIMENSION, ELECTROMAGNETIC SPECTRUM, ORDERS OF VIBRATION, NOUS, ETHER, SPIRIT**

ONE SUBSTANCE: Rutherford had been able to prove that alpha particles emitted by radioactive elements are nothing other than positively charged atoms of helium moving with a tremendously high velocities never before encountered in physics. (25)

ONE SUBSTANCE: "In consideration of natural laws, the philosophers of Poseid had come to the conclusive hypothesis and working theory that the material universe was not a complex entity but in its primality extremely simple. The glorious truth, "Incal malixetho," was clear to them, that is, that "God is immanent in Nature." To this they appended, "Axté Incal, axtuce mun," "To know God is to now all worlds whatever." After centuries of experimentations, recording of phenomena, deductions, analyzing and synthesizing, these students had arrived at the final proposition that the universe - not here dwelling on their wondrous astronomical knowledge - was, with all its varied phenomena, created and continuously kept in operation by two primal force-principles. Briefly stated, these basic facts were that matter and dynamic energy (which were Incal made externally manifest) could readily account for all things else. This conception held that only One Substance existed and but One Energy, the one being Incal externalized and the other His Life in action in His Body (As, in its outgoing impulse the Created draws from the Creator, it looks back to its origin and notes its progression-marks, that is, its multiplied realizations of its increasing separation from its Source. The greater this separateness, the greater the field (Matter) wherein these points appear, because the dividing element in the Created has noted more points, or in other words, more things, more material objects as being between it and its source. Only when we look back at these things we have sensed, these though-forms of God, do we perceive matter, for when we look forward to reunion with Him, matter disappears, giving place to Spirit.). This One Substance assumed many forms under the action of variant degrees of dynamic force. Because it was the basic principle of all natural and all psychic, but not of

spiritual, phenomena, allow here a postulate with which not a few of my friends will find themselves at least partially familiar, perhaps wholly so. Commencing with dynamic energy as first sensibly manifest in the example furnished by simple vibration, the Poseid position may be outlined as follows: A very low rate of vibration may be felt; an increase of rate heard. For example, first we feel the pulsing of harp-string(s), and then if the rate of vibration be increased we hear its sound. But substances of other sorts, able to endure greater vibratory impulses, manifest under more intense action, following sound first heat, then light. Now again, light varies in color. The first color produced is red, and thence, by a constantly augmenting vibratile energy, orange, yellow, green, blue, indigo, violet, each spectrum-band being due to an exact and definite increase in the number of the vibrations. Succeeding the violet, further augmentation gives pure white, more gives a gray, then more extinguishes light, replacing it with electricity, and so through an ever-increasing voltage until the realm of vital or psychic force is attained. This may truly be regarded as going inward from those manifestations of nature, of Incal or God, or the Creator, which are external; as going toward the internal from externality. A very brief study will show thee that the laws of physical world continue inward to their spiritual source; that they are, truly, but prolongations the one of the other. But, ere entering into the realm of vibration, whose doorkeeper is sound, we find that the One Substance vibrates in variant, but definite, dynamic degree, and that thence arise each and all of the diverse forms of matter; in short, the difference between any given substances, as gold and silver, iron and lead, sugar and sand, is not one of matter, but of dynamic degree solely. In this dynamic affection the degree is no loose limitation, for if the vibratile rate be a shade variant, lower or higher, than in any special material which may be under notice, the variation will be different in appearance and in its chemical nature; thus to proper substantial entities definite if enormous vibrations per second may be imparted, and the resulting substance (for light is substantial) is, say, red light, (red light is stated to occur at 395,000,000,000,000 vibrations of that "ether" which by Phylos is termed the form of matter below where matter ceases and mind begins. And the highest visible light vibration is placed at 790,000,000,000,000. So says science. But Phylos says: "Vastly higher than the high purple range where light ceases ordinarily to be visible, the One Substance again vibrates visibly. As a synchronous harp-string that responds to key of low C, for example, struck on another harp, will also respond to every C in the whole register, be it low, or middle, or high, so the One Substance responds at 831,000,000,000,000; at, again, the next octave of vibration, and again at the next, where it becomes visible as the fatal Unfed Light, called in Atla the "Max-in," and again, by the Tchín as the "Vis Mortuus.") but if one-eighth greater it will be orange, and if more or less, then the resultant must inevitably be a reddish orange, or a yellowish, respectively. It thus appears that certain definite degrees exist as plainly as mile-posts, and that these major degrees are absolute. In

other words, the One Substance is not as readily kept between these greater definitions as upon them, a fact which explains the tendency of composites, or intermediate affections, to decompose into the definite or simple elements; chemical compounds are not as stable as chemical primaries. The modern "wave theory," that sound, heat, light and correlatives are but forms of force, is only half correct; they are this, but they are more also. They are, in brief, affections of the One Substance by specific degrees of the One Energy, and except that the rate of this affection is vastly greater in the case of electricity than in that of lead or gold, there is no difference between these widely diverse appearing things. This is the energy by the Rosicrucians named "Fire," that which gives entrance to that mysterious realm of nature penetrated only by the adept thaumaturgist, magician. Call these students at whose will all nature bends obedient, by whatever name best pleases thee, only bearing ever in mind that the real Magian never speaks of self or works, and is not known by his fellows to be what he is, save an accident hath revealed the secret. To this membership belonged He at whose command the winds and the waves were stayed on tempestuous Galilee. But he spoke not of Himself. Of that sublime brotherhood I will relate much ere long. No better proof is needed that all the variant manifestations are but variants of the odic force, the Rosicrucian "Fire," than this: offer resistance to an electric current, thereby reducing or diverting it against an opposing force, and thou hast light; oppose this (arc) light a combustible obstruction, and flame results. So mightest thou go on to the discovery soon to be made in the world of science, that light, all light, of the sun, or from any source, can be made to yield sound; upon this discovery hinge some of the most astounding inventions that thine age hath even dreamed of in its visions. But the primal discovery in this wonderful link, first of the sequence, will be the greatest of all, and so heralded. And this will be warranted, for the fact that it will be but a reincarnate unfoldment will not diminish its importance to mankind, nor the credit of its rediscoverer. (24) **See SUN**

ONE-THIRD OCTAVE BANDS: [ACOUSTICS] Frequency ranges where each octave is divided into one-third octaves with the upper frequency limit being $2\frac{1}{3}$ (1.26) times the lower frequency. Identified by the geometric mean frequency of each band. (85)

ONTOGENESIS: The development of the individual organism, and its science. (121)

ONTOGENETIC: Pertaining to ontogenesis. (121)

ONTONGENY: Ontogenesis. (121)

OPEN FIELD: [ACOUSTICS] An environment in which a sound source can be mounted on an acoustically reflective plane. Above that plane, sound may propagate in a hemispherical pattern without obstructions or reflections. Examples are an anechoic room with a "hard" (reflective) floor and an outdoor environment with flat ground and no obstructions.

(85)

OPEN HARMONY: Chords formed by as equidistant a disposition of the parts as possible. (125)

OPEN NOTES: Of stringed instruments, the notes of the open strings. Of wind instruments, such as the horn, trumpet, etc., the series of natural harmonies which can be produced by the lip of the performer without assistance of a slide, key, or piston. (125)

OPEN PIPE: A pipe open at the top, as opposed to one closed at the top. The pitch of a closed pipe is approximately one octave lower than that of an open pipe of the same length. (125)

OPEN STRINGS: Strings producing the sounds assigned to them according to the "accordatura", or system of tuning belonging to the particular instrument. Strings are said to be stopped when their pitch is altered by the pressure of the fingers. (125)

OPHICLEIDE: A keyed serpent. A brass instrument of large compass and great power, but having so peculiar a quality of tone as to necessitate careful treatment by a composer. (125)

OPPOSITES: "For opposites create disturbance, dissensions, disruptions, devilment. A union of force makes for strength and power." (262-87) (2)

OPTICAL TRANSDUCER: A noncontacting transducer which detects the level of reflectivity of an observed surface. A light-emitting diode, operating in the infrared region, provides a light source out the tip of the transducer. When light is reflected back to the transducer from the observed surface, it is focused by the transducer lens into an infrared sensitive phototransistor whereby a voltage is generated. The most common application is as a temporary Keyphasor transducer observing a once-per-turn change in reflectivity (dark or light paint spot or strip of reflective tape) on the shaft. (100)

ORBIT: The dynamic path of the shaft centerline motion during shaft rotation. The orbit is observed with an oscilloscope connected to XY proximity probes. An orbit is sometimes referred to as a Lissajous Plot. (100)

ORDER: The order of a filter determines its rate of rolloff with frequency. For example, a third order lowpass filter tends to ultimately rolloff as the cube of frequency, at an 18dB-octave rate, while a first order lowpass filter rolls off at a 6dB-per-octave rate.

ORDER: The first aspect of the Negative polarity. **See MOTION, NEGATIVE**

ORDERS OF VIBRATION:

- I. Molecular
- II. Inter-molecular
- III. Atomic

- IV. Inter-atomic
- V. Etheric
- VI. Inter-etheric
- VII. Compound Inter-etheric

See **MOLECULAR DISSOCIATION, LAWS OF BEING, ORGONE ENERGY** same as **ODIC FORCE**

ORANGE: Orange is the color of the sun. It is vital, and a good color generally, indicating thoughtfulness and consideration of others. Again, however, it is a matter of shade. Golden orange is vital and indicates self-control, whereas brownish orange shows a lack of ambition and a don't-care attitude. Such people may be repressed, but usually they are just lazy. People with orange in their auras are subject to kidney trouble.

In the early church orange signified glory, virtue, and the fruits of the earth, all of these being connected naturally with the sun. In the musical scale the note *re* corresponds to orange. (73)

ORANGE: [COLOR THERAPY] Use orange to alleviate: Chronic asthma, phlegmatic fevers, bronchitis, wet cough, gout, chronic rheumatism, inflammation of the kidneys, gall stones, cessation of menstruation, mental debility, epilepsy, cholera, *etc.* (87)

ORGANIC MUSIC: A mediaeval name for instrumental music. (125)

ORGANUM: (1) An early form of harmony, called also diaphony. (2) An organ. (125)

ORGONE ENERGY: [ORGONOMY] A bio-electric field surrounding the earth and all biological organisms. Discovered by Wilhelm Reich. (89) See **ORGONOMY**.

ORGONE PROPERTIES: [ORGONOMY]

1. Being mass free, orgone energy itself has no inertia or weight. This, it is noted, is one of the main reasons why it is difficult to measure with conventional techniques.

2. Present everywhere it fills all space, although in differing degrees or concentrations. It is even present in vacuums.

3. It is the medium for electromagnetic and gravitational activity. It is held to be the substratum of the most fundamental natural phenomena, the medium in which light moves and electromagnetic and gravitational fields exert force.

4. Orgone energy is in constant motion, and this can be observed under appropriate conditions. For instance, the bluish heat waves seen shimmering above wooded areas and mountains are said to be orgone energy movements. Its motion has at least two characteristics, a pulsation form - that is, alternating expansion and contraction - and a flow normally along a curving path.

5. It "contradicts" the law of entropy. Orgone energy is attracted to concentrations of itself. Unlike heat or electricity, which manifests a direction of flow from higher to lower potential, orgone flows from low organotic potentials to higher. Thus, high concentrations of orgone energy attract orgone from their less orgone-concentrated surroundings. (An analogy is found in gravitation, where the larger bodies attract, or "pull," the smaller.) Non-entropic organotic processes, moreover, do not run their course mechanically, but are qualitatively entirely different from entropic processes.

6. It forms units or entities which are the foci of creative activity. These orgone energy units may be living or nonliving. The living ones include bions, cells, plants and animals, and the nonliving include clouds, storms, planets, stars and galaxies. All of these orgone energy units have certain features in common. For instance, all are "negatively entropic" in the sense mentioned above, so that they acquire energy from their environment and all have a "life-cycle" passing through birth, growth, maturity and decline.

7. Matter is created from orgone energy. Under appropriate conditions matter arises from mass-free orgone. These conditions are held to be neither rare nor unusual.

8. It is responsible for life. Orgone energy is the life energy and as such is responsible for the special characteristics which differentiate the living from the nonliving.

9. Separate streams of orgone energy may be attracted to each other and then superimpose. The superimposition function is held to be the fundamental form of the creative process. Thus, in free space, superimposing orgone energy streams typically show the form of two streams of energy converging in a spiral. This is seen in spiral galaxies and also in the structure of hurricanes and other cyclonic storms. Celestial functions such as sunspot cycles, aurora borealis, hurricanes, tides and major weather phenomena are considered expressions of the interplay of two or more cosmic energy systems and also involve spiral forms of superimposition. In living nature, mating is a principal expression of superimposition: two separate streams of energy flow together and superimpose during the coital act.

10. It can be manipulated and controlled by orgone energy devices, the best-known being the accumulator. Certain experiments indicate that the air temperature within the accumulator, and the body temperature of anyone sitting in it, rises, up to one degree centigrade, with variations depending upon the outside weather, the time of day and the sitter's character structure. Other evidence includes an increase in the impulse rate of the Geiger-Muller counter when exposed to orgone concentrations in an accumulator. (90)

ORGONOMY: [ORGONOMY] The science of orgonomy is concerned with the functional laws of nature. It is therefore an extremely broad science covering all things in nature, the non-living or physical sciences, and the living or biological sciences. It further offers a scientific basis of understanding for such non-scientific subjects as religion and the liberal arts. This science was discovered and developed by Wilhelm Reich (1897-1957). (89)

ORIGINAL POSITION: A chord is said to be in its original position when the ground-note is in the bass; in other words, before it has undergone inversion: or, when its upper notes are in the order 3, 5, 8. (125)

ORPHARION: A kind of lute, having *wire* strings. (125)

OSCILLATION: The swing of a pendulum, and its return. (8)

OSCILLATION: "Oscillation is a rhythmically recurring translatory movement." (Keely)

OSCILLATION, CENTER OF: [MECHANICAL] See **CENTER OF OSCILLATION**. (84)

OSCILLATING STRESSES: [MECHANICAL] or **ALTERNATE STRESSES** Are those by which structures, or the members of structures are placed alternately in tension and compression, as for example in counter-braced structures, subject to alternate moving loads. The conclusions deduced from the experiments of Wohler in this direction show that when a bar is subject to these oscillations in stresses, the total stress on the bar is equal to their sum, that is, supposing a tensile stress of two tons, and a compression stress of two tons, alternately applied, the equivalent is a total stress of four tons. (84)

OSCILLATOR: Generates tone or low-frequency periodic waveforms. (69)

OSCILLATOR-DEMODULATOR: See **PROXIMATOR**. (100)

OSMOSIS: The interchange of fluids through a porous medium. (121)

OSMOTIC-PRESSURE EFFECT: An enhancement in the velocity of the central ion, in the direction of the applied external field, as a result of more collisions on the central ion from ions behind the central ion than from ions in front of it.

OTOCONIA: See **OTOLITES**; **OTOLITHS**; **EAR**

OTOLITES: Otoliths or otoconia (ear dust) are found in the common sinus or utricle, in the saccule, and in the ampullae of the semi-circular canal. Otoliths are supposed to intensify sound by striking against the fine endings of the auditory nerve as they vibrate. (125) See **EAR**

OTOLITHS: See **OTOLITES**; **EAR**

OTTEMOLE: See **OCTUPLET**.

OUTER RACE: For rolling element bearings, generally cylindrical component which is positioned between the rolling elements and the bearing housing. (100)

OUTER RACE BALL PASS FREQUENCY: See **ROLLER PASSAGE FREQUENCY**. (100)

OUTPUT: Output describes the signal emerging from a component. Also, the connection through which it emerges. (103)

OUTPUT POWER: Output power is the amount of energy the amplifier delivers to the loudspeakers; it is expressed in watts. One method of stipulating output power is in watts of continuous power (also called sine-wave power or rms power), which is the amount of energy the amplifier can generate continuously. Another measurement standard, called music or dynamic power, is less stringent. It allows for an amplifier's ability to exceed its continuous power rating for short bursts of musical sound, such as cymbal crashes. Still used occasionally is the older term peak power, which is usually the continuous power rating doubled. In rating stereo amplifiers, the output of both channels is usually added. For instance, a "30 watt" amplifier is usually an amplifier that delivers 15 watts per channel. (103)

OVERBLOW: A pipe is said to be overblown when the pressure of air forces it to speak an over-tone, instead of its fundamental note. (125)

OVERTONE: "When any point of a string is agitated the harmonic which requires that point for a node vanishes from the general clang of the string." (6) pg 145-147 See **CLANG**, **HARMONY**, **BEATS**

OVERTONES: Frequency components of a sound. May be in any mathematical relationship to the fundamental. (69)

OVERTONES: "The first octave is $6 \frac{1}{4}$ times the fundamental when bowed, however, when struck, the 1st overtone is the OCTAVE, this OCTAVE being due to the secondary waves set up when the limits of the LAW OF SUPERPOSITION have been exceeded." (6) pg 381 See **LAW OF SUPERPOSITION**, **BEATS**, **HARMONIC & INHARMONIC**, **HARMONICS-RATES-OF**, **ACCELERATION OF PROGRESSIVE OVERTONES**, **POWER OF HARMONICS**

OVERTONES OR PARTIALS: Are in relation to the fundamental in the ratios of 1, 2, 3, 4, 5, *etc.* (11)

OZONE: See **ACCELERATING DISSOCIATION** and **INTER-MOLECULAR VAPOR**. [For a more complete discussion on this vital substance, see Sands' *The Primordial Energy*. It is the belief of the

author that ozone plays a part so important in the overall discussion that its value cannot be overstated.]

OZONE: Q.: "Dr. Johm is quoted as stating that there is a layer of ozone 50,000 miles from the surface of the earth - is this correct and is it ozone?"

A.: "That dependent upon what would be termed ozone. In the sense as that as is thrown off in the essence of the vibratory forces of the earth's sphere and its atmosphere moving through space, leaving as it were - that barrier between space, through which all activity of gravitation acts on through called ozone, yes. The space varies in the amount - for often there is a trail much farther off, and often much closer." (195-57) (2) See **ACCELERATING DISSOCIATION, FORCE-GASEOUS, METALLIC GASES**

P

PADA: Extent. One of the four aspects of VAK; one of the four faces of PRAJAPATI. (126)

PALÆONTOLOGY: The science of fossilized organisms. (121)

PALINGENESIS: "older birth", the development of the species in a past time. (121)

PALINGENETIC: Pertaining to palingenesis. (121)

PARA: Undifferentiated SPANDA, an aspect of VAK. (126)

PARALLELISTIC PSYCHOLOGY: The theory which regards mental and cerebral changes as parallel but distinct series. (121)

PARALLEL MOTION: The movement of two or more parts at fixed intervals, as thirds, sixths. Parallel fifths are under certain limitations forbidden. (125)

PARAMAGNETIC FARADAY EFFECT: [Electromagnetism] The Faraday effect observed in paramagnetic salts at frequencies near an absorption line of the salt which is split due to splitting of the lower energy level. (4) See **DIAMAGNETIC FARADAY EFFECT**

PARAMAGNETISM: (Electromagnetism) A property exhibited by substances which, when placed in a magnetic field, are magnetized parallel to the field to an extent proportional to the field (except at very low temperatures or in extremely large magnetic fields). (4)

PARAMESE: (Next to the middle), string adjacent to the mese. (81) See **GREEK MUSIC**

PARANETE: See **GREEK MUSIC**

PARAPHONY: The resultant consonance, like the fourth and the fifth, of two sounds which are neither in unison nor an octave apart. (81)

PARA SABDA: Focal Point. (126)

PARAVAK: "Unified filed picture" of the Universe. (126)

PARENT MATERIAL STRENGTH: Strength equal to that of the unwelded joining materials. (102)

PARAHYPATE: String adjacent to the hypate. (81) See **GREEK MUSIC**

PAR NUMBERS: [QUANTUM ARITHMETIC] A classification of numbers similar to mode 4 numbers with slight changes to comply with the requirements of Quantum Arithmetic. They are 2-par, 3-par, 4-par, and 5-par being respectively $4n-2$, $4n-1$, $4n$, and $4n+1$. The value of n is an integer but the integer value is never assigned. These are the four types of numbers described by Euclid as even-odd, odd-odd, even-even, and odd-even, with a main emphasis on excess and deficiency rather than on residue as applies to contemporary mathematics. (14)

PARITY: A mathematical operation which exchanges right and left. (116)

PARITY VIOLATION: Refers to the observed fact that in some beta decay processes electrons are emitted preferentially in the right-hand direction. (116)

PART: (1) So much of a piece of music, or work, as is performed by any one voice or instrument. (2) Division of work. (125)

PARTIAL TONES: Those simple sounds which in combination form an ordinary sound and cause its special quality of tone. (125) See **ACOUSTICS**

PARTICLE-WAVE DUALITY: A pseudodilemma brought about by the fact that elementary particles behave neither as waves nor as particles. (116)

PASSAGE: (1) A phrase of music. (2) A figure. (3) A run. (125)

PASSBAND: The band(s) of frequencies having a relative attenuation of less than 3dB.

PASSBAND GAIN: The voltage gain within the passband.

PASSBAND RIPPLE: The specified amount of permissible amplitude variation in the passband for Tchebyscheff, with 0.2, 0.5 and 1dB ripple typical available values which yield progressively steeper

rolloff rates.

PASSING DISCORD: See **PASSING NOTE**.

PASSING NOTE: A note not essential to harmony, forming an unprepared discord, which is not objectionable because it is a fragment of a scale. It is a necessary characteristic of a passing-note, that it should have a degree of the scale on each side of it. Passing-notes having degrees of a diatonic scale on each side are said to be diatonic; those having degrees of a chromatic scale on each side are said to be chromatic. (125)

PASYANTI: Text. (126)

PASYANTI VAK: Higher Order of VAK, the overview or pervasive connection. Outreach of focal point or radiation outward in all directions in straight lines – Visionary Sound – evolutionary development. Luminous Sound. (126)

PATCH: Connection of two or more functions. (69)

PAULI PRINCIPLE: The principle that states that two spin $1/2$ particles such as electrons or quarks cannot occupy the same state. (116)

PAUSE: (1) A rest or pause. (2) A bar's rest. (125)

PAYNTER FILTER: Approximates the linear phase characteristic of the Bessel filter, exchanging a flatter passband response and an initially faster rolloff rate at the corner frequency F_c , for a somewhat poorer pulse response.

PE: The 17th Hebrew letter, Pe (P), literally means mouth, and many are the ingenious poetical dissertations extant, scattered through Kabbalistic lore, alike ancient and modern, placing this letter in the gate of Praise. The Divine Word is said to be concealed in the human mouth and the truly initiated utter forth this potential Word when they truly sound the praises of the ALL HOLY. Trough we all understand clearly enough the literal humane injunction not to muzzle an ox which treadth out our corn, by Kabbalists "Muzzle not the mouth of the ox that treadth out thy corn" is treated as a repository of profound esoteric counsel relating to spiritual husbandry, with which external agricultural works truly correspond. (72)

PEAK ENERGY MEASUREMENT: Measurement of vibration acceleration in the 5 kHz to 40 kHz frequency range. Similar to the Spike Energy method. Peak energy measurements are used for incipient failure detection on rolling element bearings. See **SPIKE ENERGY** (100)

PEAK LEVEL: Defines the maximum level which is measured and is useful in the measurement of short duration shocks. However, no account is taken of the time history of the vibration. (70)

PEAK-TO-PEAK VALUE: The difference be-

tween positive and negative extreme values of a signal or dynamic motion. See **AMPLITUDE** (100)

PEDAL: Any projecting piece of metal or wood which is to be pressed down by the foot. (125)

PEG of an Instrument: A small round piece of wood or metal, placed in a hole, or two holes, so as to be capable of being turned round, and pierced to receive that end of a string or wire which is not fixed. The tightening or loosening of which causes the pitch to change. (125)

PELTIER EFFECT: A phenomenon discovered in 1834 by J. C. A. Peltier, who found that at the junction of two dissimilar metals carrying a small current the temperature rises or falls, depending upon the direction of the current. In view of experiments, which establish that the rate of intake or output of heat is proportional to the magnitude of the current, it can be shown that an electromotive force resides at a junction. Electromotive forces of this type are called Peltier emf's. See **THOMSON EFFECT, THERMOELECTRIC EFFECTS, HALL EFFECT**. (4)

PENATES: Spirits of the elements of fire, as well as imps, hobgoblins, etc., attached to particular places, haunted houses, etc. They may produce noises, "physical manifestations," stone-throwing, etc. (131) See **ELEMENTARIES; PENNATES; LARES HERCII; ETESII; MEILICHI; SPIRIT; ETHER**

PENNATES: See **PENATES**

PENDULOGRAPH: A device for creating graphic representations of the motion of a pendulum or angular motions; the ratios of motions can be varied at will creating the various ratios of frequencies most used in music. See (26) **LEMNISCATA, RATIOS, INTERVALS, MUSIC**

PENT NUMBERS: (QUANTUM ARITHMETIC) A classification of numbers similar to mode 5 numbers with slight changes to comply with the requirements of Quantum Arithmetic. They are 3-pent, 4-pent, 5-pent, 6-pent, and 7-pent, being respectively the $5n-2$, $5n-1$, $5n$, $5n+1$, and $5n+2$ numbers. The value of n is an integer but its value is never assigned. The emphasis is on excess or deficiency when the multiple of 5 is removed. (14)

PENTACULA: Plates of metal with magic symbols written or engraved upon them. They are used as charms, amulets, etc. against diseases caused by evil astral influences. (131)

PENTATONE: An interval of five whole tones, an augmented sixth. (125)

PENTATONIC SCALE: The name given by Carl Engel to the ancient musical scale which is easiest described, as that formed by the black keys of the piano. It consists of the 1st, 2nd, 3rd, 5th and 6th degrees of a modern diatonic scale. (125)

PERCUSSION: An ingenious contrivance whereby a hammer strikes the tongue of a reed and sets it in motion simultaneously with the admission of air from the windchest, thus securing the rapid speech of the reed. Were it not for the percussion, the reed would be only gradually set in motion by the admission of the current of air, and the sound would not instantly follow the striking of the key. It is commonly used in harmoniums, but has also been applied to the largest reeds of an organ. (125)

PERCUSSION: See **ETHER**

PERCUSSION of a DISCORD: The striking of a discord, which takes place after its preparation, and which is followed by its resolution. (125)

PERFECT: Complete. (1) **Perfect cadence**, an authentic or plagal cadence. (2) **Perfect concord**, a common chord in its original position. (3) **Perfect Consonance**, the consonance produced by the intervals fourth, fifth, or octave. (4) **Perfect interval**, one of the division of intervals. (5) **Perfect time**. An old name for triple time. (125)

PERIOD: A complete musical sentence. (125)

PERIOD: The time between any two similar points (crests, nodes, troughs) on sequential cycles or waves.

PERIOD: The time duration of one vibration; the minimum time necessary for the motion to repeat. (75)

PERIOD: The time required for a complete oscillation or for a single cycle of events. The reciprocal of frequency. (100)

PERIODIC VIBRATION: Oscillatory motion whose amplitude pattern repeats in time. (100)

PERIODIC VIBRATION: A periodic vibration is any movement which recurs after equal intervals or periods of time, such as that of a uniformly working punching machine, or of the hammer of a clock bell when it is striking, and so on. It should be observed that though all harmonic vibrations are periodic, it is by no means the case that all periodic vibrations are harmonic. (125) See **HARMONIC VIBRATIONS, ACOUSTICS § 9.**

PERIODIC WAVEFORM: Repeating wave pattern. (69)

PERIOD OF VIBRATION: See **ACOUSTICS § 3.**

PERPETUAL CANON: A canon so constructed that it may be repeated constantly without a break in the time or rhythm. (125)

PERPETUAL MOTION: This phrase automatically condemns ideas of "continuous motion" which many things in the universe do.

PERPETUAL MOTION MACHINE OF THE FIRST KIND: [PHYS] A mechanism which, when set in motion, continues to do useful work without an input of energy, or which produces more energy than is absorbed in its operation; it violates the principle of conservation of energy. (3)

PERPETUAL MOTION MACHINE OF THE SECOND KIND: [PHS] A device which has a component that can continue moving forever; an example is a superconductor. (3)

PERPETUUM MOBILE: A thing endowed with perpetual motion. (121)

PERTURBATION: Application of a forcing function to a system by means of an external device in order to study the system response characteristics. (100)

PETIT'S LAW: See **DEBYE CONTINUUM**

PHANTASMATA: Creations of thought; "spirits" living in solitary places (they may be produced by the imagination of men and be able to communicate with him); hallucinations. (131) See **THOUGHT; FORCE, MIND; FORCE, SPIRIT; A'KASA**

PHASE: A measurement of the timing relationship between two signals, or between a specific vibration signal and a once-per-shaft-revolution event (Keyphasor). (100)

PHASE: Relationship between waveforms at any moment in time. (69)

PHASE: Phase, as the term is used in audio, usually refers to loudspeaker hookup. In a stereo system, the two loudspeakers should be working in tandem, their cones pushing and pulling at the same time, rather than working against each other. When this condition holds true, the two speakers are said to be acoustically in phase. Conversely, when one speaker pushes forward while the other pulls back, the speakers are out of phase, which usually causes loss of bass and uneven sound. When speakers are out of phase, the situation can easily be corrected by reversing the connections to one of the speakers. (103)

PHASE ANGLE: The angular measurement from the leading (or trailing) edge of the Keyphasor pulse to the following positive peak of the 1X vibration signal. (100)

PHASE CONJUGATE WAVE: Is fundamentally an undifferentiated compound wave. The phases of the discrete components are locked and in time. This compound wave possesses certain characteristics.

1. It returns to the distant source of its stimulus wave.

2. It is a time-reversed wave.

3. It converges on its invisible path, instead of diverging.
4. Real time holography is possible, and this holography is independent of length (distance) in the interferometry involved.
5. It can be highly amplified (e.g., by four-wave mixing, using a pumped phase conjugate mirror).
6. It carries negative energy and negative time.
7. The phase conjugate wave is attributed to Tesla however it is quite certain Keely developed and used this wave several decades prior to Tesla.
8. It is negentropic, going from disorder back to order.
9. It is a solution to the wave equation, so it applies to all kinds of waves; i.e., acoustic, mechanical, electrical, etc.
10. It generates Newton's third law, since it generates the reaction force.
11. The fundamental [CPTEGS] rule captures all the foregoing: "In the interaction of a photon with a charged particle in an atom, if one of the quantities C, P, T, E, G, or S reverses from its normal algebraic sign, then all the other quantities reverse also." (132)

PHASE RESPONSE: The phase difference (in degrees) between the filter input and output signals as frequency varies; usually expressed as lead and lag referenced to the input.

PHASE SHIFT: The shifting from POSITIVE to NEGATIVE or vice versa when waves (signals) are combined.

PHASE SYNCHRONIZATION: Forcing a fixed phase relationship between two waveforms. (69)

PHI: [MATH] 1.618+ or the ratio of the **FIBONACCI SERIES**.

PHI MESON: [PARTIC PHYS] A neutral vector meson resonance, having a mass of about 1019 MeV, a width of about 4.2 MeV, and negative charge parity and G parity. (4)

PHONEIDOSCOPE: It has been demonstrated on various occasions that sound waves of different quality produce forms of various shapes, but this important fact is shown in a novel and interesting manner by a new instrument which has been invented called the Phoneidoscope. The phoneidoscope consists of a cylindrical L-shaped brass tube, to the horizontal portion of which is attached an india rubber tub and a wooden mouthpiece. At the termination of the vertical part of the instrument is a blackened brass disk, in which is an aperture. If the disk be now covered with a thin coating of soap and water similar to the

preparation used in blowing soap bubbles, and a voice or instrument be sounded close to the mouthpiece, a curious effect can be perceived in the soap film at the other end of the instrument. The vibration of the molecules of air in the tube is transferred to the film, and bands of rainbow tinted color become apparent, varying in form as the voice or instrument changes, and assuming an endless variety of patterns. Change of pitch produces a noticeable alteration in the forms, and the same notes on different instruments are marked by variations in the patterns on the soap solution, the colors in which, as the tenuity of the film increases, become marvelously beautiful." (71)

PHONOMETER: An instrument for ascertaining the number of vibrations of a given sound. (125)

PHONON: A phonon is a quantized lattice-vibration, they are also thermal vibrations in crystals. (3) See **NONION, MAGNON, PHOTON, THEORY-QUANTUM, HEAT, LAW OF ASSIMILATION**

PHONON: [SOLID STATE] A quantum of an acoustic mode of thermal vibration in a crystal lattice. (4)

PHONON: A phonon is a quantized lattice-vibration, they are also thermal vibrations in crystals. (3) See **NONION, MAGNON, PHOTON, THEORY-QUANTUM, HEAT, LAW OF ASSIMILATION**

PHONON-ELECTRON INTERACTION: [SOLID STATE] An interaction between an electron and a vibration of a lattice, resulting in a change in both momentum of the particle and the wave vector of the vibration. (4)

PHONON EMISSION: [SOLID STATE] The production of a phonon in a crystal lattice, which may result from the interaction of other phonons via anharmonic lattice forces, from scattering of electrons in the lattice, or from scattering of x-rays or particles which bombard the crystal. (4)

PHONON WIND: [SOLID STATE] A stream of nonthermal phonons that is effective in propelling electron-hole droplets through a crystal. (4)

PHOSPHORESCENT: "The light that emanates from a glowworm is the resultant of the action of the sympathetic medium of the insect itself on a center of phosphorescent matter, which is included in its structure. The resultant two conditions are quite different, but they are governed by the same laws of sympathetic percussion." (Keely) See **LUMINOSITY, LIGHT**

PHOTOMETRY: The measurement of light. (121)

PHOTON: This term historically was first applied to indivisible amounts of electromagnetic, or light, energy usually referred to as photons. The photon, or quantum of the electromagnetic field, is a massless particle, best interpreted as such by quantizing Max-

well's equations. (3)

PHOTON: "A Photon is a quantized electromagnetic wave; photons are positive in nature." (4) See **THEORY, QUANTUM, LIGHT**

PHOTON: [SOLID STATE] "A sound quantum. The energy of a phonon is $h\nu$, where h is Planck's constant and ν the frequency of vibration of the sound wave. The phonon is thus analogous to the photon, a light quantum.

The concept of a photon as a packet of sound waves, the wave packet having particle-like aspects, is particularly convenient in the theory of the thermal conductivity of insulators, where one may speak of a phonon gas, collisions between phonons, and a phonon mean free path. In the theory of the properties of superfluid helium, the quanta of longitudinal sound waves in the liquid helium are called phonons. " (3)

The quantized lattice vibration, or phonon, which can be interpreted as a quantized sound wave since it travels through a quantum solid or fluid, or through nuclear matter, in the same manner as sound goes through air. (3)

PHOTON: The "particle" associated with light. (116)

PHRASING: The proper rendering of music with reference to its melodic form. (125)

PHYLETIC: Pertaining to the history or development of the species (phylon). (121)

PHYLOGENETIC: Pertaining to phylogeny. (121)

PHYLOGENY: The development of the species, and its science. (121)

PHYSICAL VIBRATIONS: "The sympathetic flow emanating from the normal human brain comes in the Fifth and Seventh Positions of atomic subdivision with compound interetheric sympathy a resultant. When metallic mediums are brought under influence of the sympathetic flow they become organism to carry the etheric flow the same as do the nerves for the brain. The composition of metals and of organisms is one and the same, although the molecular arrangements are different. The harmonious chords of sympathetic positive vibrations permeate each and in the same manner equate differentiation. The etheric flow is of the seventh order of infinite tenuity. A grain of sand magnified to the size of the sun would not make the structure visible of the seventh order of matter. "

"The luminiferous ether, the compound interetheric or celestial mind force is the great sympathetic protoplasmic element life itself. Its sympathetic outreach is mind flow or will force sympathetic polarization to produce action and sympathetic depolarization to neutralize it. Polar and depolar differentiation re-

sult in motion. It is the soul of matter from which all forms of motion receive their introductory impulse." The sympathetic correlation its energy to the physical organism.

If platinum wires the fineness of a hair are used with nine nodal beads and concentrated toward a general focalized center, attaching the other end to the focal center, this arrangement will determine by magnetic conduction the corpuscular oscillations in the cerebral centers induced by a positive thought (dispersive or productive of action) or negative thought. (Sensory or receptive) The condition of magnetic conduction is the only one by which the force of propagation of a thought may be computed as compared by the latent energy set free as kinetic energy by physical effort so induced.

Professor Keil of Jena demonstrated about 1835 the susceptibility of the nervous system to the magnetic current and its efficacy in curing certain nervous disorders and infirmities. "The magnetic flow somewhat resembles the human brain in its reception and dispersion. Even as the magnet gradually loses power and becomes inert, so the human brain gives of a smaller quantity than that received, gradually depreciating the physical forces until dissolution takes place."

"The action of the mind itself is vibratory etheric evolution, controlling the physical through positive and negative attraction." The etheric current is the causation force of action, traversing our nerves. The sympathetic flow from the brain comes in the fifth and seventh positions of atomic subdivision and compound ether a resultant of this subdivision. Etheric flow is the seventh subdivision of matter. Metals carry this flow as well as the nerves for their molecular composition is the same as that of the nerves, although differently arranged.

Only two vibratory conditions can be so associated as to excite sympathetic affinity between two physical organisms - the etheric chord of B flat third octave, and on etheric sympathetic transmission the chords of E flat with thirds, sixths and ninths octave harmonic. The third must be dominant, the sixth enharmonic (?) and the ninth diatonic.

In November 1884, Keely performed the following experiment, constructed from theory, which he had attempted several times and at last succeeded in carrying to a successful conclusion.

A small globe (composition not given) centered axially on an iron rod (relative position of axis not given) was insulated by two plates of glass which were presumably also centered axially on the iron rod on both ends or poles of the globe. Beneath one axial terminus a circular sheet of metal was placed on the floor, from which piano wires (number, size or tension not given) stretched to and touched one of the plates of glass. The globe rotated when two persons each grasped the iron axis at its two termini with their respective right hands - one person standing on the

circular sheet of metal. Rotation ceased when Keely (who was one of the operators) took hold of the other person's left hand with his right hand (presumably substituting his left hand to grasp the axis.)

Keely stated the reason to be that "The receptive flows became independent of the circular chord of resonance set up mechanically. The power of rotation comes on the positive and power of negation breaks it up."

The revolution of the sphere he stated was caused by the "Receptive concussion of two forces, positive and negative, coming together, seeking their coincidents and producing rotation, not by harmonious streams but by harmonious waves." He stated the introductory settings were entirely different from those of the musical sphere and that sound waves had nothing to do with the motion of this globe.

"Could we equate and hold in equation the relations of mind and matter - the brain and the body - we could live eternally in our bodies there being no depreciation of the physical. But a much higher end is attained for the pure ether is liberated from the crude molecular in our physical organisms, effecting the transmutation of emotional, mental and spiritual forces from crude matter and thereby adding to the finer elements of the universe as well as of our individual souls." (11)

PI: The mathematical relation of a circle's radius to its circumference usually taken to be 3.14159... This value however is an irrational number and contains an error which is simple to see when one realizes a *whole* radius exists within a *whole* circumference. The true value of PI as given by Keely/Parker is 20612:6561 which must remain an integer ratio. These numbers are to be regarded as parts of a whole relative to each other.

PIANOFORTE: Early name for piano. (125)

PIANOGRAPH: An ingenious machine, which on being attached to a piano, inscribed what is played. Invented by M. Guérin. (125)

PICKUP: See **TRANSDUCER, CARTRIDGE.** (100)

PIEZOELECTRIC: Any material which provides a conversion between mechanical and electrical energy. For a piezoelectric crystal, if mechanical stresses are applied on two opposite faces, electrical charges appear on another pair of faces. (100)

PIEZOELECTRIC CRYSTALS: These crystals emit electricity when pressure is applied; see **Force & Energy** to better understand "pressure".

PIEZOELECTRIC EFFECT: The phenomena of converting electrical energy into mechanical energy or mechanical energy into electrical energy by use of piezoelectric materials. (102)

PILOT WAVE: See **WAVE MECHANICS**

PI MESON: (Particle Physics) 1. Collective name for three semistable mesons which have charges of +1, 0, and -1 times the proton charge, and form a charge multiplet, with an approximate mass of 138 MeV (million electron volts), spin 0, negative parity, negative G parity, and positive charge parity (for the neutral meson). Also known as **PION**. Symbolized. 2. Any meson belongs to an isospin triplet with hypercharge 0, negative G parity, and positive charge parity (for the neutral meson). (4) See **ATOMIC TRIPLET, DALITZ PLOT**

PI MESON: The pi meson or pion was theoretically predicted as the quantum of the nuclear force field. (3)

PINK NOISE: Noise which is musically balanced; high and low frequencies sound equally loud. (69)

PINK NOISE: (ACOUSTICS) Sound with an uninterrupted frequency spectrum and a power which is constant within a frequency band and proportional to center frequency. An example is constant power level per octave band. (85)

PION: See **PI MESON.** (4)

PISTOL GRIP HAND TOOL: A converter and horn with pistol grip handle for hand-held use. (102)

PITCH: (1) The position of a sound with reference to the number of vibrations which produce it. The relative height of a sound. (2) The method, now generally used, of showing the particular octave in which a sound occurs. (125)

PITCH: "Pitch is the relative frequency of vibration." (Keely) SEE **RATIO; INTERVAL**

PITCH: Is not determined by string length. Pitch is due in part by the harmonics of the fundamental and in part (this most likely of all ideas) the size and frequency of the creation and release of sound corpuscles from the vibrating medium.

PITCH: The pitch of a musical sound depends solely upon the vibration rate of the body that gives rise to it. (68)

PITCH: Perceived frequency of a sound. (69)

PITCH BEND: Changing the frequency of a pitch while played. (69)

PITCH PIPE: A wooden or metal pipe having a moveable stopper or tampion with marks, showing where it should be placed for the production of different notes of the scale. (125) See **RESONATOR**

PITHECANTHROPUS: "ape-man", the species intermediate between man and his ape-like ancestors. (121)

PITHECOID: Ape-like. (121)

PITHECOMETRA-THESIS: The thesis which expresses the relation (*metron*=measure) of the ape to man. (121)

PIVOTAL BALANCE RESONANCE: A balance resonance during which shaft motion pivots through the geometric centerline of the rotor, causing a definite zero axis crossing nodal point within the rotor span. A rotor corrects itself for its residual pivotal mass imbalance distribution above this speed range. Additional nodes may be produced as a function of bearing stiffness. Often referred to as the conical mode. (100)

PLAGAL: The name given to those Church modes which were formed from the four older or authentic modes by taking the fourth below as the new keynote and proceeding thence to the fifth above. (125)

PLAGAL CADENCE: The cadence formed when a subdominant chord immediately precedes the final tonic chord. (125)

PLANCK'S CONSTANT: A fundamental constant of nature important in quantum mechanics. (116)

PLANCK'S CONSTANT: See **THEORY-QUANTUM, LAW OF OCTAVE, LAW OF ASSIMILATION**

PLANKTON: Organisms floating in water. (121)

PLANE, MATERIAL: See **DIMENSIONS, FORCE-ATOMIC-HEALING, SPIRIT**

PLANETARY ORBITS: "The force that controls planetary suspension, which Kepler foretold would be revealed by God to man in this century, Keely shows to be the sympathetic relation which exists between the terrestrial flow and the celestial etheric radiation; Teaching that the great universe of planetary masses, associated as it is with the celestial etheric sympathetic flows, bears to the will-force emanating from the brain, - a pure illustration of the control of the celestial mind over terrestrial matter. All planetary masses Keely calls terrestrial, showing in his writings that the beauty of the celestial concordant chords of sympathy forming the harmonious connective link, in what may be denominated "the music of the spheres" , is seen in the alternate oscillating range of motion between the planetary systems; for at a certain range of the greater distance, harmony is established, and the attractive forces are brought into action, under the command, "Thus far shalt thou go, and no father." Then in the return towards the neutral centers, when at the nearest point to each other, the opposite or propulsive force is brought into play; and "thus far shalt thou come, and no nearer"; advancing and receding under the celestial law of etheric compensation and restoration, as originally established by the great Creator.

"As in the celestial organism all is subservient to

one general center, or center of complete control, so is it with the planetary masses. Where this general center is located has never been revealed to man, and never will be until he is brought into complete harmony with pure celestial radiation and freed from all the crude molecular conditions that accompany him on his terrestrial journey through this life. Our planet may be considered as one of the terrestrial convolutionary centers, in planetary space, that help to make up the full combination revolving round the general center." Bloomfield-Moore See **ASTRONOMICAL CIRCLES**

PLASMA: The Fourth state of matter. (Crookes (30), Keely)

"Those (plasmas) responsible for coagulation are positive." (2) See **LEVITATION**

PLASMA: Protoplasm. (121)

PLASMATIC: Of protoplasm. (121)

PLASMODOMOUS: Organisms that build up protoplasm from inorganic material. (121)

PLASMOPHAGOUS: Organisms that live on the plasma-forming plants. (121)

PLASMOGONY: The formation of protoplasm. (121)

PLASTIC FILLERS: An inexpensive inert material added to the resin to either reduce the cost of plastic or to improve the plastic's physical characteristics. (102)

PLASTIDULES: The smallest elements or molecules of protoplasm. (121)

PLECTRUM: A little staff made of ivory, horn, quill, or metal, with which (having it in his right hand) the player on a lyra or cithara, set the strings in vibration. (125)

PLINTHE: A rectangular parallelopiped having two equal sides and the third smaller. (81)

PNEUMA: [Greek] Breath. (125) See **NEUMES**.

POLAR: Discretely, refers to a vibration or vibratory flow containing both positive and negative phases. See **DEPOLAR, ANTI-POLAR & POLAR, LAWS OF BEING**

POLAR CURRENT: "I include in the polar forces, magnetism, electricity and gravital sympathy, each stream composed of three currents, which collectively make up the governing conditions of the one Universal controlling medium."

"The polar current is a triune flow, in which the dominant is the controlling element." He sought to demonstrate through instruments the sympathetic as-

sociation of the polar stream with the "luminiferous track" or "compound etheric field."

"The laws governing the polar current are intimately concerned in the phenomena of rotation."

"Fine as are the unit particles of odor, which belong to the atomic or third subdivision, they are very crude compared to the tenuity of that subdivided substance which acts as the governing medium for a sympathetic or magnetic flow. The tenuity of that subdivision comes to and above sound."

"Without the sustaining vitality of the polar current all organisms would cease to exist and if the "sympathetic negative polar stream" should be cut off from the earth, the neutral centers of all its molecules would float away into space like a swarm of bees."

"The attractive power of the molecule lies in the magnetic element - in other words, the form of crystal aggregation lies in the polar attractions of the respective molecules." He states that molecular cohesion operates by reason of the same cause.

"The negative sympathetic portion of the polar stream - the neutrally attractive portion - is the magnetic flow proper, and coincides sympathetically with the "second atomic flow."

He had a desperate struggle in attempting to learn the laws and conditions of the polar streams and suffered several severe accidents during this time. The importance of his researches is evidenced by his statement of only one of the properties of this polar streams. "All the magnets in the world, no matter how differentiated, cannot induce rotation, but POLAR NEGATIVE ATTRACTION INDUCES ROTATION."

He obtained such control of the mysterious polar current that he was able to show on the "third or molecular graduation of the propellor of his airship" 120 revolutions per minute; on the 6ths or atomic graduation, 360 revolutions per minute, and had still the etheric field to conquer.

In his magnetic engine he attempted to use the ether only as a medium for "sympathetic vibration associated positively and negatively with the polar stream." He states "Even as the magnet arouses the latent power in iron, my sympathetic polar harness will, by exciting concordance in the interstitial corpuscular domain, and then intermittently negatizing by association with the dominant thirds, the concordant 3rds, 6ths and 9ths, produce great power of rotation." (11)

POLAR/DEPOLAR, CHORDS OF: Polar chord: B flat, D natural and F. Depolar chord: D, F sharp and A. See **SYMPATHETIC NEGATIVE TRANSMITTER**

POLAR NEGATIVE ATTRACTION: "Polar Negative Attraction shows positive negative outreach, of a high order." (Keely) See **MAGNETISM**,

SYMPATHETIC OUTREACH, NEGATIVE ATTRACTION, ATTRACTION, POSITIVE NEGATIVE ATTRACTION, LAWS OF BEING

POLAR PLOT: Polar coordinate representation of the locus of the 1X shaft vibration vector at a specific lateral shaft location with the shaft rotative speed as a parameter. The polar plot is generated by in-phase and quadrature signals, usually during machine start-up or coast down. This plot has also been incorrectly termed a Nyquist plot. (100)

POLAR PROPULSIVE: See **MOLECULAR DISSOCIATION, LAWS OF BEING**

POLAR SYMPATHETIC EQUILIBRIUM: See **POLARIZATION & DEPOLARIZATION**

POLAR SYMPATHIES: Sympathetic currents of the Triune Polar Stream.

POLAR TERRESTRIAL ENVELOPE: See **ELECTRICITY, TRIPLE FLOW, MAGNETISM**

POLAR TERRESTRIAL FORCE: See **FORCE-POLAR-TERRESTRIAL**

POLAR TERRESTRIAL STREAM: "Keely has constructed instruments by which he is endeavoring to determine the nature of the triune action of the polar terrestrial stream, or luminiferous track, - the compound etheric field, from which all planetary masses spring. He considers the electric stream to be one of the triune sympathetic streams which help to build up, in their order of triple concentration, the high vitality of the polar stream, or, more correctly, the magnetic-electric terrestrial envelope, with out which all living organisms would cease to exist. He classes the cohesive force of molecular masses as the dominant order of the electric stream, the molecule owing its negative attractive quality to the magnetic element." Bloomfield-Moore

"In reply to the question, "What do you include in the polar forces?" Keely answers, "Magnetism, electricity, and gravital sympathy; each stream composed of three currents, or triune streams, which make up the governing conditions of the controlling medium of the universe; the infinite ninths that I am now endeavoring to graduate to a sympathetic mechanical combination, will, if I succeed, close by researches in sympathetic physics, and complete my system. These sympathetic streams from celestial space, percussing on the dense atmospheric environment of our earth, by their infinite velocities, wrest from their atomic confinement the latent energies which we call heat and light." (Keely)

Question: And where do these sympathetic conditions or streams of force have their origin?

Answer: "So God created man in His own image, in the image of God created He him; male and female created He them, ' Genesis 1:27." All sympathetic conditions, or streams of force, are derived (if we

dare to make use of such a term in speaking of Deity) from the cerebral convolutions of the infinite; from the center of the vast realm of the compound luminous. From the celestial intermediate, the brain of deity, proceed the sympathetic flows that vitalize the polar terrestrial forces." (Keely) See TRIUNE POLAR STREAM, TRIUNE FLOW, POWER, ELECTRICITY, LAWS OF BEING

POLAR WAVE: See ELECTRICITY

POLARITY: Polarity is determined by number (odd or even). Polarity of a thing is of the nature of the greater amount of the force which is in it, either negative or positive. The radiations or vibrations from a thing are always of the nature of the polarity, either negative or positive.

POLARITY: In relation to transducers, the direction of output signal change (positive and negative) caused by motion in a specific direction (toward or away from the transducer) in the sensitive axis of the transducer. Normal convention is motion toward the transducer which will produce a positive going signal. (100)

POLARIZATION & DEPOLARIZATION: Sir Isaac Newton, in his "Fundamental Principle of Natural Philosophy" calls the magnetic agent the "Soul of the World."

Electricity and magnetism are shown to be differential in character by progressive subdivision, which also shows the magnetic flow to be but one of the triune family. Electricity and magnetism would be interchangeable if magnetism could be conducted, and in this difference we must look for the actual character of the forces they represent.

The rotation of the magnetic needle produced in my researching instruments proves conclusively that the mutual interchange between electricity and magnetism is a differentiated vibratory difference, the dominant and enharmonic exchanging compliments with each other in a differential manner - that is, by vibratory interference ratio, thus inducing rotation, which is caused simply by polarization and depolarization.

The explanation of the magnetic flow is very simple. The harmonic attractive chord, thirds, induces nodal interference on the harmonic current in the earth's polar stream, and it moves toward the negative pole to flow out through the positive end. The diversion of the harmonic portion of the stream from the dominant portion causes the magnet to assume its position.

The state of matter existing in polarized light is the same as that existing in magnetic force. Both are interatomic and travel in the same path, assimilating in a definite time period to continue in the same ray, although in my experiments, one is evolved before the other. The frequencies and more of vibration of polar-

ized light are a "pure coincident" (simple vibrational ratio) of that subdivision of matter known as magnetism.

The action of the magnetic flow is dual, being both attractive and propulsive. The inclination to the right or left of the plane in which this subtle flow moves has nothing to do with positive or negative conditions. The essential difference between what is called positive electricity and negative electricity, is simply a difference in vibration, which are either propulsive (positive or dominant) or receptive (negative or harmonic). The flow can be right or left receptive or right or left propulsive. The positive vibrations are the radiant (having affinity for the celestial) while the negative vibrations are the concentrative or focalizing - having affinity for neutral centers.

The vibrational frequency governing the magnetic flow comes under the "first inter-atomic" and ranges from 300,000 to 780,000 per second. This is the first order above odor and permeates the glass molecules of the compass cover as air permeates a sieve. The course of this sympathetic flow is governed by the full harmonic chord and consequently moves in straight lines, its sympathetic transmission being free from molecular interference.

When a steel bar induces magnetism in an iron mass it does not depreciate its own power one iota. The latent force in the unmagnetized bar is sympathetically brought into action and this can go on indefinitely, adding mass after mass to the chain of attracted objects, without depreciating or exhausting the power of the magnet itself.

However, age is shown in the magnet in somewhat the same manner as in the human organism. Whether used or not a magnet gradually loses activity until at last it becomes inert, without any magnetism whatever. We may call this the decay of magnetic power.

A magnet does not induct magnetism in its keeper - this is merely sympathetic outreach of a very limited range.

Magnetism is not associated with the neutral center. The neutral center represents only molecular focalization and redistribution, and is not directly associated with magnetism. However, when the "radiant" elements already generated are submitted to compound vibration or their mass thirds, rotation ceases and they become magnetic. That is, they cease their equatorial revolution and possibly circulate through meridian sectors of the envelope instead.

Like poles do not repel each other, for there is "sympathetic equation" the same as in unlike poles. Like or unlike poles become attractive on a differentiation of $33 \frac{1}{3}$ against 100 being established between them, and likewise become repellant on differentiating them $66 \frac{2}{3}$ of the one against 100 of the other, simply by sympathetic resonant vibrations.

Magnetism has no outreach as has sympathetic negative attraction, but it pervades all terrestrial and planetary masses. Magnetism is highly electrical in character, in fact, is born of electricity, whereas negative attraction is not electrical. Negative attraction, however, displays a sympathetic outreach for magnetism. Sympathetic negative attraction reaches from planet to planet, but magnetism does not, for it is static. Sympathetic negative attraction is born of the celestial and impregnates every mass in space, linking itself to all electric and magnetic conditions and all spatial masses in turn are subservient to celestial outreach. All the magnets in the world could not induce rotation, no matter how differentiated, but polar negative attraction induces rotation.

He speaks of the magnet indicating the "dominant electric flow". The static position assumed by the magnetic needle proves the dominant to control the triple flow in the terrestrial magnetic envelope, the two other elements being obliged to coordinate themselves to it. By altering the dominant alone, that is, by changing intermittently its vibrations by "triple vibrations" antagonistic to its continuous flow (by interference) Keely secured rapid rotation of the magnetic needle. This periodic interference with the dominant, the controlling element, changes polarity and rotation follows. He thought the existence of the Polar Stream necessary to all life. This may possibly be shown by its necessity in crystallization. Keely proved to his own satisfaction that the magnetic element in the molecule contains the negative power through which it forms aggregates.

The sympathetic stream between sun and earth, by its positive and negative interchange, keeps the magnetic force in the polar envelope intact, making this polar envelope a great magnet of itself.

The "negative sympathetic portion" of the polar stream (having neutral affinity) is the magnetic flow proper and coincides sympathetically with the "second atomic flow".

The time approaches when electric magnetic waves will be produced with an outreach of two feet, as powerful at that distance as is now shown when the keeps is almost touching the poles. These waves will demonstrate a radiating force too stupendous for measurement with present instruments. (11)

"In its action, is Nodal Negative Interference, intermittently excited, inducing differential disturbance of polar sympathetic equilibrium." page 315 of (1) See **NODES, MAGNETISM, POLAR, VIBRATORY TRIUNE STREAM, MOLECULAR DISSOCIATION, LAWS OF BEING**

POLARIZED LIGHT: "According to all available theoretical and experimental evidence, it is the electric vector rather than the magnetic vector of a light wave that is responsible for all the effects of polarization and other observed phenomena associated with light. Therefore, the electric vector of a light wave,

for all practical purposes, can be identified as the light vector." (4) See **LIGHT, MAGNETISM**

POLE: A root of the filter transfer function denominator, As a rule of thumb, an n-pole filter of this type will have an ultimate gain rolloff rate with frequency of nx6dB/octave.

POLE: The POSITIVE pole radiates a certain flow of electrical waves which seek a series of negative gaps or holes. The NEGATIVE pole causes to exit an electrical or vibratory vacuum. See **NEGATIVE ATTRACTION, IMPULSE-CREATIVE**

POLLEN: "Pollen from flowers is negative." (2884-1) (2)

POLYCHORD: An instrument invented by Fried. Hillmer of Leipzig, in 1799. It was strung with ten strings. In shape it was not unlike a double bass without a neck. It was never generally used. (125)

POLYCEPHALUS: One of the neumes. (125) See **NEUMES**

POLYEPIMER: Fractionary number in the form $a+=M/m+n$ (81)

POLYMORPHOUS: Of many shapes, a term applied to compositions, the parts of which are capable of inversion, as in double counterpoint; or of augmentation, diminution, *per thesin et arsin*, and other devices, as in Canon. (125)

POLYPHYLETIC: Having more than one source of origin. (121) See **BEAT FREQUENCIES**

PORTAMENTO: Sliding between notes. (69)

POSITION: (1) A chord is said to be in its original position when the ground note is in the bass, in other positions when the relative arrangement of the component notes is changed. (2) The position of a chord is the same as the disposition of its parts. A close position is close harmony; an open position open harmony. (3) A position, on a violin or other string instrument, is to use the fingers otherwise than in their normal place. (125)

POSITIVE: "The positive may be considered as the active forces in their activity and the negative as those tending to keep the balance." (195-70) (2)

POSITIVE: The Positive, Celestial, Cosmic polarity manifests as:

Enharmonic
Blue
Motion
Heat
Curving
Round
Even number

Aggressive
Out-going
Expressive
Father
Ra
Male
Convex
Pointed
Light
A
First Point
Constructive
Accumulative
Individualizing

See **NEGATIVE**

POSITIVE: See **FORCE-ATOMIC, FORCE-ONE, LAWS OF BEING**

POSITIVE ATTRACTION: "Success was guaranteed when Keely changed his field of experiment from positive attraction to negative attraction." page 78 of (1) See **NEGATIVE ATTRACTION, MAGNETISM, FORCE-ATOMIC**

POSITIVE NEGATIVE OUTREACH: See **POSITIVE NEGATIVE ATTRACTION, SYMPATHETIC OUTREACH**

POSITIVE PROPULSIVE: See **PROPULSIVE POSITIVE**

POSITIVE RAYS: See **FORCE-RADICAL, SPECTROSCOPY**

POSITIVE SYMPATHETIC OUTREACH: See **MAGNETISM, NEGATIVE SYMPATHETIC OUTREACH, SYMPATHETIC OUTREACH**

POSITIVE VIBRATIONS: "How would one explain the differentiation between time in night and day? How would one explain the differentiation in activity of forces when there is a vibratory force set in a cellular force, and one set in an oval or oblong force which perpetrates, or penetrates, that force which produces or generates force as in its activity. In a negative force, as is seen in what has ordinarily or commonly in alchemy been called night-side.

That as is of positive force is that as of the active force in its action, see? Now we have this demonstrated here in motor here, with motor: In the various turns of these cams about central portion of the drum, see? we have, when these in their turn are in opposition a negative force, see? Now when they begin - by their turning over to become in a positive act - then you see the difference in them. Hence that as has been said as respecting the small end or the large end being in the radial force of that necessary to produce a positive, or an active rather than a negative - for if the negative becomes as powerful as the activity of the force in the positive, then we only begin to run down." (195-54) (2)

POSITRON: The antiparticle of the electron. (116)

POST-CYCLING: Most ultrasonic assembly systems are factory adjusted to trigger the ultrasonics when either a preset pressure is applied on the work-piece or a prescribed time period has elapsed. If this triggering is altered, delaying the factory-set triggering, the system is considered post-cycled or post-triggered. (102)

POTENTIAL: *To understand induction see #544 in (29);* Induction induces current without electron transference, while conduction induces current via electron flow.

POTENTIAL: Potential is determined by rate of vibration.

POTENTIAL ENERGY: Stored energy; the capacity to do work by virtue of position. (75)

POWER: "Assimilate the low vibratory sub-dominant (2nd) to the harmonic undulatory (3rd), by thirds, will produce power with the Polar stream; an introductory impulse would bring the sub-dominant (2nd) into a concordant relation with the dominant (1st)." (1) pg 368 See **INTRODUCTORY IMPULSE, DOMINANT, TRIUNE POLAR STREAM, THIRDS, ORDERS OF VIBRATIONS**

POWER CONTROL: A variable control, usually located on the generator, for altering the output power of the generator. (102)

POWER OF HARMONICS: "Calling the intensity of the fundamental tone, in each case, 100, that of the second harmonic, when the string was simply pulled aside at a point $\frac{1}{7}$ th of its length from its end and then liberated, was found to be 56.1, or a little more than one-half. When the string was struck with the hammer of a pianoforte, whose contact with the string endured for $\frac{3}{7}$ ths of the period of vibration of the fundamental tone, the intensity of the same tone was 9. In this case the second harmonic was nearly quenched. When, however, the duration of contact was diminished to $\frac{3}{20}$ ths of the period of the fundamental, the intensity of the harmonic rose to 357; While, when the string was sharply struck with a very hard hammer, the intensity mounted to 505, or to more than quintuple that of the fundamental.

"Pianoforte manufacturers have found that the most pleasing tone is excited by the middle strings of their instruments, when the point against which the hammer strikes is from $\frac{1}{7}$ th to $\frac{1}{9}$ th of the length of the wire from its extremity. Why should this be the case? Helmholtz has given the answer. **Up to the tones which require these points as nodes the overtones all form chords with the fundamental; but the sixth and eighth overtones of the wire do not enter into such chords; they are dissonant tones, and hence the desirability of doing away with them. This is accomplished by making the point at which a node is required that on which the hammer falls. The possibility of the tone forming is thereby shut**

out, and its injurious effect is avoided." (6) of 149 See BEATS, OVERTONES, HARMONIC & INHARMONIC, HARMONICS-RATES-OF, ACCELERATION OF PROGRESSIVE OVERTONES

POWER SUPPLY: The electrical unit that converts low-frequency line power into high-frequency electrical energy. (102)

POWER TRANSMISSION, ATMOSPHERIC:

"The principle is this: a ray of great ionizing power is used to give to the atmosphere great power of conduction. A high tension current of 10,000,000 to 12,000,000 volts is then passed along this ray to the upper strata of the air, which strata can be broken down very readily and will conduct electricity very well." (Tesla) See AUDION, RESONANT AMPLIFICATION

PRAESAGIUM: Omen; signs of future events. (131) See NECTROMANTIA; PSYCHIC

PRAJAPATI: Types of knowledge taken to have four faces:

1st face – fullness of objective sense – knowledge together with its appropriate methods and instruments.

2nd face – perfected methodology or logical apparatus wielded by a master Reason.

3rd face – way of the mystic – intuition and Yoga – SUSUMNA – "direct line home".

4th face – integral coordination and final sublimation of the first three orders of knowledge – TURIYA – BHANA (126)

PRANA: Ultimate Principle of Reality, First Derivative of Brahma. Divine Power as absolute Rest renders itself as Divine Power, as prime causal Movement. Is the Fundamental Urge in the Grand Reality or Brahman to manifest as the manifold of a possible universe of appreciation. Composed of four flows:

First: Unveils and opens

Second: Operates as a power center prone to become organized

Third: SANKALPA – is represented by the kala aspect of VAK and TAPAS by ARDHAMATRA KAIA evolves RJU (right) and SUSUAMA (symmetrical) phases and forms. That proneness is "forwarded" to a formulation of definite types of organized form and behaviour

Fourth: The fourth is fourfold also:

- 1) Condenses and becomes the Point
- 2) Expands and becomes the Continuum
- 3) Evolves segments, phases and aspects and intervals between the two limiting positions according to a Principle of rhythmicity or harmonic measure. (126)

PRANA-BRAHMAN: Is what renders the equilibrated trance of the Absolute into a varied theme of universal relatedness. (126)

PRATYAYA: One of the four aspects of VAK; apprehension and appreciation by a Center – the fertile place, sensitive to SABHA and ARTHA. (126)

PRAYER: "...prayer is the making of one's conscious self more in attune with the spiritual forces that may manifest in a material world...Prayer is the concerted effort of the physical consciousness to become attuned to the consciousness of the Creator, either collectively or individually." (122-13) (2) See FORCE, PRAYER

PREAMPLIFIER: Preamplifier is a section of the amplifier, sometimes called "preamp" for short, that contains the various controls to regulate volume, balance, treble, bass, and to select different program sources (records, radio, or tape). In most models, the preamplifier and the main amplifier (also called the power amplifier) are a single unit. However, in equipment designed for very high output power, the preamplifier and the power amplifier are separate pieces of equipment. (103)

PRE-CYCLING: The opposite of POST-CYCLING. (102)

PREFERRED FREQUENCIES: [ACOUSTICS] Octave and one-third octave band center frequencies are the geometric means of their respective lower and upper limits as defined by ISO and ANSI standards. The upper and lower nominal octave band limits are arrived at by multiplying the center frequency by 1.4142 and 0.7071 respectively. One-third band center frequencies are given by $10n/10$ where n is the one-third octave band number. For instance, for 125 Hz the band number is 21 and 102. $1 = 125.89$. Lower and upper frequency limits are a function of $2^{-1/6}$ or (0.89) and $2^{1/6}$ or (1.12) respectively. (85)

PRE-LOAD EXTERNAL: Any of several mechanisms that can externally load a bearing, *i.e.*, create a force acting at the journal in a radial direction. This includes "soft" preloads such as process fluids or gravitational forces, as well as "hard" preloads, from gear contact forces, misalignments, rubs, etc. (100)

PREPARATION: The causing a discord to be heard as a concord immediately before its percussion. It must take place in the same part as that which has the discord. (125)

PRESSURE: Force divided by area. (75)

PRESSURES PRODUCED BY VIBRATION: in one experiment in liberating ozone by molecular percussion. including luminosity, a percussive molecular force of 110,000 lbs. per square inch was registered on the testing lever. This enormous pressure caused the heavy steel parts to so bend and bulge that the instrument was at that time unfitted for further experiments and had to be repaired.

"The vapor from the liberator registers 20,000 lbs. per square inch when the rotary atomic oscillation is $1333 \frac{1}{3}$ times the normal diameter of the atmospheric molecule. At

10,000 lbs. the range is $666 \frac{2}{3}$ lbs. per sq. inch.
 5,000 lbs. the range is $333 \frac{1}{3}$ lbs. per sq. inch.
 2,500 lbs. the range is $166 \frac{2}{3}$ lbs. per sq. inch.
 1,250 lbs. the range is $83 \frac{1}{3}$ lbs. per sq. inch.
 625 lbs. the range is $41 \frac{2}{3}$ lbs. per sq. inch.

being normal at the commencement of the experiment, in other words, with no vacuum or pressure in the sphere." (11)

PRE-TRIGGERING: See **PRECYCLING**. (102)

PRESS: See **STAND**. (102)

PRIMA: First. (125)

PRIME: (1) Tonic or generator. (2) The lowest note of any two notes forming an interval. (125)

PRIME: An integer is prime when it has no factors other than itself, unity, or when it is a power of an otherwise prime number.

PRIME NEUTRAL CENTERS: "The luminous, etheric, protoplasmic element, which is the highest condition of the ether, fills the regions of infinite space, and in its radiating outreach gives birth to the prime neutral centers that carry the planetary worlds through their ranges of motion." (Keely) pg 270 of (1) See **NEUTRAL CENTERS, ETHER, FORCE-ATOMIC**

PRIME SPIKE: The region that contains the majority of the signal generated by a flawed rolling element bearing. The rotor related activity is filtered out of the prime spike signal in order to focus on the flawed bearing vibration. (100)

PRINCIPAL: Chief. (125)

PRINCIPLES: A term expressing the primary categorical forms of all matter. (air, earth, fire, and water)

PRINCIPLE OF CAUSE AND EFFECT: This principle embodies the fact that there is a Cause for every Effect; an Effect from every Cause. It explains that: "Everything Happens according to Law"; that there is no such thing as Change; that while there are various planes of Cause and Effect, the higher dominating the lower planes, still nothing ever entirely escapes the Law. The Hermetists understand the art and methods of rising above the ordinary plane of Cause and Effect, to a certain degree, and by mentally rising to a higher plane they become Causers instead of Effects. The masses of people are carried along, obedient to environment; the wills and desires of others stronger than themselves; heredity; suggestion; and other outward causes moving them about like pawns on the Chessboard of Life. But the Masters, rising to the plane above, dominate their moods, characters, qualities, and powers, as well as the environment surrounding them, and become Movers instead of pawns. They help to **PLAY THE GAME OF LIFE**, instead of being played and moved about by other

wills and environment. They **USE** the Principle instead of being its tools. The Masters obey the Causation of the higher planes, but they help **RULE** on their own plane. In this statement there is condensed a wealth of Hermetic knowledge - let him read who can." (28)

PRINCIPLE OF CORRESPONDENCE: "This Principle embodies the truth that there is always a Correspondence between the laws and phenomena of the various planes of Being and Life. The old Hermetic axiom ran in these words: "As above, so below; as below, so above." And the grasping of this Principle gives one the means of solving many a dark paradox, and hidden secret of Nature. There are planes beyond our knowing, but when we apply the Principle of Correspondence to them we are able to understand much that would otherwise be unknowable to us. This Principle is of universal application and manifestation, on the various planes of the material, mental, and spiritual universe - it is an Universal Law. The ancient Hermetists considered this Principle as one of the most important mental instruments by which man was able to pry aside the obstacles which hid from view the Unknown. Its use even tore aside the Veil of Isis to the extent that a glimpse of the face of the goddess might be caught. Just as a knowledge of the Principles of Geometry enables man to measure distant suns and their movements, while seated in his observatory, so a knowledge of the Principle of Correspondence enables Man to reason intelligently from the Known to the Unknown. Studying the monad, he understands the archangel." (28)

PRINCIPLE OF GENDER: This Principle embodies the truth that there is **GENDER** manifested in everything - the Masculine and Feminine Principles ever at work. This is true not only of the Physical Plane, but of the Mental and even the Spiritual Planes. On the Physical Plane, the Principle is ever the same. No creation, physical, mental or spiritual, is possible without this Principle. An understanding of its laws will throw light on many a subject that has perplexed the minds of men. The Principle of Gender works ever in the direction of generation, regeneration, and creation. Everything, and every person, contains the two Elements or Principles, or this great Principle, within it, him or her. Every Male thing has the Female Element also; every Female contains also the Male Principle. If you would understand the philosophy of Mental and Spiritual Creation, Generation, and Re-generation, you must understand and study this Hermetic Principle. It contains the solution of many mysteries of Life. We caution you that this Principle has no reference to the many base, pernicious and degrading lustful theories, teaching and practices, which are taught under fanciful titles, and which are a prostitution of the great natural principle of Gender. Such base revivals of the ancient infamous forms of Phallicism tend to ruin mind, body and soul, and the Hermetic Philosophy has ever sounded the warning note against these degraded teaching which tend toward lust, licentiousness, and perversion

of Nature's principles. If you seek such teaching, you must go elsewhere for them - Hermeticism contains nothing for you along these lines. To the pure, all things are pure; to the base, all things are base." (28)

PRINCIPLE OF MENTALISM: "This Principle embodies the truth that "All is Mind." It explains that THE ALL (which is the Substantial Reality underlying all the outward manifestations and appearances which we know under the terms of "The Material Universe"; the "Phenomena of Life"; "Matter"; "Energy"; and, in short, all that is apparent to our material senses) is SPIRIT, which in itself is UNKNOWABLE and UNDEFINABLE, but which may be considered and thought of as AN UNIVERSAL, INFINITE, LIVING MIND. It also explains that all the phenomenal world or universe is simply a Mental Creation of THE ALL, subject to the Laws of Created Things, and that the universe, as a whole, and in its parts or units, has its existence in the MIND of THE ALL, in which Mind we "Live and move and have our being." This Principle, by establishing the Mental Nature of the Universe, easily explains all of the varied mental and psychic phenomena that occupy such a large portion of the public attention, and which, without such explanation, are non-understandable and defy scientific treatment. An understanding of this great Hermetic Principle of Mentalism enables the individual to readily grasp the laws of the Mental Universe, and to apply the same to his well-being and advancement. The Hermetic Student is enabled to apply intelligently the great Mental Laws, instead of using them in a haphazard manner. With the Master-Key in his possession, the student may unlock the many doors of the mental and psychic temple of knowledge, and enter the same freely and intelligently. This Principle explains the true nature of "Energy", "Power," and "Matter," and why and how all these are subordinate to the Mastery of Mind. One of the old Hermetic Masters wrote, long ages ago: "He who grasps the truth of the Mental Nature of the Universe is well advanced on The Path to Mastery." And these words are as true today as at the time they were first written. Without this Master-Key, Mastery is impossible, and the student knocks in vain at the many doors of The Temple." (28)

PRINCIPLE OF POLARITY: "This Principle embodies the truth that "everything is dual"; "everything has two poles"; "everything has its pair of opposites," all of which were old Hermetic axioms. It explains the old paradoxes, that have perplexed so many, which have been stated as follows: "These and antithesis are identical in nature, but different in degree"; "opposites are the same, differing only in degree"; "the pairs of opposites may be reconciled"; "extremes meet"; "everything is and isn't, at the same time"; "every truth is half-false"; "there are two sides to everything," etc., etc., etc. It explains that in everything there are two poles, or opposite aspects, and that "opposites" are really only the two extremes of the same thing, with many varying degrees between them. To illustrate: Heat and Cold, although "opposites," are really the same thing, the differences consisting merely of degrees of the same thing. Look at

your thermometer and see if you can discover where "heat" terminates and "cold" begins! There is no such thing as "absolute heat" or "absolute cold" - the two terms "heat" and "cold" simply indicate varying degrees of the same thing, and that "same thing" which manifests as "heat" and "cold" is merely a form, variety, and rate of Vibration. So "heat" and "cold" are simply the "two poles" of that which we call "Heat" - and the phenomena attendant thereupon are manifestations of the Principle of Polarity. The same Principle manifests in the case of "Light and Darkness," which are the same thing, the difference consisting of varying degrees between the two poles of the phenomena. Where does "darkness" leave off, and "light" begin? What is the difference between "Large and Small"? Between "Hard and Soft"? Between "Black and White"? Between "Sharp and Dull"? Between "Noise and Quiet"? Between "High and Low"? Between "Positive and Negative"? The Principle of Polarity explains these paradoxes, and no other Principle can supersede it. The same Principle operates on the Mental Plane. Let us take a radical and extreme example that of "Love and Hate," two mental states apparently totally different. And yet there are degrees of Hate and degrees of Love, and a middle point in which we use the terms "Like or Dislike," which shade into each other so gradually that sometimes we are at a loss to know whether we "Like" or "dislike" or "neither." And all are simply degrees of the same thing, as you will see if you will but think a moment. And, more than this (and considered of more importance by the Hermetists), it is possible to change the vibrations of Hate to the vibrations of Love, in one's own mind, and in the minds of others. Many of you, who read these lines, have had personal experiences of the involuntary rapid transition from Love to Hate, and the reverse, in your own case and that of others. And you will therefore realize the possibility of this being accomplished by the use of the Will, by means of the Hermetic formulas. "Good and Evil" are but the poles of the same thing, and the Hermetist understand the art of transmuting Evil into Good, by means of an application of the Principle of Polarity. In short, the "Art of Polarization" becomes a phase of "Mental Alchemy" known and practiced by the ancient and modern Hermetic Masters. An understanding of the Principle will enable one to change his own Polarity, as well as that of others, if he will devote the time and study necessary to master the art." (28)

PRINCIPLE OF RHYTHM: "This Principle embodies the truth that in everything there is manifested a measured motion, to and fro; a flow and inflow; a swing backward and forward; a pendulum-like movement; a tide-like ebb and flow; a high-tide and low-tide; between the two poles which exist in accordance with the Principle of Polarity described above. There is always an action and a reaction; an advance and a retreat; a rising and a sinking. This is in the affairs of the Universe, suns, worlds, men, animals, mind, energy, and matter. This law is manifest in the creation and destruction of worlds; in the rise and fall of nations; in the life of all things; and finally in the men-

tal states of Man (and it is with this latter that the Hermetists find the understanding of the Principle most important). The Hermetists have grasped this Principle, finding its universal application, and have also discovered certain means to overcome its effects in themselves by the use of the appropriate formulas and methods. They apply the Mental Law of Naturalization. They cannot annul the Principle, or cause it to cease its operation, but they have learned how to escape its effects upon themselves to a certain degree depending upon the Mastery of the Principle. They have learned how to USE it, instead of being USED BY it. In this and similar methods, consist the Art of the Hermetists. The Master of Hermetics polarizes himself at the point at which he desires to rest, and then neutralizes the Rhythmic swing of the pendulum which would tend to carry him to the other pole. All individuals who have attained any degree, more or less unconsciously, but the Master does this consciously, and by the use of his Will, and attains a degree of Poise and Mental Firmness almost impossible of belief on the part of the masses who are swung backward and forward like a pendulum. This Principle and that of Polarity have been closely studied by the Hermetists, and the methods of counteracting, neutralizing, and USING them form an important part of the Hermetic Mental Alchemy." (28)

PRINCIPLE OF VIBRATION: "This Principle embodies the truth that "everything is in motion"; "everything vibrates"; "nothing is at rest"; facts which Modern Science endorses, and which each new scientific discovery tends to verify. And yet this Hermetic Principle was enunciated thousands of years ago, by the Masters of Ancient Egypt. This Principle explains that the differences between different manifestations of Matter, Energy, Mind, and even Spirit, result largely from varying rates of Vibration. From THE ALL, which is Pure Spirit, down to the grossest form of Matter, all is in vibration - the higher the vibration, the higher the position in the scale. The vibration of Spirit is at such an infinite rate of intensity and rapidity that is practically at rest - just as a rapidly moving wheel seems to be motionless. And at the other end of the scale, there are gross forms of matter whose vibrations are so low as to seem at rest. Between these poles, there are millions upon millions of varying degrees of vibration. From corpuscle and electron, atom and molecule, to worlds and universes, everything is in vibratory motion. This is also true on the planes of energy and force (which are but varying degrees of vibration); and also on the mental planes (whose states depend upon vibrations); and even on to the spiritual planes. An understanding of this Principle, with the appropriate formulas, enables Hermetic students to control their own mental vibrations as well as those of others. The Masters also apply this Principle to the conquering of Natural phenomena, in various ways. "He who understands the Principle of Vibration, has grasped the scepter of power," says one of the old writers." (28)

PRISMS: Q.: What is the best substance for induction, conduction, transmission of etheronic energy?

A.: "This is as raised power that would be produced from a combination of crystal. This should be rather interesting to this body, for it is very much like that used by the body in destructive forces in the Atlantean sojourn! Not that which caused the cosmic ray, or the death ray, or the healing ray - but the ray that came from setting of the prismatic influences from high heating - it may be from Arcturus or it may be from the Sun; Though Arcturus would be nearer proper. The Sun may be induced to make for destructive or constructive forces, either one. It's a combination of those forces or rays that may be gathered in certain settings or prisms. It would require a lot of detail in preparing same." (440-3) (2) See **HARMONICS, PROGRESSION**

PROBE: See **HORN**. (102)

PROBE: Specifically, a proximity probe transducer, although sometimes used to describe any vibration transducer. (100)

PROBE ORIENTATION: The angular location of a probe with respect to a polar coordinate system when viewed from the driver end of the machine. Typically, zero degrees is at top dead center (vertical) or at the horizontal right (3 o'clock) position on the coordinate system. (100)

PROCELEUSMATICUS: A foot consisting of four short syllables or of two Pyrrhics. (125) See **METRE**

PROCHORIATA: Mammals with a rudimentary chorion. (121)

PRODYNAMICS: See **PYKNOTIC THEORY OF SUBSTANCE**.

PRODYNAMIS: The fundamental force or energy (*dynamis*) of which all specific forces are several aspects. (121) See **ONE FORCE; PYKNOTIC THEORY OF SUBSTANCE**.

PROGASTER: A primitive gut (*gaster*). (121)

PROGRAMMER: An adjustable control for automatically timing the weld and hold cycles. (102)

PROGRESSION: There are two kinds of progression, melodic or harmonic. Speaking in general terms, the former is a "succession of sounds forming a tune or melody" but the term is also applied to an "imitative succession of melodic phrases" that is to a melodic sequence. Harmonic progression is "the movement of one chord to another" and is diatonic or chromatic. The term is also sometimes used as synonymous with sequence. (125)

PROGRESSIVE DISINTEGRATION: "The question arises, how and by what means are we able to measure the velocity of these capsules and the differential range of their vibratory action? Also, how can we prove beyond dispute the facts relating to their

sympathetic government? By progressive disintegration; this is the only way; and it is accomplished by the proper exciters of vibratory focalization; the introductory acoustic impulses which negate their molecular, atomic and inter-atomic media of neutral attractions, towards their focalized centers of sympathetic aggregation." Keely in (1) of 311 **See INTRODUCTORY INPULSE, MOLECULAR DISSOCIATION**

PROLATION: One of the three divisions of measurable music. Prolatio is perfect or imperfect. Prolatio is the subdivision of a semibreve into minims, as Tempus is of a breve into semibreves, and as Modus is of a long into breves, or of a maxim into longs. (125) **See TIME, TEMPUS**

PROMECIC: Number: the product of two different numbers. (81)

PROPORTION: The ratio of two numbers to each other. Proportion is in three kinds: (1) multiplex. (2) Superparticularis. (3) Superpartiens. **Proportio multiplex** is when the larger number contains the smaller so many times without a remainder, as 2:1 (dupla), 3:1 (tripla), 4:1 (quadrupla). **Proportio superparticularis** is when the larger number exceeds the smaller by one only as 3:2 (sesquialtera), 4:3 (sesquitercia), 5:4 (sesquiquarta). **Proportio superpartiens** is when the larger number exceeds the smaller by more than one, as 5:3 (superbipartientstertias), 7:4 (supertripartientstertias), 9:5 (superquadrupartientstertias).

Thus, it will be understood, that instead of giving simply the ratio between two numbers, early writers on arithmetic and geometry, as well as music, coined a single word to express that ratio; for example, 17:5 was said to be *Triplasperbipartientstertias*, i.e., that the larger number contained the smaller number three times (tripla) with two remainder (bipartientstertias). Again, *Triplaspertripartientstertias* proportio, signified that the larger contained the smaller three times and three over, as 15:4, 27:8, etc., the last part of the compound word always pointing out the smaller of the numbers compared, or an exact multiple of it. Lastly, the addition of *sub* showed that the smaller number was compared to the larger, e.g., 4:15 would be called *Subtripaspertripartientstertias* proportio. This system of proportion was used not only with reference to intervals but also to the comparative length of notes (time). (125)

PROPULSIVE POSITIVE: "The dominant current of the electrical stream is electricity luminous, or propulsive positive." **See ELECTRICITY (1) of 277 See LAWS OF BEING**

PROSLAMBANOMENOS: An added string, giving the lowest sound of the perfect system. (81) **See GREEK MUSIC**

PROSODY: **See METRE**

PROSTOMA: a primitive mouth (*stoma*). (121)

PROTHYL: A simple primitive matter or monad as conceived by Crookes, Wendt, Preyer and others. The fundamental matter (*hyle*) of which our chemical elements are diverse forms. (121) **See ONE SUBSTANCE.**

PROTISTS: The simplest and earliest forms of life. (121)

PROTON: The massive, positively charged particle that is the nucleus of the hydrogen atom. (116)

PROTON, PRIMARY: A Proton is positive in nature. **See MATTER**

PROTOPHYTA: The earliest, unicellular plant-organisms. (121)

PROTOPLASM: (Music) The first elemental substance of a thing. (8)

PROTOPLASM: The complex, jelly-like substance of which all organisms are composed. (121)

PROTOPLASM: **See DISPERSION, PRIME NEUTRAL CENTERS, LUMINIFEROUS ETHER**

PROTOZOA: The earliest, unicellular animal-organisms. (121)

PROXIMATOR: A signal conditioning device which sends a radio frequency signal to an eddy current proximity probe, demodulates the probe output, and provides output signals proportional to both the average and dynamic probe gap distances. Also called an oscillator-demodulator. (Proximitor is a Bently Nevada trade name.) (100)

PROXIMITY: (Music) The nearness of two notes to each other in small intervals. (8)

PROXIMITY PROBE: A noncontacting device which measures the displacement motion and position of an observed surface relative to the probe mounting location. Typically, proximity probes used for rotating machinery measurements operate on the eddy current principle and measure shaft displacement motion and position relative to the machine bearing(s) or housing. (100)

PSALTERY: **See NEBEL**

PSIONICS: Same as **RADIONICS, PSYCHOTRONICS**

PSYCHADE: A group of cells with a common consciousness. (121)

PSYCHE: The "soul" or mind. (121)

PSYCHIC: "Psychic means the expression to the material world of the latent, or hidden sense of the soul or spirit forces, whether from behind, or in and

through the material plane." (3744-1) (2) See **FORCE-SPIRIT, FORCE-PSYCHIC**

PSYCHIC LIBERATION: Energy, in itself, in whatever dimension or form that it assumes, is intelligent. It re-creates that intelligence and continues to re-create it until it is further modified by some existing or external forces. We might liken a human being to a television set; we say that the Infinite is the transmitter. Within the television set are certain components which are known as condensers, resistors, coils, etc. By the continuity or the expression, or we say a polarized plane and frequency transmission from the transmitter, take unto themselves an amplification and separate these various single component parts to further integrate them and project them into the picture tube where they are flashed onto the fluorescent screen. There are at that time a series of dots moving at the rate of 16,000 per second which are in horizontal lines and as you would write in a letter across the page, there are certain elements of synchronization, retrace, etc., which are expressed.

The human being functions much the same, with but little difference. Your external life, or your physical life on the outside, can be likened to that phosphorus screen on the surface of the tube. The same scientific principles are involved in various wave structures or frequency relationship: these psychic structures are themselves the determining elements of transmission. You, yourself, as a physical being, are reflecting outwardly. Your physical body and your physical appearance are just a reflection of your psychic self which is composed of an infinite number of tiny vortexes of innumerable wave forms and shapes. They are in themselves portraying their own individual expression, their own particular portion of life; if not from this life, then surely from some past life experience. (117)

PSYCHOGENETIC: Pertaining to the development of mind. (121)

PSYCHOMETRY: The ability to see the "Soul of Things". See **NECTROMANTIA; CLAIRVOYANCE**

PSYCHOMONISM: Subjective-idealism, the theory that mind only exists. (121)

PSYCHOPLASM: Protoplasm as the basis of mind. (121)

PSYCHOTRONICS: The word "psychotronics" was coined by a group of researchers in Czechoslovakia in the mid-1970's working with simple mind over matter experiments and thought actuated devices of novel design. Today the word is generally used to describe "electronic" devices that create effects that impinge upon or by the human consciousness. Not the same as radionics (qv). (127) **FORCE, BRAIN; RADIONICS, PSIONICS**

PULSATILE: A term applied to instruments of percussion, such as the drum, gong, cymbals, etc. (125)

PULSE ECHO: See **ULTRASONIC TESTING**.

PULSE WAVE: Family of waveforms with square corners. (69)

PUNCTUS: A point or dot. (125)

PURE TONE: (Acoustics) A sound emitted at a single frequency. (85)

PURGATORY: See **KAMA LOCA; LEMURES; HADES**

PYGMAEI: Spirits of the Element of the Earth; being the products of a process of organic activity going on in that element, by which such forms may be generated. They are dwarfs and quite microscopical beings, ever at war with the Gnomes. (131) See **GNO-MI; PENATES**

PYKNATOMS: See **PYKNOTIC THEORY OF SUBSTANCE**.

PYKNON: The close note. (1) A name given to those half or quarter tones which came together in the chromatic and enharmonic genera of the Greeks. (2) In mediaeval music, a semitone. (125)

PYKNOSIS: See **PYKNOTIC THEORY OF SUBSTANCE**.

PYKNOTIC: From *pykno'sis*=a thickening or condensation. (121)

PYKNOTIC THEORY OF SUBSTANCE: In fundamental opposition to the kinetic theory of substance, we have the "theory of condensation" or the pyknotic theory of substance. It is most ably established in the suggestive work of J. C. Vogt on *The Nature of Electricity and Magnetism on the Basis of a Simplified Conception of Substance* (1891). Vogt assumes the primitive force of the world, the universal *prodynamics*, to be, not the vibration or oscillation of particles in empty space, but the condensation of a simple primitive substance, which fills the infinity of space in a nonbroken continuity. Its sole inherent mechanical form of activity consists in a tendency of condensation or contraction, which produces infinitesimal centers of condensation; these may change their degree of thickness, and, therefore, their volume, but are constant as such. These minute parts of the universal substance, the centers of condensation, which might be called *pyknatoms*, correspond in general to the ultimate separate atoms of the kinetic theory; they differ, however, very considerably in that they are credited with sensation and inclination (or will-movement of the simplest form), *with souls*, in a certain sense - in harmony with the old theory of Empedocles of the "love and hatred of the elements." Moreover, these "atoms with souls" do not float in empty space, but in the continuous, extremely attenuated intermediate substance, which represents the uncondensed portion of the primitive matter. By means of certain "constellations, centers of perturbation, or systems of deformation," great masses of centers of

condensation quickly unite in immense proportions, and so obtain a preponderance over the surrounding masses. By that process the primitive substance, which in its original state of quiescence had the same mean consistency throughout, divides or differentiates into two kinds. The centers of disturbance, which positively exceed the mean consistency in virtue of the *pyknosis* or condensation, form the ponderable matter or bodies; the finer, intermediate substance, which occupies the space between them, and negatively falls below the mean consistency, forms the ether, or imponderable matter. As a consequence of this division into mass and ether there ensues a ceaseless struggle between the two antagonistic elements, and this struggle is the source of all physical processes. The positive ponderable matter, the element with the feeling of like or desire, is continually striving to complete the process of condensation, and thus collecting an enormous amount of potential energy; the negative, imponderable matter, on the other hand, offers a perpetual and equal resistance to the further increase of its strain and the feeling of dislike connected therewith, and thus gathers the utmost amount of *actual* energy. (121) See **ETHER, ATTRACTION, NEUTRAL CENTER**

PYRAMIDON: An organ stop of 16 ft. or 32 ft. tone, the pipes of which are closed at the top, and pyramidal in shape, the top being more than four times the width of the mouth. From a pipe only 2 ft. 9 in. in length, 2 ft. 3 in. square at the top, and 8 inches at the block, the note CCC is produced. (125)

PYROPHONE: An instrument invented by Kastner, the sounds of which are produced by jets of gas burning under glass tubes. It has three manuals. (125)

PYRRHIC: A foot consisting of two short syllables. (125)

PYTHAGOREAN KOMMA: See **COMMA, INTERVAL; TEMPERAMENT**

PYTHAGOREANS: The followers of the system of Pythagoras, in which the consonance or dissonance of an interval was judged by the ratio of the vibrations without appeal to the ear. The Aristoxenians, on the other hand, held that the ear should be the sole judge of right or wrong in music. The former were called Canonici, because they appealed to the monochord or harmonic canon for their laws, the latter Musici, because they made the ear and practice their guide. (125) See **CANONICI, MUSICI, ARISTOXENIANS**

PYTHAGOREAN SCALE: (After Sir James Jeans)

Range	Ancient	
Scale	Glarean's	
	Greek	
beginning with C		ecclesiastical name
c-c'	Lydian	
c-d-e-f-g-a-b-c'		Ionian
g-g'	Ionian*	
c-d-e-f-g-a-bf-c'		Myxolydian
d-d'	Phrygian	
c-d-e-f-g-a-bf-c'		Dorian
a-a'	Aeolian**	
c-d-e-f-g-a-bf-c'		Aeolian
e-e'	Dorian	
c-d-e-f-g-a-bf-c'		Phrygian
b-b'	Myxolydian	
c-d-e-f-g-a-bf-c'		Locrian
f-f'	Syntolydian	
c-d-e-f#-g-a-c-c'		Lydian

* Or Hypophrygian when in another pitch.

** Or Hypodorian when in another pitch.

PYTHAGOREAN SCALE - FREQUENCIES:

C	=	
1	Tone	
D	=	
9/8	Tone	
E	=	
81/64	Hemitone	
F	=	
4/3	Tone	
G	=	
3/2	Tone	
A	=	
27/16	Tone	
B	=	
243/128		Hemitone
C	=	
2	Octave	



Q FILTER: Filter selectivity, *i.e.*, the band of frequencies passed or rejected by the filter. The narrower the band of frequencies, the higher the Q, and the broader the band, the lower the Q. This is computed by $Q = f_c/\Delta f$ where f_c is the center frequency and Δf is the band-width of the filter at the -3 dB points. (100)

QOPH: The 19th Hebrew letter, Qoph (Q), means literally the back of the head. Hieroglyphically Qoph has been represented by an axe, a sharp incisive weapon. Alchemists attach importance to the meaning of this letter in connection with energy manifesting in manual dexterity and accomplishing the work of materialization of hitherto volatile substances. Related to Qoph we find qopha, which means to thicken or congeal. (72)

QUAD: Short for quadraphonic. See **FOUR CHANNEL SOUND**. (103)

QUADRATE: (or B quadratum). The sign b, used originally to raise B rotundum b, one semitone. Hence arose its general use for the raising of all flattened notes, as exemplified in its modern form of a natural sign. (125)

QUADRATURE OF THE CIRCLE: "All operations of nature have for their sensitizing centers of introductory action, triple vacuum evolutions. These evolutions are centered in what I call atomic triple revolutions, highly radiaphonic in their character, and thoroughly independent of all outside forces in their spheres of action. In fact, no conceivable power, however great, can break up their position that, within a circle that would enclose the smallest grain of sand, hundreds of billions of them perform, with infinite mathematical precision, their continuous vibratory revolution of inconceivable velocity. These triple centers are the very foundations of the universe, and the great Creator has, in His majestic designs, fixed them indissolubly in their position. Mathematically considered, the respective and relative motion of these atomic triplets, gravitating to and revolving around each other, is about one and one-third of their circumference. The problem of this action, when reduced to a mathematical analysis (presupposing taking it as the quadrature of the circle) would baffle the highest order of mathematical science known to bring it to a numerical equation." (Keely) Chapter 5 of (1)

See Bibliography and the book (12) See **ATOMIC TRIPLETS, GEOMETRY; ILIASTER QUARTUS**

Propositions of the Quadrature of the Circle
by John Keely, 1874.

PROPOSITION I

"The circumference of any circle being given, if that circumference be brought into the form of a square, the area of that square is equal to the area of another circle, the circumscribed square of which is equal in area to the area of the circle whose circumference is first given."

PROPOSITION II

"The circle and the equilateral triangle are the primary of all shapes in nature; they are opposite each other in all the elements of their construction, and hence the square of diameter being made the standard of measure, the circle and the equilateral triangle in their fractional relations to the square are opposite each other in ratio of the squares of their diameters."

PROPOSITION III

"The true ratio of circumference to diameter of all circles is four times the area of an inscribed circle for a ratio of circumference to the area of the circumscribed square for the ratio of diameter." See **PROPOSITIONS OF GEOMETRY; ILIASTER QUADRUS**

QUADRATURE MOTION COMPONENT (QUAD): The Cartesian value of the 1X vibration vector that lags the in-phase portion of the signal by 90 degrees. This may be expressed as: $Quad = A \cos(0-90) = A \sin$, where A is the peak-to-peak amplitude, and 0 is the phase angle of 1X vector. The quadrature and in-phase signals are used to generate a polar plot with an XY plotter or recorder. (100)

QUADRIVIUM: Educational philosophy of olden times; Composed of four Great Studies *i.e.*, MUSIC, ASTRONOMY, ARITHMETIC, GEOMETRY

QUADRUPLE COUNTERPOINT: Counterpoint of four parts, so constructed that all the parts may be transposed among themselves without transgressing the laws of progression. A perfect piece of this kind

of counterpoint will be capable of twenty-four different dispositions of the parts. It is only feasible at the interval of the octave. (125)

QUALITY FACTOR, Q: The ratio of center frequency F_0 to the difference between the upper and lower 3dB frequencies of band-pass, band-reject and notch filters; that is, $Q = F_0 / (F_u - F_l)$.

QUANTA: See PHOTON, THEORY-QUANTUM

QUANTIZATION: A term applied to the transition from a description of a system of particles or fields in the classical approximation where canonically conjugate variables commute to a description where these variables are treated as noncommuting operators. In this transition, Poisson bracket relations among dynamical variables are replaced by commutation relations. So-called second quantization is the analogous treatment of a field, such as the electromagnetic field solution of Maxwell's equations, the wave-function solution of Schrodinger's equation, or the solution of Dirac's equation, with commutation relations imposed upon the field as the canonical coordinate and with the generalized momentum defined through the Lagrangian. The wave equation in the latter two cases resulted from the first quantization. (3)

QUANTIZE: A term used in Quantum Arithmetic to find the prime fraction equivalent of any decimal.

QUANTIZE TO ONE: To find reciprocal equal to Unity. To assign Unity or One to any quantity thus making it the base or fundamental (base aliquot part) quantity of all other dependent quantities retaining relative values at all times.

QUANTUM: [PHYS] A term characterizing an excitation in a wave or field, counting fundamental particle-like properties such as energy or mass, momentum, and angular momentum for this excitation. In general, any field or wave equation that is quantized, including systems already treated in quantum mechanics that are second-quantized, leads to a particle interpretation for the excitations which are called quanta of the field. This term historically was first applied to indivisible amounts of electromagnetic, or light, energy usually referred to as photons. The photon, or quantum of the electromagnetic field, is a massless particle, best interpreted as such by quantizing Maxwell's equations. Analogously, the electron can be said to be the quantum of the Dirac field through second quantization of the Dirac equation, which also leads to the prediction of the existence of the positron as another quantum of this field with the same mass but with a charge opposite to that of the electron. In similar fashion, quantization of the gravitational field equations suggests the existence of the graviton. The pi meson or pion was theoretically predicted as the quantum of the nuclear force field. Another quantum is the quantized lattice vibration, or phonon, which can be interpreted as a quantized sound wave since it travels through a quantum solid or fluid, or through nuclear matter, in the same man-

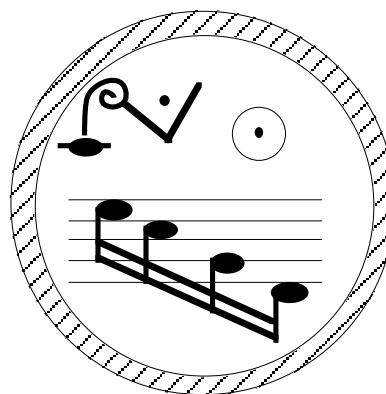
ner as sound goes through air. (3) See PHONON

QUANTUM: According to a certain theory, a hypothetical particle or cell composed of the smallest amount (quanta) of energy capable of existing independently, or this amount of energy regarded as a unit.

QUANTUM ARITHMETIC: An entire new field of mathematics developed by Ben Iverson having its roots in proportion and ancient mathematical works. The following is a paper describing the fundamentals of the field.

THE NEW PARADIGM OF SCIENCE; by Ben Iverson, P. E. *

Abstract - New Energy research needs the Grand Unified Field, which is derived from ancient texts. It will set parameters for instrumentation, and can identify many probable areas of danger in this new



Quadruple Chord 3rd Octave

field. Much deficiency is pointed out in contemporary science which will mislead researchers.

GENDER IN SCIENCE AND MATHEMATICS

Did you know that you can learn about sex in mathematics. Current science must get with it or they will be losing their oversight. This is one of the earliest LAWS OF MATHEMATICS AND OF SCIENCE. In people, no man is 100% male and no woman is 100% female. So I am not talking about people. I should refer to it more as "Gender" rather than sex.

Yes! Gender, (Yonge, 1993, page 4) is one of the basics of science because it is of primary concern in BASIC Mathematics. It relates to the even and odd integers.

Gender is one of the earliest basic LAWS which are established. It is called the LAW of OPPOSITES. "FOR EVERY LAW THERE IS AN OPPOSITE WITHIN THAT LAW". I can show you better

by a series of examples.

WINDS

You know that every tornado turns in a counter clockwise direction.

Every hurricane revolves in a counter clockwise direction. Even Low Pressure areas on a larger scale of continent size, turns in a counterclockwise direction. These are all males, (I think). This is a law of the winds, or LAW of the vortex. I'll tell you about the mathematics of these magnitudes later. Opposed to these are the high pressures which turn in a clockwise or supposedly female direction. (Fig. 1). South of the Equator, a different "opposite" has the low pressures revolving in a (male) clockwise direction. When one enters the Southern Hemisphere the parameters are reversed. So this is another opposite or male/female reversal in the Northern and the Southern hemispheres. These are all examples of the LAWS OF OPPOSITES. In each of these cases there is a change in gender of one of the parameters.

These are each a vortex of energy. There is male energy, and there is a female energy for each type of male energy. One of their differences is that female energy and male energy act at a right angle to each other. This is the mathematical connection.

CURRENT

A current in a wire forms a magnetic field around the wire at right angles to the current. I have not tested it out but it is indicated that the magnetic field around a wire carrying female energy will be in the opposite direction to the magnetic field around a wire carrying male electricity. This female current and a male magnetic field will be a right angles, (Iverson, B., 1993a, page 60), to a male current and its female magnetic field. (Fig. 2)

As you can see, defining what is male and what is female is difficult. -- In QA we are not allowed to arbitrarily, just grab a definition. We can define male from female by their Quantum Number. Another difference is found in the actual QUANTUM NUMBER of the item of energy with which we may be concerned at any given time. This goes back to Euclid (Heath, T.L., 1956, Book VII, Definition 11 omitted), and the four kinds of numbers he defined. The even/even; the even/odd; the odd/even; and the odd/odd. The even/even or the $4n$ numbers are male. The $2n$ numbers, the even/odd numbers, are female throughout. If we can obtain the Quantum Number, we can define the gender. This is one of the earliest LAWS OF MATHEMATICS AND OF SCIENCE.

We can derive the Quantum Number for an electric frequency, but we cannot do it for magnetism. This is partly because we really have no idea of what magnetism is and partly because it is bipolar. (That is, both male and female combined.) QA says there is no reason that we cannot split magnetism, and get

two magnetic di-poles -- Male and Female, if we knew what we were working against.

One hundred years ago John Keely identified the male and female. 2000 years ago Phylos, The Egyptian Jew from Alexandria, also defined them, (Yonge 1993, Page 4). The definition is that male features are radiative and outgoing, while the female are characteristically more stationary and attract external energies.

With that in mind, electrons are male and protons are female within the atom. The protons will probably carry female photons of energy and the male electrons will carry male photons of energy, but it may be more complex than that. It may be that electrons carry female magnetism, and protons carry male magnetism. Here we have a three-way picture of the LAW OF OPPOSITES and we must get our parameters together. It is a sort of three dimensional picture. That is covered in my books so I will try to get on the important subject of energy as it concerns many of you..

EARTH FIELDS:

Let us go back to the Earth fields. Mathematics says there are three fields around the Earth. They are 1) the magnetic field which is oriented north and south; 2) There should be an electric field which travels East-West along the parallels of latitude, and 3) there is the gravitational field which works on the vertical and all three are at right angles to the others. It is something to consider and it was certainly known in ancient times. (Fig. 3)

In the Hawaiian belief system there is an east/west field which they call the "Kahuna Ring" which encircles the Earth. Is it possible that this is an electrical current and is the source of the energy which Tesla tapped into.

Let me define energy as it comes from Quantum Arithmetic. The first thing to ask is, "What is energy?" Energy is only a vibration. It is never directly back and forth, and it is never in a perfect circle. It lies between these two extremes and the shape of electricity is elliptical, not sinusoidal, (Iverson, B., 1993c page 61-63). The ellipse will be taught in QA during the first year whether it is 5th Grade Elementary, or High School or College level. Many ellipses can be solved mentally and simply.

ONLY ONE SCIENCE AND THAT IS SCIENCE OF ENERGY:

LET ME EMPHASIZE THAT there is only one subject in the New Science. That SUBJECT is Energy and Energy creates everything we can experience and hundreds of things beyond our experience. Energy creates Matter and knowing energy we can know the finest details about Matter.

I started out with the example of the tornado, the hurricane, and the larger figure of low pressure

within the weather. These are vortex shapes and the corresponding sizes of energy. The energy with which we are concerned comes in seven sizes. (Fig. 4)

They are:

Creative energy at the top which cascades to form the Metaphysical energy, which cascades down to Light Myriad cascades down to the Myriad of Chemism, referred to by Keely, Chemism cascades down to Myriad of Ultra-Sound, which cascades down to the Myriad of Sound or Music. And the seventh is the Myriad of sub-sound.

Each in succession, is higher valued wavelength and lower valued frequency. All of these are important in understanding the parameters of Energy. We have direct personal access to the last five through our senses. (I will go deeper into the Myriads as we go along.)

There are examples to be found everywhere of these different Myriads. Reading "Philo" the other day, 2000 years ago he made reference to the Metaphysical Myriad. He called it the INTELLECT stage of energy which it is also. It is the Myriad in which the energy of our thoughts originate. Philo was born about 20 B.C. in Alexandria, and Died about 50 A.D. His writings start out with description of the prime numbers and the male and female connotation of them. He also describes "Female" as being reticent, attracting, and nurturing, while "male" refers to radiative, outgoing and often obtrusive. These writing just became available in 1993, through a newly published book. The book is slightly oversize and contains 900 pages of very fine print. In the first fifty pages I find more ancient mathematics than I have run into anywhere, even in Euclid. Philo confirms very much what I am about to tell you about energy, although I derived it separately from his works.

THE FLOW OF ENERGY

My finding is that energy occurs in these seven Myriads. A myriad is from the Greek meaning 10,000. Each Myriad has approximately 10,000 strong quantum frequencies. All myriads comply with the same mathematical rules, which I will describe later. Knowing these rules and the characteristics of energy in general will help you understand the parameters which you must measure. You must develop the instruments to do these measurements. Volts, amps, ohms etc. are not sufficient to measure the proper parameters which are needed for Cosmic Energy projects. We need to measure "WAVE-FORM". -- I can lead you part way to understanding those parameters, but my work is not complete either. It needs your input.

HARMONICS:--

Energy travels from the upper Myriad to a lower Myriad. This is accomplished through HARMONICS, and the LAW OF HARMONICS which I will

give in a moment. It leads to the LAW OF ENTROPY.

We are not through with our "sevens" yet. Each wave in any Myriad is composed by seven different prime integers. These seven waves, or wavelets, will bond together under the laws set out by Harmonics. Every Quantum Wave is formed of seven wavelets as it cascades to a lower Myriad. The wavelets come from their list of seven unique prime numbers, from the upper Myriad. Those are factors of its wavelength or frequency. They become wavelets in a lower Myriad. The critical part here is in the waveform, and not in the wavelength. I don't have time to go into that mathematics. It is in my books, but we must learn to define waveform by discovering the prime numbers contributing to it.

These seven prime numbers each contribute to the waveform which is all important. In pairs, in threes, in fours and in fives they all make different HARMONIC CYCLES which show up in the waveform. ("Harmonic Cycle, Fig 5) It becomes very complex, but QA can handle it. The various harmonic Cycles are, very definitely, the bonding energy between electrons. It also bonds between the colors of light, and the bonding between different tones of music.

HARMONIC CYCLE:

Shown here is a cycle of wavelets, being the 3, 4, and 5 unit cycles. They will complete and close their combined cycle at 60 units. $3 \times 4 \times 5 = 60$. The waveform for each of those 60 units is different. It will not begin repeating until the second round.

Every Quantum Wave has a 2-factor and a 3-factor in its complement of seven factors. About one third of all Quantum waves have a 3, 4, & 5 for their harmonic cycles. One third have a 3, 4, 7 for their harmonic cycle. These are for the males. For the female harmonic cycles a 2 is substituted for the 4 to make 2, 3, 5, and 2, 3, 7. Given here is the male harmonic cycle for the 3, 4, 5 Harmonic cycle. I want to impress on you that these are mathematically proven, and physically tested. This is the simplest 3-wave male cycle which can be drawn.

I said I would give you THE LAW OF HARMONICS. The Law reads:

"WHEN TWO ENERGY WAVES HAVE HARMONIC CYCLES OF THE SAME MAGNITUDE BUT DIFFERENT MULTITUDES, THEY WILL BE HARMONIC TO EACH OTHER TO THE EXTENT OF THE VALUES OF THE MAGNITUDES AND MULTITUDES OF THEIR HARMONIC CYCLES, (Iverson, B. 1993c, page 82-83).

Each harmonic cycle is essentially a series of seven waves from an upper Myriad. These waves become wavelets in a lower Myriad. The process of burning organic material is essentially the breaking up of the wavelets of the harmonic cycles to push

them back to a higher Myriad, thus releasing their heat and light originally gathered through photosynthesis.

Now, theoretically, we can do the same thing with the protons and electrons themselves and create transmutations of matter. Or we can make atomic bombs of any element, releasing the entire energy which went into the making of the atoms. This is precisely what John Keely did under controlled conditions. I am talking about dissociation of matter, or the transmutation of matter, -- not just dissociation of chemical compounds. (Iverson, B., 1994, Chapter 5)

AREAS OF CHAOS:

The entire spectrum is not quantum there are large ranges in the waterfalls between the Myriads in which chaos reigns. Those high numbers simply do not meet the requirements for number definition above 10,000 for each Myriad. Each Myriad may actually stop at 5040 in its own scale. After 500 K-Hertz, we seem to be in the next Myriad above, and ready to start the numbering over beginning with THE ONE for that higher Myriad. This blind area between Myriads is not understood at the present time. It may be an area of extreme danger. Radical harmonic resonances may occur at unexpected places. Note that the high end of the Table of Elements the elements are radioactive. I think Keely ran unknowingly into some of the higher waterfalls. This is possibly responsible for his explosions and resultant injuries in the 1890's, when he ventured from one Myriad to the next. This probably occurred also with Sparky (Sweet Device) when he got above 5 Kw of his female electricity.

Somewhere in this discussion comes the one-way gate which severely limits energy from going from a lower Myriad back to a higher Myriad. There is some kind of LAW here which is the LAW behind ENTROPY. Energy must cascade downward and only extra-ordinary events will reverse the cascades. (Fig. 7)

These seven spheres of energy are possibly the reason the Greeks stopped at 10,000 and started over in the next scale. Of course they worked in Base-60 numbers which made it quite a bit simpler. Quantum Arithmetic does not use base 2, base 10 or base 60. Each Quantum Number establishes its own number base, which is the base of its included prime numbers. So it is working simultaneously in seven number bases, and in combinations of those prime number bases. The calculations must be done with computers at the present time and there is a computer program to change to those bases, and relate them to base-10.

"Energy is all there is" Everything else is created from energy through harmonic resonances. Those resonances can be monitored mathematically through QA, and number values can be found and applied. All energy is of two forms. One is male and the other

is female. We find this particularly in the octaves of the Table of Elements with the Acids and Base Elements. Learn all about one Myriad and you essentially learn all the rest, including matter.

"Male Female" seems to apply to even lower Myriads like the Myriad of our Solar system. You will notice the four inner planets of which Venus and Earth are females, and the four outer planets of which I think only Jupiter and Neptune are males. (In ancient literature).

I have some very good news for you. Most of you have had trouble in getting published. Don't worry about it. What I am talking about today is what comes from mathematics, but I cannot tell you much about it in my allotted time because there are 7 books on the subject and we would be here a couple years reading them. You can get that from my books, or from Dale Pond who is well versed in it.

The good news is that this work has a solid mathematical proof in the manner of Euclid himself. Disproval of the basics of this math will be impossible, partly because one must reach back to 5th Grade math. It is that basic. But on the other hand it also disproves so much of our current science that old science dogma will be destroyed in its present hands. If a science Journal wants to publish they must come with contract in hand. They would not publish for 30 years so I copyrighted it. It will cost them but it is free to anyone who has non-profit motives. It is the GRAND UNIFIED FIELD and I hope you benefit from it.

I break three minutes now to allow time to be devoted to answering questions from the floor. I know this is pretty dense stuff to most of you, but frame the questions as best you can. This subject is expanded in the text ahead, as a more detailed discussion.

THE NEW PARADIGM OF SCIENCE (Details)

It is impossible to overstate the importance of the New Paradigm. It will affect everything we do. This is breakthrough which has been made into Natural Mathematics. It has information which was used by one or several ancient civilizations, for which we have no history. As a result of having this mathematics, these civilizations were as far above our present civilization as we are above the mathematics used by our own animals. That is no understatement. It is the Grand Unified Field. This mathematics has shown enormous errors in our present sciences. Instead of scientific theories this mathematics establishes solid LAW such as the LAW OF HARMONICS which was given previously. (Fig 7)

There are thousands of ways to get the free energy. In fact, the burning of organic fuels is free energy. Atomic energy is free energy. The harnessing of them is the costly part. The problem is that we use

energy only from the waterfall of energy between the 3rd to 4th Myriad of energy. Some of you inventors have gone to the higher waterfall -- to the second, and even to the first Myriad. I hope to give you some help here. But enough is said on that. Let us get into some demonstration. For that I will use the ellipse to demonstrate.

Our schools teach the ellipse pretty much as a last resort. But the ellipse is simple enough that it can be taught in Elementary School. This will then lead into the rest of this Natural Mathematics. (Fig. 8 -- Unit-of-measure is the only difference).

We draw an ellipse with a loop of string and two pins. The length of the loop of string should be equal to the perimeter of any Prime Pythagorean Triangle. The pins are placed a distance apart, equal to the base of that triangle.

Along the major diameter we have four measurements. Three of them are the perigee, the apogee, and the half distance between the pins at the foci. These measurements, whatever they are, will have one common factor, whether a prime triangle is used or not. If this one common factor is squared, that will be the semi-major diameter of that ellipse.

The point of using a Prime Pythagorean triangle to set it up, is that all of the major measurements of that ellipse will be in whole numbers. This carries us into a whole new mathematics utilizing its own number base. The number base will be the product of the quotients of the four measurements which were just stated as being along the major diameter.

EXAMPLE -- ELLIPSE

To put this in more understandable terms, let us assume that the major diameter is 50 units in length and the semi-major diameter is 25 units. If the perigee is 20 units then the half distance between foci will be 5 units. The square root of 25 is 5 which divided into the other three measurements, (20, 5, 25, and 30) we have 4, 1, 5, 6. This is the origin of the Fibonacci numbers. But Fibonacci had little to offer us. It was a big mistake to depend on him. These four numbers are what Euclid was describing in Book VII, Proposition 28. "When two numbers are prime to each other their sum and their difference will be prime to both of them."

It may seem to be restrictive to insist that the original triangle be a Prime Pythagorean triangle, but not so. There are many more such triangles than there are integers in the whole numbering system. Do not forget that we are using a much larger number base. The answers which we derive have their own unit of measure and the coefficient to change them back into original common units is easily obtained.

That is just a start into the natural Mathematics of quantum Arithmetic. There are three books written totaling about 500 pages and another four books of

about 700 pages, still to be written in their final form. They exist in desktop editions which many of you already have.

I am not going to say much more about Quantum Arithmetic. I no longer offer it to the Establishment Journals. If they want to print it they will come to me with a contract in hand. They cannot print my material because they have no reviewers. Any reviewers would have to go back over every bit of mathematics they have ever learned since they were in Fifth Grade in Elementary School. I realize it is quite a setback for them to understand there is a Natural mathematics, (Iverson, 1993b, page 15-16), that surpasses the Invented mathematics with which they grew up. We now have the Grand Unified Field. The ellipse I described is just the beginning of it. It is far beyond anything conjectured for the Grand Unified field. Throw out your calculus. Throw out your Trigonometry. You will work with whole numbers and use only addition, subtraction, multiplication and prime numbers.

We no longer need as many equations as there are unknowns. Two variables will get us answers to dozens of questions through the sixteen simple algebraic equations which are built in, naturally, in the Grand Unified Field. There is automatic factoring of complex equations, which current math cannot even begin to solve today. I won't say more about Quantum Arithmetic except that it proves itself every step of the way, and the proof is much more stringent and positive than we find even in Euclid's Geometry. If I get into Quantum Arithmetic, this Symposium will last a full year. It is all in the three books which I have with me, and four additional books I propose to re-write in the next two years.

Free energy presents some problems. The major problem I see is in knowing the parameters of F/E. One must know the parameters in order to develop the instrumentation to measure results. Even current science does not understand the parameters of what they are working with, and that leads to accidents in our every day life. Quantum arithmetic shows so much which is wrong with conventional science, and particularly with conventional math. Fibonacci was wrong or deficient in his work. Lord Rayleigh was not only wrong but he was bass ackward in his work on "Theory of Sound".

The Grand Unified Field touches every one of us. Fourteen years ago I put it to a test. I weighed nearly 230 pounds and my cholesterol was over 300. Fourteen years ago the Doctor said, "You have lung cancer". I said "baloney" and went on to prove it. My wife and I took a three week trip to California, Nevada, Utah, Montana, and Idaho, all the while using the cure indicated by the Grand Unified Field. Returning home, the supposed "cancer" was gone. Eventually my weight dropped about 30 pounds and my cholesterol dropped to 150 and has been there ever since. Science was wrong, wrong, wrong. The idea of a low fat, low sodium diet is absolutely wrong. I eat any-

thing I want including high fat milk, a pound of margarine a week, and all of the fat on any steaks. The Grand Unified Field told me the cause.

Yes! Science was so wrong that it will surely kill many people with their misinformation, guesswork and theories. I expect to live to 104 as did my grandmother. I have the help of the Grand Unified Field, and God's hand is on my shoulder.

I should not talk about Quantum Arithmetic itself. You can get that from my books, or from Dale Pond who is fairly well versed in it along with many others. I will talk about some of the advanced physics I have learned and theorized from my working with Quantum Arithmetic.

This theme is that "Energy is all there is" Everything else is created from energy through harmonic resonances. Those resonances can be monitored mathematically through QA, and number values can be found and applied.

THE FLOW OF ENERGY

My finding is that energy occurs in seven Myriads. A myriad is from the Greek, meaning 10,000, (Fig. 5). Each Myriad has approximately 10,000 quantum frequencies. All myriads comply with the same mathematical rules, which I will describe later. Knowing these rules and the characteristics of energy in general will help you understand the parameters which you must measure. You must develop the instruments to do these measurements. Volts, amps, ohms, etc., are not sufficient to measure the proper parameters which are needed for Cosmic Energy projects. I can lead you part way to understanding those parameters, but my work is not complete either. It needs your input.

Energy, is simply a vibration. From the highest to the lowest, there are seven scales of energy. Each scale is called a Myriad which comes from the Greek meaning 10,000. That is "There are 10,000 different quantum energies in each scale. These 10,000 different quantum frequencies, or wavelengths, in each Myriad, are divided into seven octaves. Those frequencies between the quantum frequencies are non-quantum. You will be concerned with only QUANTUM frequencies which will produce Cosmic Energy. Four of the frequencies in each octave will be specially productive. Up to 18 others will also produce highly usable energy. Let start with the first of the Seven Myriads.

THE SEVEN MYRIADS

MYRIAD 1): Energy is created continuously and dependably in the first myriad, The Creative Myriad. This is true Cosmic Energy. Its frequencies are probably from One Trillion hertz up to four Quadrillion Hertz. How are these created? We can only say they are created by the CREATOR, OR BY "THE ONE", or by God if you can conceive of a

God.

You must have an instrument which will read values to 10 trillion hertz in order to work in this Myriad and it must read to an accuracy of 12 digits. But you will not read in hertz or vibrations per second. You will read in vibrations per nano-second or per teva-second and the readings will run from Zero to ten thousand and should be accurate to seven significant digits. Your reading should be mathematically accurate in the Creative Myriad or any other Myriad, to seven significant digits in this scale of 0 to 10,000. There may be some in this audience who have already designed such an instrument. (I am thinking of E. E. Richards who designed such a device seven years ago. He now lives in New England. He does have such an instrument, although I believe he is inactive, or was the last time I spoke with him two years ago). These measurement apply to all myriads in their own scale. Once you have developed the numbers for any one Myriad you will reuse those same numbers in all other Myriads.

MYRIAD 2): METAPHYSICAL: The Creative Myriad, through the mechanics of HARMONICS, creates the Second myriad which I call the Metaphysical Myriad. Philo called it Intellect.

Like the Creative Myriad, the metaphysical Myriad has 10,000 different Quantum energies. These 10,000 frequencies, or wavelengths, are arranged in seven octaves. Four of the frequencies in each octave will be specially productive. Up to 144 in each octave will also produce efficient energy.

This Myriad is within our reach and should be a big energy producer. The Metaphysical Myriad is the Myriad of thought energy, of spiritual energy, of psychic energy and of metaphysical manifestations. One's aura, one's spirit, one's memory, and probably one's soul, and consciousness lie in this Myriad, above Ultra Violet Light.

MYRIAD 3) LIGHT: The Metaphysical Myriad cascades energy, through the mathematical Laws of Harmonics, to the myriad below, and this is the first Myriad which you can visualize. It is the MYRIAD OF LIGHT, BUT LIGHT IS ONLY ONE OCTAVE OF THIS MYRIAD. Ultra Violet and Infra Red provide three more octaves on each end of this Myriad. We measure light in angstroms which is wavelength rather than frequency.

"There are 10,000 quantum energies in the Light Myriad and perhaps 60,000 non-quantum energies. These 10,000 different frequencies, or wavelengths, are divided into seven octaves. Four of the wavelengths in each octave will be specially productive. In the octave of Light these are the primary colors red, yellow, green and blue. Several others, up to about 144 per octave will also produce usable energy. In this myriad there are productive frequencies in the whole myriad which includes three octaves of Ultra-Violet above light and three octaves of Infra-Red

below the frequency of light. Most of our energy today can be traced to these three bottom octaves. It includes burning of coal and wood to Atomic energy.

Let us look at that one octave in visible light which we can see. There are the four colors of Red, Yellow, Green, and Blue. The Blue light is at a ratio of two to one with the Red making it one octave. In addition to these colors we have added orange, violet and indigo. This makes 7 usable or productive energies in each octave. If you can find the most productive frequency, or wavelength of either the red or the blue, to seven significant digits, I can give you the approximate frequency of all 144 of the extra productive frequencies or wavelengths.

MYRIAD 4): CHEMISM: The Light Myriad cascades energy, through the mathematical Laws of Harmonics, to the myriad below, and this is the first Myriad which you can see and feel. Your body is a part of this Myriad. It is the MYRIAD OF CHEMISM or MATTER. THERE ARE TWO PARTS TO IT. One part is inorganic matter and the other is organic matter.

Inorganic matter consists of the Periodic Table of Elements with its seven octaves, and up to 18 elements in some octaves. This is MATTER, and the energy has been cascading down for, (it is said) 15 billion years. Each electron and each proton, and other particles of atoms is an energy field. This Myriad consists of 10,000 different spectrographic lines which we can obtain through spectro-analysis. Each spectrographic line represents an energy state of an electron. This is a valid and usable measurement.

Organic matter is also produced by the Light Myriad. It does this through a harmonic process we call photosynthesis. This process takes the inorganic matter and runs its electrons to higher energy states, making organics or temporary energy states. This process can be reversed and we can burn the organic matter which carries the energy, back into the Myriad of Heat and Light above it. This is our major source of energy today. The other source is atomic energy which frees the energy of the atom into the three Myriads above it plus the three Myriads below it.

Electricity is not electrons passing down a wire. It appears to be the electrons passing the photons of energy down the wire from electron to electron. Each electron only changes its energy state, and passes the energy on to its neighbor. Protons also do this, passing on, the female energy such as Sparky has found. The low end of this Myriad seems to be about 40 Khz. and the speed of energy travel is about 186,000 miles per second.

MYRIAD 5): ULTRA SOUND: The fifth Myriad of energy is Ultra sound. The energy in the Ultra-Sound Myriad can be presumed to follow the same rules as given above. It travels at a slower rate because it must be transferred through Matter and Chemism. The low end of this Myriad is about 4

Khz and this energy travels in feet or meters per second.

When we twang a Guitar string we are actually stressing the bonding between electrons. In order to regain their original state they must cascade the energy down through the ultra Sound Myriad and then re-cascade it further into the audible sound Myriad. I have more information on this but let us go to the next one.

MYRIAD 6): SOUND OR MUSIC: The Sixth Myriad is the Myriad of Audible sound. This Myriad has been studied because we can observe all seven octaves. We can also observe the four prominent frequencies which are the C F A C or the natural bugle tones, (not tones of a piano). They are the replicate of the four colors in the single octave of the Light Myriad. Then there is the ART of MUSIC which contributes much theory to this overall theory of Energy. We can learn a lot about energy through Chemism, Ultra Sound and Sound because we have seven octaves ready for study in each of these three Myriads. The Myriad of Music has the pattern of all other Myriads. By studying the mathematics of Music we can gain a much greater understanding of energy and its place in science. Once we understand energy, the whole world of science opens for us.

There are 10,000 quantum energies in the Audible Sound Myriad. These frequencies, are divided into seven octaves. Four of the wavelengths in each octave will be specially productive. They are C, F, A, C of each octave. (Fig. 6)

Up to 18 per octave will also produce usable free energy. Other frequencies probably will not carry much energy because they are so weakly quantum. We hear the seven octaves with up to 12 usable notes per octave. (Fig. 9), The individual notes run in fractional part of the keynote. These fractions are all of the possible prime fractions from one 1/7 to 6/7 and include the prime sixths, fifths, quarters and thirds of their single keynote. There are actually eight keynotes but the other seven have been found only recently. I won't go too deeply into the Audible Sound Myriad because you can get a lot of information from Music. But I do have a usable list of the 144 related tones of Music of The Spheres and their place in History. (Fig 9 is not shown).

Before leaving this myriad let me explain how we get music from a guitar string. We pluck the string. This stresses the atoms in the string and the elasticity of their bonding strength between electrons. These electrons resound in the Myriad of Chemism or Matter. The resounding notes cascade into the ultra-Sound Myriad, and then cascade again to the Music Myriad. I have cascaded sounds from Kilo hertz range to the Myriad below Music. My sister cascaded tones down from the Megahertz range to the 100 hertz range of the Music Myriad. Pipe organ builders have used this for nearly 200 years using UltraSound whistles to produce the 16 hertz tones. The 80-foot

pipe would have gone through the roof of most cathedrals.

MYRIAD 7): The seventh Myriad is also somewhat known. This is the Myriad of Mentalism. This Myriad involves emotions through Sympathetic Vibration. This Myriad concerns the brain waves and the energy which travels the nervous system. It runs from a fractional hertz up to about 40 hertz. We unknowingly deal with this every day. (It should not be confused with the Metaphysical Myriad which is the energy of thought and memory. It appears these may be in the aura within the metaphysical Myriad.) This seventh myriad, Mentalism is entirely different and is deeply involved in emotions, and various body cycles, including heart beat and breathing.

There are hundreds, or thousands of ways to get the free energy. In fact, the burning of organic fuels is free energy. Atomic energy is free energy. The harnessing of them is the costly part. The problem is that we use energy only from the waterfall of energy between the 3rd to 4th Myriad of energy. Some of you inventors have gone to the higher waterfall to the second, and even to the first Myriad. I hope to give you some help here.

We are continually getting its input from many various sources. One of these sources is the tremolo of Music. This myriad also is found at the ocean beaches in a storm. These low frequencies puts one in awe, because you can actually feel the vibration in your chest and is very awe inspiring.

EXPERIMENT:

We also get these wave frequencies directly from the Sun. In a study I have made it does affect the whole population. Anyone can read this frequency. Face the sun with your eyes closed. The frequency will affect the muscles of the eyes, and one can count the lower frequencies. When the frequency is below four hertz the whole population is in a relaxed state. As it goes to six, people will become industrious and active. When it reaches eight hertz, people become agitated, and quarrels will break out. When it gets above eight, and they can no longer be counted, it becomes a day when police activity is caused to mount from the turmoil. It affects the mood of freeway traffic in the same way. Some days traffic is relaxed, and other days there is much cutting back and forth between lanes, speeding and anxiety.

I would like to tell you of a rather personal experience, related to this Myriad. With the help of the Grand Unified Field I have developed the 144 tones of Music of The spheres. (Fig. 9), I put them into my computer, a Commodore 64 which has the patented SID chip. This is "Sound Interface Device" which only the Commodore and the Amiga computers have. With this SID chip, sounds can be calculated and all parameters can be entered digitally to know exactly what tones are being produced, with an eight digit accuracy. (That is to a millionth of a hertz.)

With these 144 notes in the computer I proceeded to play two-note chord permutations and observing the chords they made. Over several months I had played millions of 2-note and 3-note combinations. That is one feature of Music of The Spheres. Every note is in some degree of harmony with every other note. Along with the harmony, every pair will have some input into this seventh Myriad.

One evening I was playing these two-note combinations and I struck a chord that froze me with the most chilling fear anyone has ever experienced. It was as though the room was filled with the chilling scream of mountain lions. I was so filled with fear that I never did find what those two notes were. This came from that two note chord. It is exactly the same thing as is given to us in ancient tales of events which were accomplished with music. I became very certain that this might be a very dangerous Myriad to be working in. Through sympathetic vibration those low frequencies enter your body every day.

In your searches for energy, you may accidentally be cascading energy from an upper Myriad into this Myriad of Mentalism. In my case, there is a possibility that might have caused a break in my own nerve signals even to my heart and elsewhere. Some nights my nerves became so jangled that it was impossible to sleep. It has been nearly six years since I last played this music. I have a great deal of respect for it.

Any of you who have read the Iliad and Odyssey may recall the time that Ulysses passed by the Island of the Sirens. He ordered his crew to put wax in their ears, and to tie him to the mast of the ship. Only he heard the Sirens, and he passed safely by the Island which was known for enticing seamen ashore, never to be seen again.

Then there is the story of Hermes teaching the tortoise to sing. He invited the tortoise into his house, whereupon Hermes cut off the head and feet and proceeded to clean out the shell. Across the shell he placed strings making a harp. With this harp he drove Apollo's cattle, backward into the sea.

Then there is the story of Keely blowing his harmonica and caused water to dissociate which built up pressures of 20 thousand pounds per square inch within a steel sphere.

In your search for new energy the whole world is at your doorstep, but it is a world we have a great deal to learn of new dangers. Quantum Arithmetic and the Grand Unified Field do much to inform us of possibilities.

Free energy presents some problems. The major problem I see is in knowing the parameters of F/E. One must know the parameters in order to develop the instrumentation to measure results. Even current science does not understand the parameters of what they are working with, and that leads to accidents in

our every day life. Quantum arithmetic shows so much which is wrong with conventional science, and particularly with conventional math. Fibonacci was wrong or deficient in his work. Lord Rayleigh was not only wrong but he was backward in his work on "Theory of Sound". Frequencies cascade downward, -- NOT UPWARD. That is the essence of ENTROPY.

THE FLOW OF ENERGY

My finding is that energy occurs in seven Myriads. A myriad is from the Greek meaning 10,000. Each Myriad has approximately 10,000 quantum frequencies. All myriads comply with the same mathematical rules. Knowing these rules and the characteristics of energy in general will help you understand the parameters which you must measure. You must develop the instruments to do these measurements. Volts, amps, ohms etc. are not sufficient to measure the proper parameters which are needed for Cosmic Energy projects. We must measure waveform, I can lead you part way to understanding those parameters, but my work is not complete either.

Energy, is simply a vibration. From the highest to the lowest, there are seven scales of energy. Each scale is called a Myriad which comes from the Greek meaning 10,000. That is "There are 10,000 different quantum energies in each scale. These 10,000 different quantum frequencies, or wavelengths, are divided into seven octaves. Those frequencies between the quantum frequencies are non-quantum. You will be concerned with only QUANTUM frequencies which will produce Cosmic Energy. Four of the frequencies in each octave will be specially productive. Up to 18 will also produce usable energy.

CONCLUSION:

All energy is in one of two forms. One form is Male. The other is Female. They can be definitely classified if we can find the correct Quantum Number for them. We have found these two forms in our present Periodic Table of Elements which we call acids and base, elements. It also seems to apply in still lower Myriads, below these seven, in the Myriad which applies to our Solar Planetary System. You can note that of the four inner planets, only Earth and Venus are Females. Of the four outer planets, I think only Jupiter and Neptune are Males, according to Ancient literature.

The entire spectrum within the seven Myriads, all natural frequencies are Quantum, and most strongly Quantum at their lower end. At the higher end and to the next waterfall above, the energy is non-quantum. It is here where chaos reigns because the number values are not sufficiently definitive to maintain Quantum Relationships.

Each Myriad may actually stop at 5040 vibrations per unit of time for that Myriad, and that scale. After we reach 500 Kilohertz at that scale, we seem to be at

the bottom of the next higher Myriad. This is the bottom end of the higher Myriad where numbering is the lowest and most Quantum. It is in this gap between Myriads where we will find an area of extreme danger. Radical harmonic resonances may occur at unexpected places. You will note that the high end of the Periodic Table of Elements has most of the radioactive elements. That is the type of thing which can be expected in the high end of all Myriads and in the waterfall areas.

I think John Keely ran unknowingly into some of these waterfalls. They would certainly be responsible for some of the accidents which he encountered. Again, I think Sparky may have done the same thing and this may be responsible for some of his problems when he tried to go too high on wattage. It was not the wattage, per se. There are other parameters which come into play. The most important parameter seems to be wave form and not wavelength. Waveform pertains to the harmonic parameters.

Thank you very much. If there is time we can have a few questions. And let me remind you, "There are no stupid questions!", only stupid answers. Contemporary Science has them in large supply.

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QUANTUM PHENOMENA: See **BRAGG REFLECTION, THEORY-QUANTUM**

QUANTUM THEORY: See **THEORY, QUANTUM**

QUARK: The hypothetical particle that is believed to be the basic constituent of the elementary particles. (116) See **ATOMOLE; ATOMOLINI**

QUARK CONFINEMENT: The theory that there is some reason why quarks might exist inside of elementary particles but may not be seen in any experiment. (116) See **ÆTHER; ETHER; CELESTIAL ATTRACTIVE; ETHERIC CAPSULES**

QUARTA: The interval of the fourth, as major, minor, abudans, (superfua), a major, minor, or augmented fourth. *Quarta modi, Quarta toni*, the fourth of the scale, the modern subdominant. (125)

QUARTER NOTE: The crochet. (125)

QUATERNION: A quaternion has four parts – three vector components, and an associated scalar component which itself may be a function of vectors. When the three vector components reduce to zero (by phase conjugation), the scalar component still exists, and may vary in both magnitude and vector composition. That is, when the three vector components of the quaternion are zeroed, the quaternion does not necessarily disappear at all. In modern vector analysis, however, the associated scalar component is not used; only the three vector components make up the vector. When the three vector components are zeroed, the entire vector disappears without any remaining residue being accounted for. In quaternions, for example, one could still remain, and could actually change if the sum-zeroed components were dynamically varying while yet maintaining their zero summation. In this manner, one could easily have the scalar function represent the stress of local spacetime, and could unite gravitation and electromagnetics on a local, engineerable basis. One could use infolded (zero-summed) EM force vectors to create gravitational scalar stress potential waves. (132)

A quaternion consists of a triple vector part and a scalar part and can readily take into account the stress and strain of the medium, including internal structuring of the stress or strain, whereas a vector (Heaviside's vector) consists only of the vector part. Quaternions are difficult, and even in the time of their founder, Hamilton, few mathematicians and scientists ever mastered them. When Maxwell's theory was transposed to its modern vector form many of the characteristics of this scalar part were effectively discarded and only the vector part was retained. (132)

Quaternions describe mathematically the structure of Keely's triple streams or concordant flows as he called them when harmoniously balanced. This triple flow is then an undifferentiated flow. Keely once mentioned that Maxwell was substantially correct and apparently went on to make full use of his mathematics. **SEE DIFFERENTIATION; TRIPLE FLOWS; ONE FORCE**

QUATERNION: QUATERNIONS - by Ben Iverson & Dale Pond

Quaternions were developed in 1843 by W. R. Hamilton (1805-1865) in Dublin, Ireland. The background of these is rather hazy and is rather moot.

These were a precursor of the actuality and reality of force and energy as manifested in the form of longitudinal, transverse and vortexian vibrations (Energy manifests rhythmically over Time). Quaternions are not an invention but parts of the procedure had to be invented in order for quaternions to be applied. The use of quaternions has a profound effect on science because: 1) It recognises a greater scope in physics; and 2) they add recognition of the dynamism inherent in energy. However, in nature there is not the necessity of having imaginary numbers. Nature is real and

hence it uses real quantities. Quaternions resemble to no small degree the well established arithmetical methods used in the study and development of music and sound (as music) dynamics. In fact one could almost say that what are known as computations of "summation and difference" tones between musical notes from the primary through the higher chords are in fact a subset of a quaternion-like math. These computations are a form of arithmetic/algebra hybridization.

Putting together this 'virtual' relationship and making it workable is quite another thing. That is for putting it together into a workable mathematics for use in science. A large part of the backdrop is now in place but more explanation is needed.

Everything in science and nature is quantum; i. e., discrete quantities. That is everything works and is numbered by whole numbers except (on first view) quaternions in themselves. They are the undercurrent of the whole number system or a "look behind the scenes".

In addition to being in whole numbers, all values must be based within the system of prime numbers. This much is covered by the books on Quantum Arithmetic¹. Essentially, a Quaternion is the square root of a prime number. They never actually appear individually in any calculation, but are combined in various combinations of them. The quaternion represents the latent unmanifested, unseen potential locked into a given triple vector system. Because this triple vector system is in reality a compound vibration this latent energy or potential may be quantified in terms of "polarization" or "degrees of polarization" (when dynamic) as opposed to a raw individualized and independent quantum of energy (when latent). John Keely referred to this undifferentiated triple vector complex as the Full Harmonic Chord of vibratory energies. The ancients referred to this as "white light" or undifferentiated (unrefracted) light from whence comes all degrees and forms of manifestation; i.e., Ra, Om, Yod, etc.

The involved prime numbers are combined in various and sundry groups such that their products in each group is a whole number. This combination takes place until there are only four whole numbers, some of which are prime and some of them are composite numbers. These four whole numbers must then be able to fit into a Fibonacci type arrangement. They must also be formed of not more than seven prime numbers for all four whole numbers. This is easier to demonstrate than to describe.

If one takes the combination of whole numbers to be 15, 7, 22, 29 for the Fibonacci configuration. The prime numbers here are 5, 7, 11, and 29, and the quaternions are the square roots of these six integers, plus the square root of 1, 2, and 3, to make the set of seven quaternions:

Integers	Square Roots (Common)	Square Roots (Quantized)
1	1	1/1
2	1.41421...	14169/10019
3	1.73205...	18985/10961
5	2.23606...	7900/3533
7	2.64575...	10583/4000
11	3.31662...	13031/3929
29	5.38516...	19015/3531

Now, these seven prime numbers will always contain the square roots of 1, 2, and 3 in every set of quaternions. These are what sets the unit-of-measure for nature and creation. The other prime numbers, in their relationships of one to another, are what sets the parameters of the energy of the thing created.

Going back to the set of four integers, they show the deficiency in Fibonacci's postulate. The configuration is that given by Euclid in Book VII Proposition 28, in what we call "sum and difference numbers". (But these were in use more than 2000 years before Euclid). Of the four numbers, in that configuration, the first and last are the extremes. The third is the mean, and the second is the variation as they apply to quaternions. Here we can begin to see the computation of "beat frequencies" or chords (whichever the case may be) as is done in musical tones. Having seen this musical connection to higher physics we can begin to understand the heavy emphasis John Keely placed on music throughout his entire system of vibratory physics.

In the example, 15, 7, 22, 29 the 15 and 29 are the extremes. 22 is the mean, i. e.,

$$(15 + 29)/2 = 22.$$

7 is the variation from the mean, i. e.,

$$29 - 22 = 7 \text{ and } 22 - 15 = 7.$$

The quaternions will be expressed as:

The square root of (15×29) x the square root of $((22^2 \times 7^2) - n^2)$.

This product of square roots is then divided by 7.

The value of n is the actual distance from the mean in integral units, from either extreme for the point being measured. If the extremes are designated $b = 15$ and $a = 29$; the mean is designated as $d = 22$, and the variation is designated $e = 7$, then the formula will be for y and x :

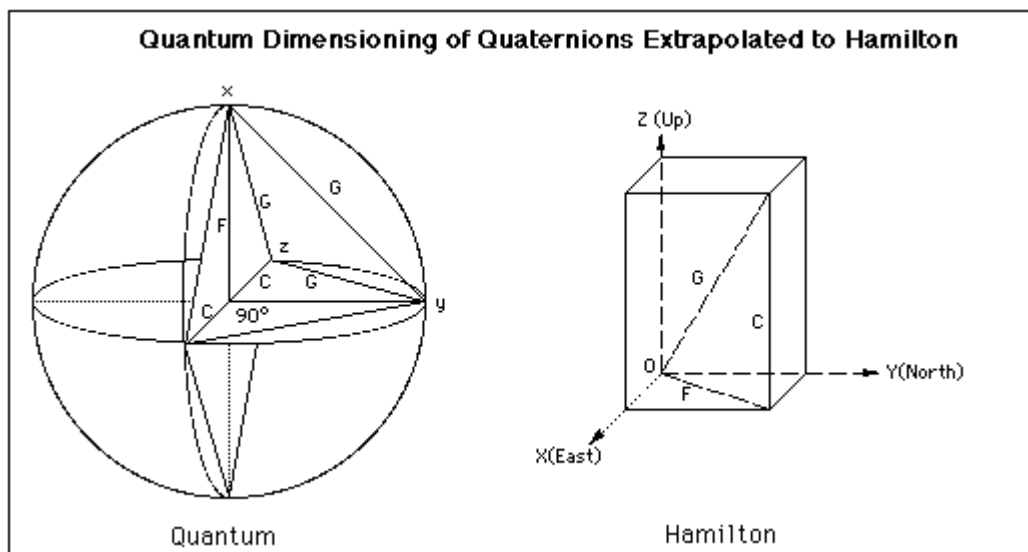
$$y = ((ab)^{1/2} (d^2e^2 - n^2)^{1/2})/e$$

$$x = nd/e$$

In this formula, the quaternions are used but the exact value of them will be the square roots of a , b , d , & e . In essence, the formula will be the product of three square roots: a , b , & $(d^2e^2 - n^2)$, or the product of three quaternions divided by the variation. Broken down further, each quaternion will be the square root of a prime number which is a factor of the product of the four larger numbers, a , b , d , & e .

The only variable in the equation is the value of n . When n is equal to de , the result will be zero. Then $n = 0$, then the value of the equation will be at its maximum. The value of n will progress from de to zero and then back to de . In this case, $de = 7 \times 22 = 154$ and $d^2e^2 = 1542$.

The term $d^2e^2 - n^2$ as part of the value for "y" in the above formula for the scalar is what Hamilton called the quaternion. In his formula, "the square root of -1" is a reintroduction of our number which we call The One, or The Ubiquitous One.⁴ That "One" originates in the higher dimensions and it is suspected that Hamilton put his math in and through the higher realms and had to then call these numbers imaginary numbers.



Another major difference is Quantum Arithmetic and Sympathetic Vibratory Physics does not recognize nor use negative numbers in the conventional sense. All quantities are real amounts. In lieu of this we use a natural phenomena called polarity. In many instances this polarity may be referred to as male or female numbers or even as positive or negative. All discrete quantities have real significance but are generally phase matched or opposite in polarity just as no coin can exist without two opposite sides. Conventionally a negative number is generally considered as "less than 0" which is a misconception and can lead to tremendous illusions. In Hamilton's system the -1 caused the equation to rotate 90° and further discussions of "negative Time". In QA and SVP a change in polarity also causes a 90° rotation. So to derive a full 360° sweep there must be a positive/positive, a positive/negative, a negative/negative, and a negative/positive orientations which of course there are.

This will make little sense to the experienced mathematician or scientist in contemporary terms. The background behind it will be explained in Quantum Arithmetic, Vol. 2, Bk. 2, pages 25-322 and also in Pythagoras and the Quantum World, Vol. 1-4.

The numbers derived from the working of this equation will give, not a sine curve, but an equivalent elliptical curvature, which is the true formation created by the quaternions. This might be considered as the epi-sinusoidal curve. Each point so calculated will be a quantum point in which most of the values will be irrational numbers when reduced.³ However, at least two of the derived answers will be whole integers and they will be located at the latus rectum of the elliptical curve.

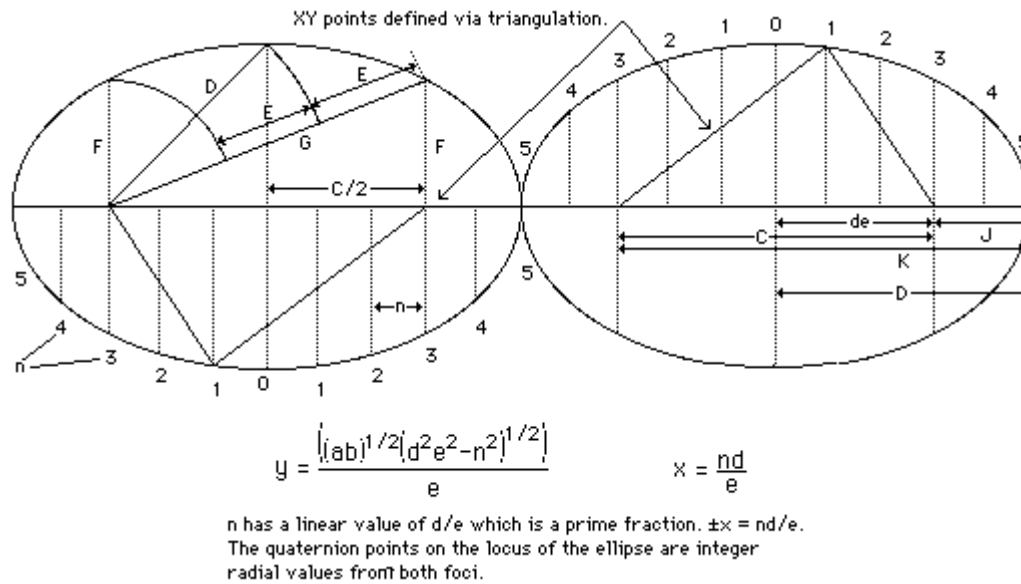
These two equations are for calculating the coordinates of a point on a 2-dimensional surface. Three or more dimensions may be calculated individually and then superimposed on this 2-dimensional surface.

What makes this new type of calculation possible is the replacement of invented calculus, along with other extraneous invented features of conventional mathematics, with an entirely natural Quantum Arithmetic. In this new method, there are no "imaginary" or "irrational" numbers and all answers are simple and entirely logical. Children love the simplicity of this arithmetic and geometry when exposed to it.

The above description is a bit difficult to follow. A repeat of the description in a different frame will help to understand quaternions from a different angle. There is a change from the accepted information on quaternions, much like there is a definite change from the way Fibonacci described the parameters of Fibonacci numbers and the way in which Euclid described them. By these changes we can see that Quantum Arithmetic is evolving from older ideas into a more complete whole.

In the case of quaternions, there are major changes. Quantum Arithmetic takes quaternions out of the field of the virtual and imaginary numbers, and their background is changed in many ways. But this new method is only the basic beginning of Quaternions.

The approach to quaternions is through Quantum Arithmetic. The current contemporary texts describes quaternions as: "An invented associative, noncom-



mutative algebra based on four independent units or basal elements." This is changed in two ways. In the first place it is now based on four interdependent variables. In the second place, it is changed from a non-commutative algebra to simple arithmetic.

The four interdependent variables are dependent on any two of themselves, and the four will be in Fibonacci configuration.

The adaptation of simple arithmetic precludes the necessity for use of calculus to obtain a resolution. This is the simple arithmetic of Quantum Arithmetic.

The origin of quaternions lies in the series of elliptical equations for the Quantum Ellipse. So it is first necessary to define the difference between an empirical ellipse and a quantum ellipse.

Only the quantum ellipse need be described. A Quantum Ellipse: In the Quantum Ellipse, the measurements are exact, and most of the measurements, 16 of them, are always measured in exact whole integers. For every empirical ellipse there is a comparative Quantum Ellipse. The measurements of this Quantum Ellipse will be within 0.001%⁵ of the comparative values for the empirical ellipse, but the unit-of-measure will be changed to quantum units in every case.

Once the Quantum Ellipse is derived, the four numbers will be obtained. These four interdependent integers will be coprime⁶ between themselves, just as Euclid stated in Book VII, Proposition 28. These four integers will involve from five to seven prime numbers as their factors. The quaternions, per se, will be the square roots of these prime numbers.

In the Quantum Ellipse there are four measurements along the major diameter. These four measurements are in the proportion of the four integers which generate their factors, and the square roots of the factors are the quaternions.

The four measurements are the perigee and the apogee of the ellipse. These are the "extremes" or 15 as b and 29 as a in our example. The mean of these extremes is the semi-major diameter of the ellipse. It will be designated as d or 22. The mean will vary from the extremes by the fourth integer which is the "variation" and will be designated as e or 7 as given. These are the "basal measurements" which are termed above. To obtain the actual quantum meas-

urements of these four segments, they will again be multiplied by d, to give the linear measurements along the major diameter. The actual measurement of the major diameter will then be:

db = J = the perigee;
da = K = the apogee;
de = the variation; and
 $d^2 = D$ = the mean, or the semi-major diameter.
ab = the semi-latus rectum;
 $d^2 + e^2$ = the vector from either focus to the opposite semi-latus rectum;
 $d^2 = D$ = the vector from either focus to the midpoint n of the ellipse

There are two of each of these above the major diameter and two more of each below the major diameter. All sixteen measurements will be integers.

This provides the backdrop of the quantum ellipse behind the quaternions.

For the purpose of constructing a Quantum Ellipse on the basis of rectangular coordinates, the major diameter is divided into quantum segments. Each segment will be d/e in length, along the major diameter. There will be 2de such segments along the major diameter which is $2d^2$ in length, $(d/e)(2de) = 2d^2$. These segments provide the x-axis for plotting by rectangular coordinates.

This brings us to the origin of the quaternions which relate to the y-axis coordinates at each of the x-axis segments.

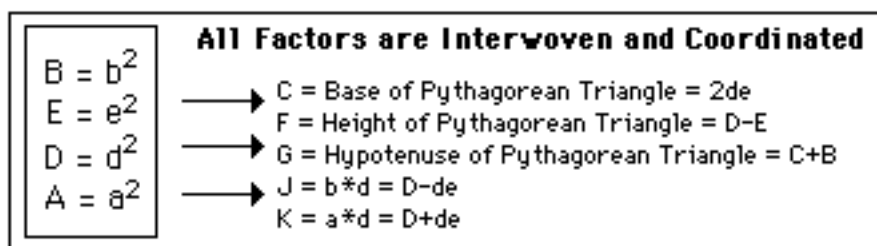
The segments of the major diameter are numbered, (n), beginning with zero at the center and increase incrementally to the value of de at either end of the ellipse. This value is the amplitude of the wave. Then:

$$y = ((ab)^{1/2}(d^2e^2 - n^2)^{1/2})/e$$

This gives the scalar value for the vertical vector (n). This combines the quaternions into a list which is handled like an ordinary grocery list.

At the midpoint of the ellipse the equation for y is simplified when n=0 and the scalar is also simplified to:

$$y = d(ab)^{1/2} \text{ for the minor semi-diameter}$$



$(ab)^{1/2}$ is the square root of (F), the height of the triangle which generates the given ellipse. The calculation gives the scalar which is always an integer when converted from conventional irrational terms back to quantum whole number ratios.

so

$$y = 22 (15 \times 29)^{1/2} = 458.84638 = 310639/677.$$

This is the origin of quaternions in 2-dimensional calculations. To simplify the definition of quaternions it can be said that quaternions are not a thing but are mathematical terms. Quaternions then are the number roots of the numerical terms used to define an ellipse. In the case of other calculations which get into higher dimensions another calculation, using the quantum number of the next dimension is superimposed on this calculation giving the j, k values of the quaternions superimposed on the above calculations. These calculations will apply in cases of the lissajou, ellipsoid solids, etc.

This is not the full story of the origin and usage of quaternions but it is a significant beginning. As stated earlier, Hamilton's quaternions are an invented system. The system which is given here is not invented. It is derived from natural mathematical functions and relationships, which the remainder of Quantum Arithmetic consists. In due time, others will derive the extension of this usage of quaternions, in which the whole idea of quaternions disappears, along with invented imaginary numbers and Gaussian integers. These were a step in the right direction and served their purpose for a time.

One feature which may confuse many mathematicians is the necessity for conversion to quantum units-of-measure in order to utilize the equations. That conversion is a linear coefficient which is obtained in the conversion process. After quantum answers are derived this same conversion coefficient is again applied to return to conventional units-of-measure. In following Quantum Arithmetic procedures absolute answers are obtainable.

1 An interactive computer program exists for QA/SVP. For a complete list of the QA and other books request free catalog from Delta Spectrum Research 2100 W. Drake Rd., Suite 402, Fort Collins, Colorado 80526.

2 At the time of this writing this book is in the hands of the printer and will be available 12/93.

3 For purposes of creating harmonically balanced systems the answers of such equations must never be reduced or allowed to become irrational. All irrational numbers can be 'quantized' to a ratio of whole numbers to any desired degree of accuracy.

4 In Quantum Arithmetic and Sympathetic Vibration Physics there is a process we call "Quantizing to One". Basically this is a method whereby all values are set as relative to each other in a parametric fashion. This can be easily done by using algebraic type notation or even music symbols as representations of values and their relationships to each

other.

5 Any degree of accuracy can be easily established in these equations. One of the seeming discrepancies shows up when a simple ratio is reduced to an irrational number. In these equations and most others developed within QA and SVP all ratios are used as they occur. These ratios are never reduced because a whole number is a discrete quantity (quantum) and an irrational number is not.

6 COPRIME: Co-Prime Numbers are two different numbers which are not divisible by any single prime number. Examples: 8 & 9; 15 & 22; 6 & 35.

7 Ben Iverson; Institute for Technically Applied Music; 11466 SW Royal Villa Dr., Tigard, OR 97224.

QUAVER: The eighth part of a semibreve. (125)

QUINT: (1) The interval of a fifth. (2) An organ stop, sounding a fifth above the foundation stops. (125)

QUINTABSATZ: A half close. The imperfect cadence, the penultimate chord of which is a tonic triad; the final chord, a dominant triad. (125)

QUINTE: The E string of a violin. The lowest string of violoncello and viola being C, A is their fourth string, hence the higher string of the violin came to be called the Quinte, or Quintsaite. (125)

QUINTOLE: A group of five notes to be played in the time of four. (125)

QUODLIBET: (1) A sort of Fantasia; (2) a pot-pourri. (3) A Dutch concert. At the annual re-unions of the members of the Bach family singing or improvising quodlibets was one of the amusements indulged in. (125)

R

RAD-ENERGY: See **FRAUNHOFER**

RADIAL CENTER: Q.: Explain what is meant by smaller and larger radial centers. Are not these centers concentric? A.: "Concentric - but that as has just been explained in giving that force that produces, then, in this radial activity about the common center, the variation in the smaller end and the larger end." (1954-54) (2) See **ACTIVE PRINCIPLE, LAW OF OCTAVE, FORCE-RADIAL, NEUTRAL NEGATIVE CENTER, LAWS OF BEING**

RADIAL EFFECT: "Electrify, through the chemical change, that of sodium and calcium combinations for its radial effect." (487-19) (2)

RADIAL LINES: A direction of a machine which is perpendicular to the shaft centerline; in the XY plane; usually refers to direction of shaft or casing motion or measurement. (100)

RADIAL POSITION: The average position of the shaft centerline within the bearing. This can be measured by noting the change in DC output of two XY probes from a known position, usually with a shaft at rest. The XY probes must be attached to the bearing or bearing housing in order to eliminate thermal growth errors. See **ATTITUDE ANGLE**. (100)

RADIAL VIBRATION: Shaft dynamic motion or casing vibration which is measured in a direction perpendicular to the shaft centerline. (100)

RADIATING (RADIAL) FORCE: See **FORCE-RADIAL, ATOMIC ENERGY RADIATION ANGLE, ACTIVE PRINCIPLE, LAW OF OCTAVE, MOLECULAR DISSOCIATION, LAWS OF BEING**

RADIATION: "Is the term used to express the reaching out of the thermal element, after its liberation from its corpuscular imprisonment, to be re-absorbed or returned again to its sympathetic environment; teaching us a lesson in the equation of disturbance of sympathetic equilibrium." pg 273 of (1) See **E=MC², HEAT, LAW OF SYMPATHETIC VIBRATIONS, LAWS OF BEING**

"The radiations or vibrations from a thing are always of the nature of its polarity, either negative or positive."

RADIATION, CELESTIAL SYMPATHETIC:

"Thermal radiation (and its negative, cold), the field of Prof. Dewar's researches, in Keely's system comes below the first atomic; while celestial sympathetic radiation comes as the fountain head; the compound inter-ætheric, from which all aggregated matter springs, the governing force of all aggregations. If there were no sympathetic radiation from the great celestial center, space would be void of suspended, or floating, earthly and gaseous matter; consequently, planetary worlds would never have had their birth and growth.

"The suggestion of Prof. Dewar, that an increase in low temperatures might lead to the liquefying of hydrogen, is an admission that hydrogen may be a compound; for no simple can ever be condensed into a visible form. Keely's experimental researches have proved, to his own satisfaction, that all known gases are compounds, inasmuch as, when the intensity which accompanies sympathetic vibration, in his process, is brought to bear upon any gas, it submits to dissociation." Bloomfield-Moore in (1) pg. 371 See **WATER RADIOLYSIS, DISSOCIATION, RADIATION CHEMISTRY**

RADIATION CHEMISTRY: The study of the chemical effects of the absorption of high-energy radiation in matter. High-energy radiation includes the emanation associated with radioactive decay and fission (that is, α -particles, electrons, γ -rays, and neutrons), together with their related atom and fission recoils; and the artificial analogs of such emanations produced by accelerating electrons, protons, deuterons, and helium nuclei, as well as charged nuclei of higher atomic number and x-rays. (115) See **DISSOCIATION, WATER RADIOLYSIS**

RADIATION, DIELECTRIC BIOCOSMIC: See **DIELECTRIC BIOCOSMIC RADIATION**.

RADIATION, MITOGENETIC: See **MITOGENETIC RADIATION**

RADICAL BASS: The fundamental bass, ground note, or root of a chord. (125)

RADIO-ACTIVE RAYS: Radio-active rays consist of particles of primary matter not further decomposable.[circa 1890] (The above has since been proven

to be in error.)

RADIOACTIVITY: "Radio-activity is a result of the shattering of atoms by subatomic particles." (Keely) See **ALPHA PARTICLES**

RADIOGRAPHY: [NDT] Radiography involves the use of penetrating X or gamma radiation to examine parts and products for imperfections. An X-ray machine or radioactive isotope is used as a source of radiation. Radiation is directed through a part and onto film. When the film is developed, a shadowgraph is obtained that shows the internal soundness of a part. Possible imperfections show up as density changes in the film, in much the same manner as an x-ray can show broken bones.

RADIOLYSIS: (115) See **WATER RADIOLYSIS, RADIATION CHEMISTRY.**

RADIOMETER: Caused to rotate by currents or swirls set up in the gaseous medium within the globe. This is demonstrated when different speeds are obtained as different gases are introduced within the globe, the light remaining constant. Red light causes the most action. See (31). See **FORCE-RADIAL, FORCE-ROTARY, MOTION-VORTEX.**

"Light incident to any body that absorbs or reflects it does not press upon it. The radiometer of Professor Crooke's invention is not operated by the pressure of light, but by corpuscular bombardment on the reflecting side of its vanes.

You have called my attention to the receding movement in the metal silver, which it assumes when the flow of an alternating current from an electromagnet, in front, is thrown upon it. This does not prove that light presses upon it to induce that movement. It moves by interatomic bombardment of some 800,000 corpuscular percussions a second, or more truly by intersympathetic vibrations. If a homogeneous disk of gold, silver and platina, in proper proportions, were made the medium of interference, the resultant action would be startling in showing up the movement of molecular antagonistic thirds. The movement would be very erratic and gyroscopic. If the same disk were used on an intermediate transmitter to a negative focalizer, or in other words, a polar radiator only one of which is in existence, by a nodal wire of gold, silver and platina, the effect on the disk at the negative terminus would set into action the latent force held in its molecular embrace, and would cause it to sympathetically adhere to the focalizer with a power that would make it practically inseparable." (Keely) See **LIGHT**

RADIONICS: The word "radionics" grew out of the line of research begun by H. Spencer Lewis, Dr. Albert Abrams and Ruth Drown in San Francisco in the early 1900's. Many brilliant innovators contributed to the development of this field from its inception to the present. The main branches of radionic research focus on analysis and treatment of human and agricul-

tural diseases. Radionic devices have developed along three separate lines of research for over 40 years. These generally can be categorized by the method of "tuning" used by the equipment. Those devices that tune using a bank of variable resistors developed out of the work of the late Dr. Ruth Drown. Those devices that tune using a bank of variable capacitors developed out of the work of the late T. Galen Hieronymus. Those tuned by a bank of variable acoustic resonators developed by George De-LaWarr. Besides the different methods used for tuning, all true radionic devices have the following characteristics in common:

- 1) No electricity flows in the radionic circuit.
 - 2) The radionic circuit performs the "tuning" and the operators' thoughts and/or intentions are not required for proper function.
 - 3) The components of a radionic circuit create a structure (energy matrix) in space that act as a physical counterpart to the etheric energies being tuned to.
 - 4) All such devices operate via sympathetic association between the tuned circuit and the object tuned to.
- (127) See **ODIC FORCE; PSYCHOTRONIC; DOMINANT**

RAGS: Certain Hindoo melodies founded on fixed scales. They were of three kinds, *sumpoornu*, or those comprising seven notes in a determined succession; *khadoo*, or such as comprised six notes; *oodoo*, or those comprising only five notes. (125)

RAINBOW: Primary: 40° - 42° Secondary: 52° 15'

RALEIGH VIBRATIONS: Circular vibrations, the third mode of the triune vibration modes. Travels along the surface of a vibrating object. See **ACOUSTICS §14; LONGITUDINAL VIBRATIONS; SURFACE VIBRATIONS; TRANSVERSE VIBRATIONS; TRIUNE POLAR STREAM; VORTEX**

RASTER PLOT: A type of cascade or waterfall plot, usually with a shaved Y axis so that the plot has an isometric appearance. (100)

RATES OF VIBRATIONS: Keely -
CPS NOTATION REFERENCE

Keynote Molecular Chord
620
First Octave Keynote Atomic Chord
630
Second Octave Keynote ætheric Chord
12,000
Third Octave Heat
14,000
Vibro-Atomic Lowest Molecular Vibration
20,000
Harmonic Thirds Disintegration of Water
42,800
Transmission of Odor in Molecules
220,000
Sympathetic Negative 1st Inter-Atomic Lowest
300,000
Full Harmonic Chord 1st Inter-Atomic Highest
780,000
Full Harmonic Chord Ninths
1,620,000
Highest Molecular Vibration
100,000,000
Harmonic 3rds Highest Inter-Molecular
300,000,000
Enharmonic 6ths Atmospheric
519,655,633
Highest produced in air Atomic Vibration
900,000,000
Diatonic 9ths Highest ætheric
8,100,000,000

Dom. aetheric 6ths Highest Inter-aetheric 24,300,000,000
 Inter-aetheric 9ths Full Ninths 156,057,552,198,220,000
 See **SCALE OF THE FORCES IN OCTAVES**

RATIO: Relation or proportion. (125) See **PROPORTION; TEMPERAMENT; SCALE**

RATIOS: "The simpler the ratio of the two parts into which the string was divided, the more perfect was the harmony of the two sounds. Ratios with large numbers have overtones with beats. Ratios with smaller numbers are less apt to have beats or dissonance." (6) pg 386 See **DISSONANCE, INTERVAL, RESULTANT TONES, BEATS, DIFFERENCE TONES, LAW OF SUPERPOSITION**

RATIOS:

Unison	1:1
Octave	1:2
Fifth	2:3
Fourth	3:4
Major Third	4:5
Minor Third	5:6
Greater Step or Minor Tone	8:9
Dissonant Diatonic Semitone	15:16
Dissonant, harsh & grating Enharmonic	125:128

RATIOS of VIBRATIONS: See **INTERVAL, HARMONICS-RATES-OF**

Principal Figures between the Octave 2:1 and Double-Octave 6:1 (The comparative lengths of principal and secondary pendulums, measured from point of suspension to center of oscillation, are inversely proportional to the squares of the vibrations.)

Ratio	Interval	Lengths
3:2	Perfect 5th	
64:45	Diminished 5th	
8:5	Minor 6th	
5:3	Major 6th	
7:4	Harmonic 7th	
16:9	Dominant or Minor 7th	
9:5	Tonic 7th	
15:8	Major 7th	
2:1	Octave	
1:4 32:15	Minor 9th	225:1024
9:4	Major 9th	16:81
7:3	Harmonic Minor 10th	9:49
12:5	Minor 10th	25:144
5:2	Major 10th	4:25
8:3	Perfect 11th	9:64
11:4	Harmonic 11th	16:121
45:16	Augmented 11th	256:2025
3:1	Perfect 12th	1:9
25:8	Augmented 12th	16:5
16:5	Minor 13th	25:256
13:4	Harmonic 13th	10:3
10:3	Major 13th	9:100
7:2	Harmonic 14th	4:49
32:9	Dominant 14th	81:1024
18:5	Tonic 14th	
15:4	Major 14th	16:225
4:1	Double-Octave	1:16
81:80	Komma	
25:24	Lesser Chromatic Semitone	
135:128	Greater Chromatic Semitone	
10:9	Smaller Step or Minor Tone	
45:32	Tritone	

from (32) See **INTERVAL**.

RAYS, CANAL: See **CANAL RAYS**.

RAYS, ERYTHEMAL: Are above ultraviolet, they produce suntan and vitamin D.

RAYS, GRENZ: Are soft X-rays; sometimes used in skin disease therapy.

RAYS, N: See **N-RAYS**

RAYS, RADIUM: Discovered by M. Curie.

RAYS, ROENTGEN: X-rays

RAYS, ULTRA-ACTINIC: See **FRAUNHOFER LINES**.

RE: The name of the second note of the scales, in the system of hexachords, and of the fixed sound D, in modern solmization. (125)

REAL FUGUE: A strict fugue. The term is now used in opposition to a tonal fugue. The answer in a real fugue being a fifth higher or a fourth lower than the subject, note for note; that in a tonal fugue being so far altered that dominant answers tonic and vice versa. So that in a tonal fugue, a subject occupying a compass of five notes, namely from a tonic to its dominant, has to be answered in a compass of four notes, namely from the dominant to the tonic lying above it. (125) See **Hughes' Harmonies of Tones and Colors**.

REAL TIME ANALYZER: A term used to describe an instrument which displays a vibration frequency spectrum. See **SPECTRUM DISPLAY UNIT**. (100)

REBAM: An acronym for Rolling Element Bearing Activity Monitor, which is a Bentley Nevada method and system for monitoring and analyzing the performance of rolling element bearings using eddy current transducers and MicroPROX. (100)

RECEIVER: A component that combines a stereo tuner, preamplifier, and power amplifier on a single chassis, providing compactness and convenience along with a saving in cost. Only a record player and speakers need be added to complete the system. (103)

RECIPROCAL: 1) Mutual, correlative, correspondent, complementary. 2) Moving alternately backward and forward. 3) Mutually responsive, answering. 4) Inversely corresponding, inverse. 5) A thing that is reciprocal to something else; a return, an equivalent; a counterpart; a complement; that which a given quantity is multiplied to produce Unity. See **EAR; POLARITY; SYMPATHETIC VIBRATION; QUANTIZE; ONE**

RECTANGULAR VIBRATIONS: See **ANGULAR MOTION, PENDULOGRAPH, LEMNISCATA**

RED: Red is the first of the primary colors and in ancient symbolism it represented the body, the earth, and hell, all three of which meant the same thing in the old mystery religions. The earth was the irrational world into which the soul descended from heaven. The body was the earth form which held the soul captive. Heaven was blue, and the spirit was blue. The mind was associated with yellow. It is interesting that in some systems of metaphysics blue is considered to be the true color of the sun; that is, if we could be outside earth we would see the sun as a blue light -soft, powerful, and spiritual. The yellow color is supposed to result from the collision of the sun's

rays with the atmosphere of earth. Since the greatest spiritual weapon of man is his intellect, it is natural that mind be associated with the sun's color in this world.

As to the meaning of red, it indicates force, vigor and energy. Its interpretation depends upon the shade, and as with all colors, upon the relationship of other colors. Dark red indicates high temper, and it is a symbol of nervous turmoil. A person with dark red in his aura may not be weak outwardly, but he is suffering in some way, and it is reflected in his nervous system. Such a person is apt to be domineering and quick to act. If the shade of red is light it indicates a nervous, impulsive, very active person, one who is probably self-centered. Scarlet indicates an overdose of ego. Pink, or coral, is the color of immaturity. It is seen usually in young people, and if it shows up in the aura of one who is grown it indicates delayed adolescence, a childish concern with self. In all cases of red there is a tendency to nervous troubles, and such people ought to take time to be quiet and to get outside themselves.

Red is the color of the planet Mars, and corresponds to do, the first note in the musical scale. In early Christianity it signified the suffering and death of Christ, and was the color of war, strife and sacrifice. (73)

RED: [Color Therapy] Use red to alleviate: Ailments of the blood stream, anemia, Physical debility, lassitude, colds, circulatory deficiencies, paralysis, moronic cases, *etc.* (87)

REED: A thin strip of metal or cane set in vibration by a current of air; the vibrations so caused, at the same time, dividing the current of air into rapid discontinuous puffs which produce a musical sound. The reed itself does not produce the sound, but is only a means of obtaining the sound from the current of air directed against it. Reeds are of two kinds: striking and free. (125)

REFRACTION OF WAVES: "The change of direction of propagation of any wave phenomenon occurs when the wave velocity changes. The wave velocity changes when the medium through which the wave travels becomes either denser or thinner, as when a sound wave goes through the air and into a wall or other object." (3)

REGISTER: Compass. (125)

REGULAR FUGUE: A strict, as opposed to a free fugue, or one in which the laws are not strictly obeyed. (125) See **PRINCIPAL, REPLY**

REGULAR MOTION: Similar motion. (125) See **MOTION**

REINFORCE: Early term for **AMPLIFY** through resonance. See **RESONANCE BODY**.

RELATIVE CHORD: A common chord made up of notes taken from the scale. The chords of D minor, E minor, F major, G major and A minor are therefore relative to the chord or scale of C, these being the only common chords which can be made from the scale of C. (125)

RELATIVE KEYS: A key whose tonic chord is a relative chord; that is to say, a key whose first, third, and fifth degrees form a common chord made up of notes of the key to which it is related. Thus D minor, E minor, F major, G major, and A minor are relative keys of C. The first, third, and fifth of each of these scales forming one of the relative chords of C. (125) See **AFFINITY; AUXILIARY KEYS**

RELATIVE MOTION: Vibration measured relative to a chosen reference. Proximity probes measure shaft dynamic motion and position relative to the probe mounting, usually the bearing or bearing housing. (100)

RELATIVE POSITION: See **FORCE-RADIAL**

RELATIVE PROBE: A proximity probe observing shaft motion relative to a stationary reference, usually the bearing or bearing housing. (100)

RELATIVITY OF ELEMENTS: See **SYMPATHETIC VIBRATION THEORY, LAW OF OCTAVE, SPECTROSCOPY**

RELATIVITY OF FORCES: See **LAW OF OCTAVE**

RELAXATION-FIELD EFFECT: The delay in the ion atmosphere in maintaining its symmetry around a central ion as the central ion moves in the forward direction under an applied electrical field (potential gradient).

RELEASE: Ending of a signal. (69)

RELIGIOUS SCIENCE: "The system, now being evolved and worked out to demonstration by Keely, restores, by religious science, the faith of which materialistic science has been robbing the world, thus confirming Dr. Lowber's assertions that materialists will never be able to reduce all natural and spiritual forces to mere vibratory action of matter; and that the reformatory movement in philosophy, which characterizes our age, will continue until all the sciences point to God and immortality." Bloomfield-Moore in (1) pg 328 See **ONE, FORCE-ONE**

REPEATABILITY: The ability of a transducer or readout instrument to reproduce output readings when the same value is applied to it repeatedly, under the same conditions, and in the same direction. Also the maximum deviation from the mean of corresponding data points taken from repeated tests under identical conditions. The word accuracy is often used incorrectly as a synonym for repeatability. (100)

REPLY: The answer in a fugue, the subject being called principal. (125) See **PRINCIPAL, REGULAR FUGUE**

REPULSION: "Electromagnetic radiation." (1) pg 302 See **REVERSION**

This force is exactly opposite to that of attraction, and strange as it may seem, they are both one and the same, arising from fixed, innate properties of the neutral center itself which also controls them.

Molecular repulsion Keely states to be caused by electromagnetic radiation. "Any metallic mass can be so impregnated with certain vibrations as to assume the mental qualities of repulsion and attraction." He terms the "radiating vibrations as "positive" or "propulsive". Also, that like and unlike poles of a magnet will, contrary to accepted scientific belief, repulse each other regardless of their natural properties, when their differentiation induced by vibration becomes $66 \frac{2}{3}$ of one pole against 100 of the other, and that when this differentiation becomes $33 \frac{1}{3}$ of the one against 100 of the other, like poles will attract in the same manner that unlike poles have normal attraction. These ratios simply cause antagonism in one case and sympathetic attraction in the other, with consequent motion of their respective masses. Normally, however, the action of the magnetic flow is dual, being at the same time attractive and repulsive.

Keely says the gravital flow comes under the order of the "sympathetic concordant of the 9ths" and that it is "that third of the triune combination" called the "polar propulsive". *"Gravity is polar propulsion, as magnetism is polar attraction."* (11)

REPx: (ROLLER/BALL PASS FREQUENCY OUTER RACE) For purposes of rolling element bearing studies, REPx is a symbolic indication of the frequency of rolling element passage over a fixed point on the outer race of the bearing. Harmonics of the rolling element frequency are then indicated as 2REPx, 3REPx, etc. (100)

RESH: The 20th Hebrew letter, Resh (R), stands for the whole head and particularly for the front portion containing the countenance. The Tarot figure corresponding with Resh is the sign of Judgement and displays Gabriel appearing amid clouds while a resurrection is taking place, the dead being seen rising out of their graves. This is easily understood as mystical and not literal, and we have often wondered how any Bible student who has pondered over the 37th chapter of Ezekiel could find any difficulty in connecting resurrection solely with moral and spiritual revival and higher attainment, and not at all with physical resuscitation. (72)

RESIN: A gum, the viscid exudation of certain trees, chiefly of the fir tribe, which is obtained in large quantities by cutting away part of the bark, a vessel being placed below to catch the gum as it exudes. When purified and prepared it is used to rub over the

hair of a bow, the surface of which it renders rough and so enables it to "grip" the string. (125)

RESOLUTION: The smallest change in applied stimulus that will produce a detectable change in the instrument output. Resolution differs from precision in that it is a psycho-physical term referring to the smallest increment of humanly perceptible output (rated in terms of the corresponding increment of input). (100)

RESOLUTION: (MUSIC) The tendency and going of a note of one chord to some note of the next chord. (8)

RESOLUTION: (1) The moving of a discordant note to another which produces a satisfactory effect. This is done sometimes by taking the discord downwards one degree, sometimes by taking it upwards. (125)

RESONANCE: The condition where a forcing frequency coincides with a natural frequency of the system. A resonance is typically identified by a substantial amplitude increase, and related phase shift. See **BALANCE RESONANCE**. (100) See **ACOUSTICS §21**

RESONANCE: (ACOUSTICS & MECHANICS) "When a mechanical or acoustical system is acted upon by an external periodic driving force whose frequency equals a natural free oscillation frequency of the system, the amplitude of oscillation becomes large (Resonance causes this increase) and the system is said to be in a state of resonance." (3) See **LAWS OF BEING**

RESONANCE: Sounds are "communicated" when they are merely conveyed from one sounding body to another, and this can take place in a noise as well as a musical sound. Sounds are "excited" under two circumstances: when a body which is sounding and that to be excited have the same note and the vibration of one produces sympathetic vibration of the other, the bodies are mutually called "reciprocating", while of the vibration of one produces its harmonics in the other, the latter is said, with regard to the exciting body, to be "resonant". According to Helmholtz, "timbre" or "quality" depends on definite combinations or certain secondary sounds or harmonics with a primary or fundamental sound, and such combinations he calls "sound colours". (125)

RESONANCE: Resonance or Co-vibration is the name given to the phenomenon of one vibrating body imparting its vibratory movement to another body, previously at rest.

To obtain the maximum resonance two conditions are essential:

1) The two bodies must be in exact unison; that is to say, they must be capable of executing precisely the same number of vibrations in the same time.

2) A certain period of time must be allowed for the exciting body to impress its vibrations on the other. (68) See **SYMPATHETIC VIBRATION**

RESONANCE: Amplifies a band of overtones. A resonance which moves in frequency can create a "wow" sound. (69) **SYMPATHETIC VIBRATION**

RESONANCE: Resonance is the name given to the tendency of any physical body to vibrate at one particular "preferred" frequency. The vibrations are greatest when the frequency of the applied force is the same as the natural resonance of the vibrating body. ("Natural resonance" is the frequency at which a body prefers to vibrate.) In audio, the electrical and mechanical resonances of the various components must be controlled so that they do not affect the tonal color of the music being reproduced. Equipment designers have therefore taken great care, for example, to place the natural resonance of phonograph cartridge styli above the audible range, and that of tone arms below the audible range. Resonance also has its analog in the electrical realm, making it possible to tune circuits to various frequencies, much as an organ pipe or violin string can be tuned to a certain pitch. This is the principle by which radio stations are "tuned in." (103)

RESONANCE ABSORPTION: See **NEUTRON, RESONANCE.** (67)

RESONANCE BODY: The hollow part of a stringed instrument which reinforces the sound of the vibrating strings. Its shape is of the utmost importance, and, in the case of the violin has only been definitely fixed after great practical and scientific research. The resonance box has certain openings to admit of the escape of the reinforcing vibrations. (125)

RESONANCE BOX: A Resonance Box is usually constructed of wood; it may be open at one or both ends, and must be of such dimensions that the enclosed mass of air will vibrate in unison with the tuning fork to be applied to it. (68)

RESONANT AMPLIFICATION: Can be done through audions as receivers of power transmission. See **AUDION, POWER TRANSMISSION**

RESONANT FREQUENCIES: Same as natural frequencies and **EIGENFREQUENCIES.** See **MAGNETOACOUSTIC RESONANCE**

$$f = \frac{c}{2} [(n/L)^2 + (m/W)^2 + (p/H)^2]^{1/2} \text{ Hz}$$

c= velocity of sound

L= length

W= width

H= height

f= resonant frequencies of any room n,m,p= corresponding to resonant mode (3)

RESONANT FREQUENCY: For active bandpass,

band-reject and notch filters, usually taken as the center frequency F_0 , expressed as the geometric mean of the upper and lower 3dB corner frequencies. Can also refer to the frequency at which minimum/maximum attenuation occurs for pass/reject filters.

RESONANT IMPULSES: See **MOLECULAR DISSOCIATION, LAWS OF BEING**

RESONANT MINORITY: The number at which spontaneous synchronous action takes place. Maybe the same as "critical mass." See **RHYTHMIC ENTRAINMENT.**

RESONATING RINGS: Keely invented what he called a "resonating ring." The old straight tube resonators in his "Generator" continually had the caps blown off from them by the violent vortex action generated in them at periodic intervals by his "reversions." To avoid this annoyance, he invented these "resonating rings" which are simply resonating tubes arranged in the infinite circle. The laws of their resonance are not known, and he does not mention the particular vibrational effects which he obtained with them, other than that they "held the neutral focalization intact" during disintegration.

In making these he used extraordinary care. The tubes were passed between triple rollers, set to give a slight bend, and were then fastened to a bed plate and a steel ball of the exact diameter of the tube was forced through it. These operations were continued until a semicircular section of this ring was formed, eighty bends and as many corrections being sometimes necessary for the complete ring, and two hours' time required for each bend. The two semicircular sections were then placed in a steel mold kept under hydraulic pressure for two or three days to correct lateral deflection or strain. They were then screwed rigidly to a face plate, soldered and to correct differentiation in molecular groupings, were placed in a hot sand bath that required seventy two hours to cool. The sympathetic negative transmitter was then attached and vibratory receptiveness was inducted in the ring until it gave, when struck, a pure unmixed chord, as shown by the indicator attached to the ring.

The ring was then centered on a steel shaft and revolved at 2000 revolutions per minute, surrounded by the "triple circuit ring." If the indicator in the "circuit ring" varied 5 degrees out of a possible 8,000, the ring had to be corrected until it varied by no more than 3 degrees, which could be considered perfect enough, since the circular tubular resonator could then hold the neutral focalization intact during the graduation of the full ninths, for sympathetic association to produce polar negative attraction.

His operation of revolving the ring 2,000 times per minute and noting the variations in its harmonic state, would seem to indicate that he intended it as the constituent of the internal volume of his disintegratory sphere, or if not, that he used it in a sphere-interrupter. It is elsewhere mentioned that this device

"held the focal chord intact" which would go to show that its mechanical action was the continuation through the mechanical energy imparted to it, of preserving the harmony or chord of mass in the sphere of which it was mechanically a part. (11) See **ACOUSTICS § 22**

RESONATOR: A Resonator is an open vessel of glass, metal, cardboard, or other material, of such dimensions, that the mass of air contained in it resounds to a note of a certain pitch. Its use is, to assist the ear in discriminating a sound of this particular pitch, from a number of others at different pitches, all sounding simultaneously. (68) See **VIBRATIONS-RATES OF, TUBE RESONATOR**

RESTS: Signs enjoining the silence of a performer for a given length of time. (125)

RESULTANT TONES: Resultant tones are produced by simultaneously sounding two or more primary tones, which may be simple or composite tones. from (11) See **LAW of SUPERPOSITION, RESULTANT TONES, SUMMATION TONES, DIFFERENCE TONES, COMBINATION TONES, TARTINIS TONES; ACOUSTICS §19**

RESULTANT TONES produced by the combination of the ordinary harmonic intervals: The resultant tone is deeper than the lowest primary tone by:

Interval	Ratio	Step	Difference
Octave	1:2	1	0
Fifth	2:3	1	an octave
Fourth	3:4	1	a twelfth
Major Third	4:5	1	two octaves
Minor Third	5:6	1	2 octaves & a major third
Major Sixth	3:5	2	a fifth
Minor Sixth	5:8	3	major sixth

RETARDATION: (1) A gradual slackening of pace in the performance of a passage. (2) A holding on of a concordant note into the succeeding chord, in such a manner that it becomes a discord, which is resolved upwards. A discord of retardation is this opposed to a discord of suspension, the latter being resolved downwards. Three or more parts may be retarded or suspended, and retardations and suspensions may occur in the same chord. (125)

REVERBERATION ROOM: [ACOUSTICS] A room, with long reverberation time, in which the boundaries are highly reflective and special care has been taken to make the sound field as diffuse as possible. (85)

REVERBERATION TIME: [ACOUSTICS] Time required for average sound pressure level in a room to decrease 60 db after a steady state source stops generating sound. Can be estimated from:

$$T = 0.049(V/A) \text{ or } T = 0.161(V_m/A_m)$$

where:

T = reverberation time in seconds

V = room volume, cubic feet

A = total room absorption, Sabins

V_m = room volume, cubic meters

A_m = total room absorption, metric Sabins (85)

REVERSE MOTION: Movement by inversion of intervals. (125) See **INVERSION, MOTION**

REVERSIONS: "As to the "law of gravity," it appears in the light of Keely's experiments, but one manifestation of a law of very much wider application - a law which provides for the reversion of the process of repulsion." Chapter 8 of (1); See **FORCE-RADIAL** near the end where it says forces must become "altogether negative" before they can be "thrown off". See **SYMPATHETIC NEUTRAL NEGATIVE, GRAVITY, GRAVITATION, LAW OF OCTAVE, LAW OF ASSIMILATION, FORCE-RADIAL**

REVOLVING GLOBE: The revolving globe was never created to be the "source of power" and Keely never affirmed that he could produce with it "an indefinite amount of horse power without current expense."

RHYTHM: "Rhythm is measured motion in time." Lewis. See **METRE**

The movements of elastic elements are rhythmical. This is the keynote of Keely's researches. (11) See **TIME & SPACE, SPACE, MOTION, INTER-MOLECULAR VAPOR**

RHYTHMIC ENTRAINMENT: The process of many unsynchronized vibrations coming into synchronized motion, first one with another, then at an ever quickening rate, the others fall into synchronous action with the first unit.

RING MODULATOR: Produces a complex output from two simple input signals. (69)

RMS: Am abbreviation for *root mean square*. In the REBAM analysis of rolling element bearings, certain bearing problems may be indicated by higher than normal RMS vibration levels of outer race motion. (100)

RMS: See **ROOT MEAN SQUARE**.

ROCK HARMONICON: An instrument, the sounds of which are produced by striking graduated lengths of rock crystal with a hammer. (125)

RODS: The number of vibrations (of a rod) executed at a given time is inversely proportional to the square of the length of the vibrating rod. (6) pg 159 For nodes and cps see pages 156 & 165 - very important. See **LAW OF VIBRATING STRING, HARMONICS-RATES-OF**

ROENTGEN RAYS: X-Rays. See **RAYs, ROENTGEN**

ROLL: The regular and rapid beating of a drum by two sticks so as to make the sound as far as possible

continuous. (125)

ROLLING ELEMENT BEARING (ANTIFRICTION BEARING): A bearing which uses rolling elements (rollers or balls) to support the load of a rotating shaft and to minimize friction. (100)

ROLLING ELEMENT PASSAGE FREQUENCY: The frequency at which rolling element bearing elements pass over a point (flaw) on a bearing. This frequency is a function of: 1. running speed, 2. number of rolling elements, 3. bearing geometry, and 4. point or flaw location. (100)

ROLLING ELEMENTS: Components in a rolling element bearing (generally rollers or balls) which support the rotating load of a shaft. (100)

ROLLOFF: The effectiveness with which a filter eliminates signals which it is not supposed to pass. (69)

ROLLOFF RATE: The condition (and its magnitude) which describes an intentional or desired amplitude and phase attenuation at frequencies above (or below) a certain point. Thus a low-pass filter is designed to provide amplitude and phase rolloff at high frequencies, and a high-pass filter is designed to provide roll off at low frequencies. Commonly rated in dB per octave. (100)

ROLLOFF RATE: Also known as ultimate slope, this term refers to a filter's rate of change of attenuation at frequencies well outside the passband. Expressed as a positive or negative rate of change of attenuation (in dB/octave or dB/decade of frequency) for a lowpass or highpass response, respectively.

ROOM ACOUSTICS: Room acoustics play a large part in determining the overall sound of a hi-fi system. Shape, size, and furnishings of the listening room all influence the sound heard in the room. (103)

ROOT: See **DIFFERENCE TONES, HARMONIES OF TONES AND COLORS, KEYNOTE, SUMMATION TONES, LAW OF SUPERPOSITION**

ROOT MEAN SQUARE: (RMS) Square root of the arithmetic average of a set of squared instantaneous values. See **AMPLITUDE**. (100)

ROOT MEAN SQUARE: Provides the most useful description of vibration levels. The square root of the integrated time-averaged squared function is related to the vibration energy and hence the vibration's damage potential. The RMS value of a sine wave is $1/\sqrt{2}$ times the value of the peak level. (70)

ROOT: Called also fundamental note, generator, and ground note. (1) A note which besides its own sound gives overtones or harmonics. (2) That note from amongst whose overtones any chord may be selected, i.e., the chord of CGE, is produced from the vibration of the lowest note C, therefore C is said to be the

root of this chord.

An attempt to reduce chords to their roots forms the chief part of many treatises on harmony, but almost insuperable difficulties are met with in consequence of certain overtones being omitted in our scale and other sounds being introduced which can only be obtained by a minute subdivision of the monochord. The flat seventh and the eleventh of nature are unused, and various notes are arbitrarily inserted in the modern scale in order to obtain more or less of temperament. Some authors derive all their chords, or rather all those called fundamental (which constitute but a very small number of the chords actually in use), from three roots – the tonic, subdominant, and dominant. Others, again, insist on only two roots, the tonic and dominant. Not a few modern musicians use the word root without reference to any mathematical laws, and only as describing a note on which, when either expressed or implied, a chord is built up. (125) See **FUNDAMENTAL, KEYNOTE, INTRODUCTORY IMPULSE, TONIC**

ROMAN STRINGS: Fiddle strings made of the intestines of lambs, although commonly called "catgut". Italy still supplies the finest quality of strings, hence called Roman. (125)

ROSIN: See **RESIN**

ROTARY MOTION: See **ATOMIC ENERGY RADIATION ANGLE, ACTIVE PRINCIPLE, MOTION-VORTEX, FORCE-RADIAL, VORTEX, CIRCLE**

ROTATING MAGNETIC FIELD: Is produced by two or more alternating currents out of step with each other.

ROTATION: Rotation arises from the harmonic interaction of the dominant and enharmonic modes of vibration, which are in the ratio of 3:9.

"Power of rotation comes on the positive and power of negation, arising when the receptive flows become independent of the circular chord of resonance (set up mechanically or otherwise) breaks up the rotational power. Rotation is caused by the receptive concussion of the positive and negative forces as they come together at the neutral center and as each seeks its "coincident" by harmonic waves, flows or streams."

Every body capable of rotation is susceptible to the operation of force, which, applied, impels motion. Receptive transmittive concordance induces rotation. This simply means - the reception of streams of energy by the neutral center, and the transforming of them into radiant outflowing streams of energy causes rotation of the molecule or mass. All the magnets in the world, no matter how differentiated cannot induce rotation, but polar negative attraction induces rotation. The earth's rotation is caused and kept in continuance by the action of the positive and negative sympathetic celestial streams, that is, by the inflowing celestial from the sun and the outflowing radiant

celestial dispersing this same energy to all planetary masses in space.

"Polar and depolar differentiation result in motion. The compound interetheric or seventh subdivision is the Soul of Matter, from which all forms of matter receive their introductory impulse."

The neutral center represents only focalization and distribution of the streams of energy. It is not associated with magnetism. When the radiant elements generated by the focalizing chord are submitted to compound vibration of their mass thirds, those radiant elements become magnetic and rotation ceases. (Perhaps the rotation is transformed to polar sector rotation of these streams). Rotation is induced by submitting the mass to three different orders of vibration simultaneously, giving the majority to the harmonic third.

When we rotate a mass with sufficient rapidity, the particles of that mass ultimately overcome cohesion by dispersing as fragments at a tangent but should we cause rotation of the æther, this would produce condensation, which is opposite in effect. This condensation effect increases with the velocity of rotation of the æther. This is the direct cause of formation of molecules as well as planetary masses.

To control rotational force or produce commercialized energy, we must control through its properties the "negative attractive" or "enharmonic" current. This will solve the problem up to any limit of power.

At the same time Keely was completing his third system, he was also completing an experimental sphere in which he intended to test the combination of the positive and negative rotation. This experiment was at least entirely successful which showed the explanation of rotation given above, to be correct. The sphere even rotated with physical vibrations from the positive and negative interchange of positive and negative waves - not streams in this case. He had a desperate struggle in seeking to learn these laws of polarization and depolarization. It was necessary for him to understand these laws before he could unflinchingly secure rotation and control the reversions which so often had made wrecks of his machines. (11)

ROTATION - PHILOSOPHY OF TRANSMISSION AND ROTATION OF MUSICAL SPHERE: The only two vibratory conditions that can be so associated as to excite high sympathetic affinity, as between two physical organisms are: ætheric chord of B flat, 3rd octave, and on ætheric sympathetic chords transmission E flat on the scale 3rd, 6ths, and 9ths, octaves harmonic, having the 3rd dominant, the 6th enharmonic and the 9th diatonic.

The chord mass representing the musical sphere, being sympathetic ætheric chord of B flat third octave, indicated by the focalization of its interior mechanical combination, as against the neutral sevenths of its atmospheric volume, makes the shell highly sensitive

to the reception of pure sympathetic concordance, whether it be physical, mechanical, or a combination of both. Taking the chord mass of the different mechanical parts of the sphere and its adjuncts, as previously explained, when associated and focalized to represent pure concordance, as between its atmospheric volume and sphere mass, which means the pure unit of concordance, we have the highest position that can be established in relation to its sympathetic susceptibility to negative antagonism. The beauty of the perfection of the laws that govern the action of Nature's sympathetic flows is here demonstrated in all the purity of its workings actually requiring antagonistic chords to move and accelerate. The dark side of the shell, which represents fifty per cent of its full area of concordant harmony, is the receptive area for the influence of the negative transmissive chords of the thirds, sixths and ninths to bombard upon, which bombardment disturbs the equilibrium of said sphere, and induces rotation. The rotation can be accelerated or retarded, according as the antagonistic chords of the acoustic forces are transmitted in greater or lesser volume. The action induced by the mouth organ, transmitted at a distance from the sphere without any connection of wire, demonstrates the purity of the principle of sympathetic transmission as negatized or disturbed by discordants, which, focalizing on the resonating sevenths of resonators, or tubes attached to ring, the sympathetic flow is by this means transmitted to the focalizing center, or center of neutrality, to be redistributed at each revolution of sphere, keeping intact the sympathetic volume during sensitization, thus preventing the equation or stoppage of its rotation.

Again, the sphere resting on its journals in the ring, as graduated to the condition of its interior combinations, represents a pure sympathetic concordant under perfect equation to receive the sympathetic, or to reject the non-sympathetic. If a pure sympathetic chord is transmitted coincident to its full combination, the sphere will remain quiescent, but if a transmission of discordance is brought to bear upon it, its sympathetic conditions become repellant to this discordance." Keely.

Hertz conjectures that a knowledge of the structure of æther should unveil the essence of matter itself, and of its inherent properties, weight and inertia. Hertz constructed a circuit, whose period of vibration for electric currents was such that he was able to see sparks due to the increased vibration leaping across a small airspace in this resonating circuit, his experiments have proved and demonstrated the ethereal theory of electromagnetism; that electromagnetic actions are due to a medium pervading all known space. Keely's experiments have proved that all things are due to conditions of the æther. The Buddhists have taught "There is no such thing as blind or dead matter, as there is no blind or unconscious thought."

1890 - The steam engines of the world now represent the work of 1,000,000,000 men, or more than double the working population of the earth, whose total pop-

ulation is about 1,500,000,000 inhabitants Steam has trebled man's working power, enabling him to economize his physical strength. Our race which seems to have reached its limit of physical development, seems ready to enter upon the foretold stage of psychically evolution.

In November 1884, he obtained a standard for progressive research in the success of an experiment, for which he has tried many times before without arriving at result of his theories. One of those present afterwards wrote him for an explanation of the phenomena. A small globe rotated when two persons had taken hold of the rod together, with a firm grasp - one of them standing on a circular sheet of metal, from which piano wires stretched toward the globe, near enough to touch one of the plates of glass which insulated the ball, Mr. Keely replied, "I cannot describe it other than the receptive concussion of the two forces, positive and negative, coming together, seeking their coincidents and thus producing rotation by harmonious waves, not streams. You ask if sound waves had anything to do with the motion of the globe? Nothing, the introductory settings are entirely different. The ball ceased to rotate when I took your left hand in my right hand, while with our other hands holding the iron rod resting on the metal plate, because the receptive flows became independent of the circular chord of resonance as set up mechanically. The power of rotation comes on the positive and the power of negation breaks it up."

ROTATION - THEORY OF THE INDUCTION OF SYMPATHETIC CHORDS TO EXCITE ROTATION BY VIBROPHONIC TRAJECTION TO AND FROM CENTERS OF NEUTRALITY ON REVOLVING GLOBE: All hollow spheres, of certain diameters, represent, as per diameters, and their volumes of molecular mass, pure, unadulterated, sympathetic resonance towards the enharmonic and diatonic thirds of any, and in fact all, concordant sounds. In tubes it is adversely different, requiring a definite number of them so graduated as to represent a confliktion by thirds, sixths and ninths, as towards the harmonic scale. When the conditions are established, the acoustic result of this combination, when focalized, represents concordant harmony, as between the chord mass of the instrument to be operated and the chord mass of the tubes of resonance. Therefore the shortest way towards establishing pure concordance, between any number of resonating mediums, is by the position that Nature herself assumes in her multitudinous arrangements of the varied forms and volumes of matter - the spherical. The great difficulty to overcome, in order to get a revolution of the same sphere, exists in equating the interior adjuncts of same. In other words, the differentiation induced must be so equated as to harmonize and make their conditions purely concordant to the molecular mass of the sphere. Example: Suppose the chord of the sphere mass represents B flat, or any other chord, and the internal adjuncts by displacement of atmospheric volume differentiates the volume one-twentieth, this displacement in the shell's

atmospheric volume would represent an antagonistic twentieth against the shell's mass concordance, to equate which it would be necessary to so graduate the shell's internal adjuncts as to get at the same chord; an octave or any number of octaves that comes nearest to the concordance of the shell's atmospheric volume. No intermediates between the octaves would ever reach sympathetic union.

We will now take up the mechanical routine as associated with adjuncts of interference and follow the system for chording the mechanical aggregation in its different parts, in order to induce the transmissive sympathy necessary to perfect evolution and produce revolution of the sphere or shell.

Example: Suppose that we had just received from the machine shop a spun shell of twelve inches internal diameter, $\frac{1}{32}$ of an inch thick, which represents an atmospheric volume of 904.77 cu. in. On determination by research we find the shell to be on its resonating volume B flat, and the molecular volume of the metal that the sphere is composed of, B natural. This or any other antagonistic chord, as between the chord mass of the shell and its atmospheric volume, would not interfere but would come under subservience. We now pass a steel shaft through its center $\frac{1}{2}$ in. in diameter, which represents its axial rest. This shaft subjects the atmospheric volume of the shell to a certain displacement or reduction, to correct which we first register the chord note of its mass, and find it to be antagonistic to the chord mass of the shell, a certain portion of an octave. This must be corrected. The molecular volume of the shaft must be reduced in volume, either by filing or turning, so as to represent the first B flat chord that is reached by such reduction. When this is done the first line of interference is neutralized, and the condition of sympathy is as pure between the parts as it was when the globe was minus its axis. There is now introduced on its axis a ring which has seven tubes or graduating resonators, the ring being $\frac{2}{3}$ the diameter of the globe, the resonators three inches long and $\frac{3}{4}$ in. diameter, each one to be set on the chord of B flat, which is done by sliding the small diaphragm in the tube to a point that will indicate B flat. This setting then controls the metallic displacement of the metallic combination, as also the arms necessary to hold the ring and resonators on the shaft or axis. Thus the second equation is established, both on resonance and displacement. We are now ready to introduce the diatonic scale ring of three octaves which is set at two-thirds of the scale antagonistic to the chord mass of the globe itself. This is done by graduating every third pin of its scale to B flat, thirds, which represent antagonistic thirds to the shell's molecular mass. This antagonism must be thoroughly sensitive to the chord mass of one of the hemispheres of which the globe is composed. The axis of the scale ring must rotate loosely on the globe's shaft without revolving with the globe itself, which it is prevented from doing by being weighted on one side of the ring by a small hollow brass ball, holding about two ounces of lead. The remaining work on the device is finished by painting the interior

of the globe, one hemisphere black and one white, and attaching a rubber bulb such as is used to spray perfume, to the hollow end of the shaft. This bulb equates vibratory undulations, thus preventing an equation of molecular bombardment on its dark side when sympathetically influenced. It is now in condition to denote the sympathetic concordance between living physical organisms, or the receptive transmissive concordance necessary to induce rotation.

ROTATION FROM VIBRATION: "Rotation arises through the harmonic interactions of the dominant and enharmonic modes of vibration, in the ratio of 3:9. To produce and control rotational force or commercialized energy, we must control through its properties, the negative attractive or enharmonic current. This will solve the problems up to any limit of power." (11)

ROTOR RELATED REGION: In the REBAM analysis of rolling element bearings, the ROTOR RELATED region includes low-pass signals of the principle spectral components due to rotor/rolling element defects. Typically this frequency range is from dc up to 3 times the rolling element passage frequency (REPx). (100)

RPM: Shaft speed in revolutions per minute. (100)

RTD: Acronym for Resistance Temperature Detector; a sensor which measures temperature and change in temperature as a function of resistance. (100)

RULE OF THE OCTAVE: A name given to a system of adding harmonies to the diatonic scale, using it as the lowest part. From the nature and relation of the chords added, many laws as to progression and modulation were deduced; in fact it was formerly taught as a formula for the assistance of students, who committed to memory the harmony or harmonies which each degree was capable of bearing. (125) See **LAW OF THE OCTAVE; HARMONIES OF TONE OF COLORS.**

RULING MEDIUM: "Pure sympathetic concordants are as antagonistic to negative discordants as the negative is to the positive; but the vast volume the sympathetic holds over the non-sympathetic, in æthereal space, makes it at once the ruling medium and readjuster of all opposing conditions if properly brought to bear upon them." Chapter 7 of (1)

"Christ is the ruling force in the world." (5749-4) (2) See also **POSITIVE, NEGATIVE, DOMINANT, MOLECULES**

RUMBLE: Rumble, as its descriptive name suggests, is a low, rumbling noise produced by poorly built turntables or changers. It is caused by vibrations of the turntable mechanism that are picked up by the cartridge along with the signal on the record. In quality turntables, rumble is minimized by the use of properly balanced drive motors, shock mounts, and often by an elastic transmission between the motor shaft and the turntable rim (usually in the form of a

plastic belt) that filters out motor vibration before it reaches the stylus. Turntable rumble is measured, in decibels, against a standard level tone played on a test record. The minimum requirement for high fidelity, as defined by the National Association of Broadcasters, is -35 db, meaning that the rumble must be 35 db softer than the test tone. (Note that unless turntable rumble figures are specified as being derived according to the NAB standard, they cannot be compared with one another). (103)

RUN: A rapid succession of notes. (125)

RUNNING: The improper sounding of an organ pipe or pipes from a defect in the sound-board or other causes. (125)

RUNOUT: See **ELECTRICAL RUNOUT** and **MECHANICAL RUNOUT.** (100)

RUNOUT COMPENSATION: Electronic correction of a transducer output signal for the error resulting from slow roll runout. (100)

RUPA: An Eastern term. Form. **KAMA RUPA:** form caused by desire. **MAYAVI RUPA:** illusive form caused by the will and imagination of a person who consciously projects his own astral reflection, as that of any other form. (131) See **THOUGHT; FORCE, WILL; ASTRAL**

RVDT: Acronym for Rotary Variable Differential Transformer. A transducer which operates on the same principle as an LVDT, but measures rotary (angular) displacement as opposed to linear displacement. See **LVDT.** (100)



SABECA: One of the musical instruments mentioned in Daniel 111. 5, 7, 10, 15. It is generally supposed to have been identical with sambuka, a large species of harp, perhaps the large Egyptian harp. In the authorized version it is unfortunately rendered sackbut, an utterly unwarranted translation. (125)

SABINS: [ACOUSTICS] See **TOTAL ABSORPTION.** (85)

SACKBUT: One of the Babylonian musical instruments mentioned by Daniel in chap. 111. v. 5, 7, 10, 15. It is the translation in the English version of the Bible of the word sabeca. Some authors identify it with the sambuka of the Greeks and Romans, a kind of harp. (125)

SAFETY DEVICES, MECHANICAL: His "carbon register" was a device by means of which he produced a vibratory circuit of sufficient frequency to break up cohesion - molecular magnetism by use of the "ætheric order of ozone" liberated by sympathetic vibration of air and water, which it seems he caused to pass into this "carbon register" and which produced the high frequencies by chemical affinity or some other form of action on the carbon.

His second system, in which he used the "Liberator" was not quite perfected so as to assure safety to the operator. The devices for indicating and governing the vibratory ætheric circuit also left much to be desired.

3/22/85 "I have a plan for a device to be attached to the Liberator to show when the neutral center is free from intensification during operation. This will prevent the extension of the dangerous vibratory waves that are generated when operating the gun."

"Am preparing new features necessary as adjuncts to denote condition of safety during vibratory operations. Had an accident to one of my registers this morning, which burst with a tremendous report. It shook up things, but nothing was damaged but the register."

5/20/85 "After laboring six hours to set my safety process, the first operation of the Liberator tore the caps of the resonating tubes all to pieces. I replaced them with duplicates and set the Liberator on the low

octaves, when everything worked to a charm. I followed up with great care the progressive chords to the tenth octave and liberated a score of times with the gun, yet no variation or intensification on the Liberator. I worked the Liberator continuously for 64 minutes on the revolving sphere when a second intensification took place, demolishing two safety shells and one vibratory indicator. I am unable to account for this. I then set up a position on the resonating wave plates in the forty resonating circuit and secured the best results I have ever yet secured. I believe I shall be able to obtain continuity of motion with perfect rotation."

7/15/85 "My safety arrangements (governors and indicators) are not working well but I hope soon to have them all right."

8/5/85 "I have met with an accident to the Liberator when experimenting on the third order of intensification. The rotation on the circuit was thrown down into the compound resonating chamber, where the instantaneous expansion of its volume exploded the metal casing enclosing the forty resonators and completely dismantled the Liberator. The shock took my senses for a few moments but I was not even scratched this time. A part of the wall was torn away, resonators and vibrators scattered about the room and the neighborhood alarmed. I quieted them by saying I was only experimenting. Dr. Woods and Mr. Collier saw the effect of the explosion just as things lay around."

Another time: "The safety arrangements now being attached to my Liberator will greatly improve it. It will now be operated by a gum bulb instead of a violin bow."

Keely suffered severe accidents in his battle with the problem of polarization and depolarization, which exposed him to accident after accident, violent explosions without the slightest warning, and was occasionally laid up for a number of days recovering from the effects. Except in one or two instances he escaped unharmed. He worked so hard, so continuously, that his hands became actual knobs of callouses. Never once did he falter in his unflagging zeal, his determination to learn the secret of polarization and depolarization, the control of which meant the prevention of reversions, which caused the destruction of his appa-

ratus, and continuity of rotation in his commercial engine, with which these reversions interfered so as to stop motion for varying intervals.

After several years of experiment, he gained sufficient control over the æther to prevent these explosions that made wrecks of his machines, heretofore bursting "iron and steel pipes, twelve inches in circumference, as if they had been straws." Besides preventing explosions he also gained partial control over the direction of the ætheric force generated by sympathetic negative attraction. (11)

SAGANI: Elementals or spirits of Nature. (131) **SEE ELEMENTARIES**

SALMANDRI: Salamanders; spirits living in the element of fire. (131)

SALLEN-KEY FILTER: A design technique which utilizes both positive and negative feedback to achieve single-amplifier realizations of multi-pole lowpass, highpass and bandpass responses.

SALPINX: An ancient Greek trumpet. (125)

SALTO: A leap, or skip from one note to another beyond the octave. (125)

SAMBUKA: This word, though applied sometimes to several musical instruments of different kinds, such as a lyre, a dulcimer, a triangular harp or trigon, and a large Asiatic harp, seems to have been chiefly used as a term for the last-named instrument. By some authors it has been identified with the large Egyptian hard. (125) **See SABECA**

SAMECH: The 15th Hebrew letter, Samech (X), means a prop, a strong support. In Greek as in Hebrew X stands before O and there is said to be a valid Kabbalistic reason for this occurrence and recurrence of priority. An ancient Judaic tradition connects X with Cochab, a star, sometimes a comet. Treatises on alchemy abound in references to this letter, which for some reason is treated as one of far greater than average importance. (72)

SAMPLE AND HOLD: A circuit which can be used to store, or hold, an input voltage. (69)

SAMPLE PATH LENGTH: Internal cell or sample length, cm (not used: l or d). (5)

SANKALPA: Third aspect of PRANA. Is represented by the KALA aspect of VAK and TAPAS by ARDHAMATRA KAIA evolves RJU (right) and SU-SAMA (symmetrical) phases and forms. (125)

SAT: Manifest. **See ASAT.** (125)

SATURN: "In the Saturn forces, we will find great changes coming into the experience." (2005-1) (2)

SAWTOOTH WAVE: Sounds rich, full, brassy. (69)

SCAIOLAE: Spiritual powers, qualities, virtues, depending on the quality and quantity of the elements that produce them. Such powers are thought, love, hate, imagination, hope, fear, etc. (131)

SCALAR: A quantity that has magnitude but no direction. (e.g. real numbers) **See SYMPATHETIC OUTREACH, MAGNETISM, DOMINANT, LAWS OF BEING**

SCALAR ELECTROMAGNETICS: "We first define scalar electromagnetics as the quantum mechanical effects and influences that can be accomplished by electrical and magnetic scalar potentials, even in the absence of electric and magnetic fields, or - in other words - that can occur even in otherwise zero-E (electric) and zero-B (magnetic) force-field regions. Note that this definition includes as subsets both the ordinary classical EM field approach and the more fundamental approach of quantum electrodynamics. In the latter approach, one replaces the fields E and B in modern theory with the O (electrostatic scalar potential) and A (magnetic vector potential), with the view that these potentials create E and B fields in the first place. The Bohm-Aharonov effect shows that the E and B fields can remain zero, and yet the potentials can still cause physical effects.

"Thus scalar electromagnetics encompasses two cases: (1) the normal case, in which the potentials are viewed as first creating the fields E and B, and these force fields in turn produce physical effects on charged particle systems; and (2) the case in which fields E and B are zero, yet potentials still exist and produce physical effects on charged particle systems.

"Indeed, we assume total primacy of scalar potentials, after the work of Whittaker, holding that all the effects of present electrodynamics can be produced by utilization and interference of two or more scalar potentials.

"Note particularly that one may deliberately create the zero-field, pure potential condition by opposing magnetic and or electric fields so that they sum to zero. That is, the "zero-fields" can be resultant vector zeros, where the combining vector components still exist. In this case one creates a deliberate, artificial scalar potential which contains all the energies of the separate infolded [Bohm's term] vector fields used to make the resultant vector zero. All this infolded energy has been transformed to stress of spacetime, or pure potential. However, it does not have a randomized substructure as is usual in quantum electrodynamics, but has a determined, known substructure consisting of the constructed infolded E and B field vectors.

"Conceptually, a magnetic pole is such a spatio-temporal stress potential - but usually with a randomized substructure - as is an electrical charge.

"Note also that, if one rhythmically varies all the individual summation vectors in the substructure by

the same factor, one produces pure potential stress waves - scalar waves - without ever creating external electric and magnetic fields. These are pure waves of spacetime, and they are oscillating curvatures of space-time itself. They are pure waves of compression and rarefaction of the massless charge of space-time, and are properly represented as longitudinal waves rather than transverse waves. Thus they are non-Hertzian in nature. Among other things, they may be used to generate mass and inertial fields directly." (38)

SCALAR ELECTROSTATIC POTENTIAL:

"Scalar electrostatic potential may be regarded as a sort of "locked-in stress energy" of vacuum, as can any other vacuum potential. Changing the potential in a region or at a point changes the amount of the "locked-in" or "infolded" vacuum energy available or stored in that region or at that point. Yet simply changing the potential at that point or in that region need not involve any local expenditure of work there; the work may be expended elsewhere, and the results realized directly at a distant region by a change in that region's potential, according to the Bohm-Aharonov effect. In the remote region, charged particles are imbedded in vacuum potential by their virtual particle charge flux, and in the induced potential gradients the imbedded particles move, producing electrical and magnetic forces and fields and performing work." (38) See **SYMPATHETIC OUTREACH, MAGNETISM**

SCALAR FUNCTION: A function which has magnitude only. Thus, the scalar product of two vectors is a scalar function, as is a real function of a real variable. (37)

SCALAR QUANTITY: Any quantity which has magnitude only - *e.g.* time, temperature, quantity of electricity. See **VECTOR**

SCALAR WAVE: Same as **TESLA WAVE, SYMPATHETIC OUTREACH**

SCALE: The graduated sounds used in music. To give a history of the scale would be to give a history of music itself; it must suffice, therefore, to say a few words on the growth of the scale to its present shape. Nothing is known with certainty of the nature of the scales of any of the most ancient nations. If it be admitted that the Greeks obtained their notions from the Egyptians, it may be hazarded, merely as a supposition, that the Egyptian scale was tetrachordal, that is, consisting of groups of four notes.

The octave system became practically a part of the ancient tetrachordal system, which it was destined afterwards to supersede entirely. Although our modern scale was unquestionably a development of the diatonic scale of the Greeks, yet for several centuries, a hexachordal system was in use. The Church modes were probably the connecting link between the ancient Greek music and the modern diatonic scale. The division of the octave into twelve parts, called semi-

tones, each of which can be used as a keynote, became only feasible when keyed instruments were tuned on the system known as equal temperament. This gives to the chromatic notes of our scale a far greater value than the chromatic or enharmonic notes of the ancients, as it is probable they were never used but as passing or auxiliary notes. The whole system of music hangs upon the relationship of the sounds used to a tonic, which, in modern music, is always the first note of whatever octave system (key) is chosen, but in Greek music and early Church-song was a note at or near the middle of the scale.

The old Church mode corresponding to the modern scale was the Ionic or Iastian, but when this was finally adopted as the normal scale, a still older form was retained for use with it, founded on the Dorian and HypoDorian modes, to which, now slightly modified, we give the name minor mode, and by starting from any one note in the semitonal scale, we can have twelve minor modes. As a minor mode largely consists of the notes of the major scale beginning on its third degree, it is said to be relative to that scale. The form of the minor mode has varied from time to time and even now cannot be said to be definitely settled.

The musical scales of extra-European countries are so varied in character that it is impossible to draw any reliable conclusions from their form. The Arabs, Indians, and many uncultured tribes in all quarters of the globe have more than twelve divisions in the octave, that is, use enharmonic scales. The Chinese have the old five-note scale, called by Engel, Pentatonic. This five-note scale is also associated with Scotch and other Celtic melodies.

In some nations the natural harmonic, known as the sharp eleventh, which we discard, is in use, probably because it is produced upon their simple tube instruments.

The degrees of the ascending scale are distinguished in harmony by the following names:

First.....	Tonic
Second.....	Supertonic
Third.....	Mediant
Fourth.....	Subdominant
Fifth.....	Dominant
Sixth.....	Superdominant
Seventh.....	Subtonic or Leading Note

(125) See **INTERVAL**

SCALE OF THE FORCES IN OCTAVES: "First octave (unity of sound) is approximately the lowest frequency capable of producing waves of rarefaction and condensation in the air. The atomic aggregate oscillating at this pitch can be experimentally determined, and the aggregate vibrating at a pitch one octave higher will have a mass lying between $\frac{1}{8}$ and the cube root of the mass of the first mentioned aggregate; the exact relation under varying conditions of gravity, magnetic saturation, and pressure, can be

determined only by accurate measurements. But assuming a body of a size represented by x , with a pitch represented by 1024 per second, then a pitch of 2048 per second will be produced by a body having a volume of some mean between $\frac{1}{8}$ of x and the cube root of x . By accurately determining the pitch of a volume of any metallic sphere capable of oscillating at the pitch of, *e.g.*, the eleventh octave of sonity (1024 per second), under normal conditions of gravity, pressure, magnetism, and then successively diminishing its size by $\frac{1}{8}$ of itself, we get the successive octaves of pitches higher and higher in period-frequency until we pass the domain of sonity and enter the domain of sono-thermity. The point where the one form of energy merges into the other lies approximately at the twenty-first octave, and this pitch also marks the point where the air is no longer capable of vibrating at that pitch in waves of transverse form. The first gamut of $21 \frac{1}{2}$ octaves consists of three forms; *viz.* sonity, sound, and sonism. The following is a tabulation of the pitches of sonity in octaves from one vibration per second to where the next form of energy commences."

FIRST CLASS

	Sonity, Sound, and Sonism begins
1st Octave	2
2nd	4
3rd	8
4th	16
5th	32
6th	64
7th	128
8th	256
9th	512 Keynote Molecular Chord
	620 First Octave Keynote Atomic Chord
	630 Second Octave
10th	1,024
11th	2,048
12th	4,096
13th	8,192 Keynote ætheric Chord
	12,000 Third Octave Heat (highest rate of)
	14,000 Vibro-Atomic
14th	16,384 Lowest Molecular Vibration 20,000 Harmonic Thirds
15th	32,768
	42,800 Disintegration of Water
16th	65,536
17th	131,072 Transmission of Odor in Molecules
	220,000 Sympathetic Negative
18th	262,144 First Inter-Atomic Lowest
	300,000 Full Harmonic Chord
19th	524,288 First Inter-Atomic Highest
	780,000 Full Harmonic Chord
20th	1,048,576
Ninths	1,620,000
21st	2,097,152
Major 5th	3,145,728

Sono-thermity, Sono-therm, Sono-thermism begins

22nd	4,194,304
23rd	8,388,606
24th	16,777,216
25th	33,554,432
26th	67,108,864 Highest Mole. Vibration
	100,000,000 Harmonic 3rds
27th	134,217,728
28th	268,435,456 Highest Inter-Molecular
	300,000,000 Enharmonic 6ths Atmospheric
	519,655,633 Highest made in air
29th	536,870,912 Atomic Vibration
	900,000,000 Diatonic 9ths
30th	1,073,741,824
31st	2,147,483,648

SCATULATION

32nd	4,294,967,296 Highest ætheric
	8,100,000,000 Dominant ætheric 6ths
33rd	8,589,934,592
34th	17,179,869,184 Highest Inter-ætheric
	24,300,000,000 Inter-ætheric 9ths
35th	34,359,738,368
36th	68,719,476,736
37th	137,438,953,472
38th	274,877,906,944
39th	549,755,813,888
40th	1,099,511,627,776
41st	2,199,023,255,552
42nd	4,398,046,511,104

SECOND CLASS VIBRATIONS begin

Thermism, Rad-energy, Chemism begins

43rd	8,796,093,022,208 Dark heat begins
44th	17,592,186,044,416
45th	35,184,372,088,832
46th	70,368,744,177,664 Chemism begins
47th	140,737,488,355,32 Infrared (Light begins)
48th	281,474,976,710,656 Major 4th (above)
49th	562,949,953,421,312 Below Major 4th
50th	1,125,899,906,842,62 (Light ends)
51st	2,251,799,813,685,248
52nd	4,503,599,627,370,496 Limit Actinic
53rd	9,007,199,254,740,992
54th	10,814,398,509,481,984
55th	36,028,797,018,963,968 Chemism ends
56th	72,057,594,037,927,936
57th	144,115,188,075,855,872
Full Ninths	156,057,552,198,220,000
58th	288,230,376,151,711,744
59th	576,460,752,303,423,488
60th	1,152,921,504,606,846,976
61st	2,305,843,009,213,693,952
62nd	4,611,686,018,427,387,904
63rd	9,223,372,036,854,775,808
64th	18,446,744,073,709,551,616
Major 5th	27,670,116,110,564,327,424

Limit of thermism**Electricity, Induction, Magnetism begins**

65th	36,893,488,147,419,103,232
66th	73,786,976,295,838,206,464
67th	147,573,952,591,676,413,928
68th	295,147,905,183,352,827,856 Copper-zinc couple
69th	590,295,810,366,705,655,712
70th	1,180,591,620,733,411,311,424
71st	2,361,183,241,466,822,622,848 50,000 volts
72nd	4,722,366,482,933,645,245,696
73rd	9,444,732,965,867,290,491,392
74th	18,889,465,931,745,580,982,784
75th	37,778,931,863,469,161,965,568
76th	75,557,863,726,938,323,931,136
77th	151,115,727,453,875,647,862,772
78th	302,231,454,907,753,295,724,544
79th	604,462,909,815,506,591,449,088
80th	1,208,925,819,631,013,182,898,176
81st	2,417,851,639,762,026,365,796,352
82nd	4,825,703,278,524,052,731,592,702
83rd	9,671,406,557,048,105,463,185,408
84th	19,342,813,114,096,210,926,370,816
85th	38,685,626,228,192,421,852,741,632
86th	77,361,252,456,384,843,705,483,204

The limit of electricity and the beginning of atomolity. (9)

SCAN WELDER: A device for welding flat rigid parts by either transporting the part under one or more stationary horns or scanning the part with movable welding heads. (102)

SCATULATION: An encasing, or enclosing (*scatula*=a box). (121) See **DYNASPHERE**

SCHISMA: An approximate half of a Pythagorean comma, that is, half of the difference between twelve-fifths and seven octaves. (125)

SCHWINGUNGEN: [Ger.] Vibrations. (125) See *Acoustics*

SCIENCE AND RELIGION ARE ONE: Science is slowly advancing to the point where a single law is found to be at the foundation of all other laws. This one great law is called the Law of Assimilation. It states that "every individualized object tends to assimilate itself to itself, in successive moments of its existence, and all objects to assimilate one another."

This law can be seen in the functioning of Planck's Constant which is the root of all quantum mechanics the very foundation of modern physics. This law may be rewritten as "every individual tends to love himself, at different times during its lifetime, and all persons to love one another." The practical functioning of this law was demonstrated to us by Christ, who is the law, and can be seen in John 16:16, 16:28, 17:22, 17:23 and in Mathew 22:37 & 22:39.

Modern science sees how the Sun alternately draws the Earth near and then releases it to its greater orbit in periodic fashion. Molecules and atoms do the same. Just so we all have experienced a pattern of alternately loving and hating ourselves and each other. This oscillation of opposite states of relationship may be likened unto a vibratory condition. First being in harmony or oneness and then reverting to an opposite state of discord or separateness. This undulation between opposite states unfolds in a pattern of influences. So what may be appropriate at one moment may not be appropriate in another and this rhythmic motion of time and events gives rise to the cycles or periods so evident in one's life. How does this apply to you and what can you do about and with this knowledge? Each person who is born and takes in the first breath of life energy set in vibration and attuned to the Universal Forces at that moment continues to vibrate in attunement with those very same vibrations and forces. This person has an affinity for those rhythmic conditions existing at the time of birth and will be sensitive to and respond to them during the entities sojourn on this earth plane. Various notes of Cosmic vibration were sounding at that point in time and that person forever thereafter will resonate to or be in tune with that note. If that fundamental note were middle C that person would be sensitive to and resonate to middle C regardless of the octave to greater and lesser degrees of response. In other words, that person is in sympathy with middle C. All energy in the universe, of whatever nature, has but a single source, but in its emanations and radiations becomes divided into various phases of undulations which the ancient mystics have called vibrations. These undulations have certain periodicity or periods of kinetic and static manifestations, much like the radiations from the antenna of a transmitting radio station. We may think of these various undulations as being of different wave lengths, different rates of vibrations,

or different periods as we please, but the fact is that the resulting effects from the different waves or radiations account for the various forms of known and unknown energies in the universe. The vibrations may be divided into a great many octaves of manifestation, and each octave may be divided into many distinct forms of manifestation in both the spiritual and material world. Even the few octaves which cover the manifestation of sound give a wide variation of manifestation; for some of the rates within the octaves of sound may be so low as to be inaudible to the average person, and manifest only through touch, while others may be so high as to be inaudible but manifest in light or other mental or metaphysical ways. Ordinary electricity is unquestionably another form of the periodic range of the universal vibrations, as is the divine essence of the soul, the vital force of the animal body, and the lower vibrations in plant and mineral life.

The ONE substance vibrates in different dynamic degrees, and sound, light, electricity, are the affections of the one substance by the specific degrees of the ONE ENERGY, and there is no difference between anything such as electricity and, say iron, save in rate of affection. (195-70)

Manifesting energy directs the rhythmic motion of all things in the universe, and that motion is the fundamental principle of all material, mental and spiritual things, and that if motion were eliminated in the universe, we would see, hear, feel, and sense nothing. Matter itself is the result of the motion of its inner particles and is carried into the atoms and molecules of which it may be a part. This sub-atomic motion is the result of the motion impregnated by the rhythmic pulsations of the Universal or Cosmic energies.

For, returning to the first principle, - as there are those forces that move one within another to bring harmony, as for light or color, or sound, or motion, all of these are but the variation of movement, vibration. What is the FIRST CAUSE? That from which all emanates, the SPIRIT of the force or influence itself; breaking itself upon the atomic structures about same, bringing those influences as it associates itself one with another in its varied forms of atomic structures. (2012-1)

Because of the Principle of Correspondence (As above, so below) or what we call today sympathetic vibrations and because of the foregoing explanations, you resonate to that chord of vibrations that was in activity at the time of your birth. As you resonated to it so too did the planets in their orbiting oscillations. Thus the mathematics developed by the science of astrology can be used to determine what that chord was to within a great degree of accuracy. Using computers and the physics of music and musical evolution these notes can be determined and replicated into a musical pattern resonating that initial introductory vibratory impulse to which you naturally vibrate.

"For it is not strange, that music, color, vibration

are all a part of the planets, just as the planets are a part and a pattern of the whole universe." (5755-1)

Therefore, everything that is in the universe is existing and manifesting in accordance with cycles of rhythms distinctly its own, and everything that has had a beginning or a start whereby it became a distinct entity moves forward in time and space in accordance with the cycles of progression distinctly their own aroused from the initial fundamental tones in activity at the time of such a beginning and subservient to this initial chord of birth. Therefore, since everything vibrates and is subservient to the laws of vibrations or harmony we need only study these laws to learn the true inner nature of whatever person, thing or event.

If you learn music, you learn history. If you learn music, you'll learn mathematics. If you learn music, you'll learn almost all there is to learn --- unless something bad! (3053-1)

The spiritual essence that is you was created from and by the Laws of Harmony. It has been often rightly said that the laws that govern musical evolution also govern the evolution of planets and the starry heavens. Indeed, when applying these physical laws of science to the Book of Genesis we can see the interplay of harmony and disharmony in the evolution of the material world.

"Science and religion are ONE when their purposes are one." (5023- 2)

An interpretation of the soul personality (your spiritual essence) is derived in much the same fashion. The Soul Personality is your inner soul consciousness and not of your outer ego-self. The inner self is the true YOU, with all of its latent talents, abilities, hang-ups and purposes. The outer self is composed of the various shells and personality tonal colorations we have created and is that which we present to those around us. This outer shell is the one we and others have come to know as "you" and we ourselves, through habitual image reinforcement, have even come to accept as "me." However, this inner person is of a different caliber. The "you" that was born is not necessarily the "you" you see yourself as being today. For this reason you may see contradictions or inaccuracies in an analysis of yourself. The Laws of Harmony are exact and lie at the very foundation of the Universe. As these laws unfold the consequent actions and results are as predictable as the laws themselves for these are the laws that govern the actions and reactions or causes and effects, sometimes referred to as karma. It is cautioned that you have a person who has known you for some years work with you with great care and discernment. We each know we cannot accurately see ourselves just as others do. Therefore, have this friend, counselor or family member read and compare what you together find to what they have come to learn about you. A frank and open discussion will help you to come to "know thyself."

Harmonize thy life as ye do the tones of nature itself; and more joy and beauty will be in thy daily experiences. (262-121)

The Principles of Harmony are not a panacea for one's personal discords of life. They are but a tool for focusing on the harmony already inherent in your very being. It is a helpmeet or stepping stone which may be used to achieve this harmony of being and experience. You must desire this oneness and do those things which are in alinement with that ideal of harmony. The focusing on the inner tones and chords will stir your inner being into life. YOU must listen inwardly to that awakening motion, begin to flow in rhythmical undulations with it. This will not be unlike a swooning synchronization to inner promptings, much like a dance with the Cosmic forces bestirring within you.

As has been indicated, in the interpretation through the dance or through the athletic forces or dramatic forces that may bring to the mind and experience of others the glory of expressing the rhythm and the music of the inner self. (1207-1)

The awakening and growing experience is a process - not something that happens all at once. It demands attention, discernment and above all APPLICATION or just plain work. It is seen as a two step process: 1) Cease doing that which brings discords. 2) Begin doing more and more of that which is concordant with your inner self, its purposes and desires.

For not knowing a thing makes one wise, but the ability to use it or apply it. Not what one knows [but what one does] about that it does know makes for that influence and those changes in the experiences of individuals that bring about either weal or woe in the experience of an entity. (1159-1)

The idea then is to bring yourself and your life's circumstances into harmony. By understanding your true inner self and getting away from those thoughts and activities which are not in accord or not in harmony with it you will be doing just this. The idea is to first learn who and what you are. Then study yourself, your activities and your thoughts making lists of the spiritual, mental and physical attributes and experiences. Cross out items not coincidental to what you are learning about yourself and underline those that are. Over a period of time a mosaic pattern will emerge depicting things about yourself that make you feel good. This feeling of wholeness comes from within and will resonate in a positive fashion as you zero in more and more to harmony or oneness of self and self's activities. Meditation is a process of self-focalization or centering. In other words, through the meditation process, you listen inwardly ever seeking the original chord or impulse which is you. Meditation is you assimilating your inner self to your outer self. It is in you as you are in it. This impulse is of the Divine realms of spirituality and is your connecting link to harmony with the Universal Creative Force. This inner first cause which resulted in you being

created is a motion of rhythmical undulations which may at times be perceived as music, color or rhythms of activity. Meditation for purposes of discerning this inner harmony is absolutely essential, for... without music there cannot be found the complete expression sought; whether it be music by instruments, or the music of doing good, or the music found when just being quiet in the moonlight, or listening to the voices of the night. That is music of the soul... (5164-1)

A word of caution should be added. If you perceive yourself as being much different than this growing awareness indicates then you may have an outer shell which has been created over the years of life's experiences that is or may be detrimental to the oneness you seek. Discord creates separateness or aloneness. Discord is anathema to oneness or harmony. Oneness to what? The true inner chord which is you, your oneness with the Universal Creative Forces, which is God. For music is that upon which the greater interpretation of the soul and mind may be based, in attuning the body to the Infinite. (3053-1) This discordance is the evil spoken of in the Bible. Discord and that which causes discord causes separation from oneness with this Divine force. Therefore one should avoid discordant thoughts activities and events which are perceived as problems, stigmas or other non-coincidental influences. Depart from evil, and do good; seek peace, and pursue it. (Psalms 34:14) I love them that love me; and those that seek me early shall find me. (Proverbs 8:17) No better counsel can be given for attaining peace and harmony than that given by Jesus the Christ for did not He come to be the Way? His two commandments are the law in application and show the way to harmony or oneness with one's environment and associations: Commandment I: Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind. (Matthew 22:37) Commandment II: Thou shalt love thy neighbor as thyself. (Matthew 22:39) Love is harmonious existence or oneness with another. Love is harmony - anything else is discordant and divisive. When you have sought and worked for this harmony, then - At that day ye shall know that I am in my Father, and ye in me, and I in you. (John 14:20) [Dale Pond]

SCINTILLATOR: A type of particle detector that emits a flash of light when a particle strikes it. (116)

SCOTCH SCALE: See **PENTATONIC SCALE; SCALE**

SEAMING: See **SEWING**. (102)

SEBACEOUS: Fatty. (121)

SECOND: ATOMIC SECOND - 9,192,631,770 cycles of emitted radiation of cesium.

SECOND, CHORD OF THE: An old abbreviation of the chord 6/4/2. (125)

SECOND, INTERVAL OF: The interval of a second. See **INTERVAL**

SECONDARY VIBRATIONS: See **COMPOUND VIBRATIONS, LAW OF SUPERPOSITION, HARMONICS-RATES-OF**

SEEBECK EFFECT: See **THERMOELECTRIC EFFECTS, HALL EFFECT, THOMSON EFFECT, PELTIER EFFECT**

SELECTIVITY: A measure of the ability of a filter to discriminate against out-of-band frequencies.

SELECTIVITY: Selectivity refers to the ability of an FM tuner to separate stations that are next to each other on the dial. In most large cities, the assigned frequencies of local FM stations are fairly well spread out over the dial, so that mutual interference is avoided. In some areas, however, FM stations received from different cities happen to fall too closely on adjacent frequencies. In such special locations, good selectivity becomes an important tuner specification. Selectivity is expressed as the number of decibels by which the signal from an interfering station in a nearby channel is reduced. (103)

SEMIBREVE: See **NOTA**.

SEMICHROMA: A semiquaver. (125)

SEMIDEMISEMIQUAVER: A half demisemiquaver, the 64th part of a semibreve. (125)

SEMI-DIAPASON: An imperfect octave. (125)

SEMI-DIAPENTE: An imperfect or diminished fifth. (125)

SEMI-DIATESSARON: An imperfect or diminished fourth. (125)

SEMI-DITONUS: A minor third. *Semi-ditonus cum diapente*, a minor seventh. (125)

SEMIFUSA: A semiquaver. (125)

SEMIMINIMA: A crochet. (125)

SEMIQUAVER: The 16th part of a semibreve. (125)

SEMITONE: A half a tone, or an approximate half a tone. (125) See **INTERVAL**.

SEMITONIUM: A semitone. *Semitonium modi*, The leading note, sensible, master note, or major seventh, called also *subsemitonium modi*. (125)

SENSIBLE: Expressive. (125)

SENSITIVITY: Sensitivity describes the ability of a tuner to pull in weak and distant stations. If you live in an urban area near all the FM stations you want to receive, sensitivity is not of great importance. But if you are located in a fringe reception area, a highly sensitive tuner can make the difference between satis-

factory and poor reception. Sensitivity is always stated in relation to quieting, which refers to the ability of the tuner to strip off static from the incoming radio signal so that an interference-free audio signal emerges at the tuner output. If the specification reads: "3 microvolts sensitivity for 30 db of quieting," it means that the incoming signal picked up by the antenna must be at least 3 microvolts strong if the noise is to be quieted to a level 30 decibels below that of the music. The Institute of High Fidelity (IHF) suggests that all sensitivity ratings should be based on 30 db quieting. This standard is known as "usable sensitivity," or "IHF sensitivity," and most manufacturers observe this norm. Keep in mind that, in sensitivity specifications, the lower the figure, the higher the sensitivity. (103)

SENSITIZING CENTERS: See **QUADRATURE OF THE CIRCLE**, **NEUTRAL NEGATIVE CENTER**, **SYNCPATHETIC**, **THREE REVOLVING BODIES**, **ATOMIC TRIPLETS**, **PRIME NEUTRAL CENTERS**

SEPARATION: An old name for a grace or passing note "not reckoned in the measure or time, put between two real notes rising a third, and only designed to give a variety to the melody." (125)

SEPARATION: Separation (rated in decibels) describes the ability of components to keep right and left channel signals apart. In poorly designed equipment, lack of separation permits signals from the right channel to leak over to the left, and vice versa. (103)

SEPTIEME: The interval of the seventh. (125)

SEPTIMOLE: A group of seven notes to be played in the time of four or six. (125)

SEQUENCE: The recurrence of a harmonic progression or melodic figure at a different pitch or in a different key to that which it was first given. (125)

SEROGODSKY MOTOR: Original article by Stefan Marinov International Glasnost Journal on Fundamental Physics Jan-Mar, 1992. Dr. Marinov has done a great service in finding and publishing the story about Dr. Albert Victorovich Serogodsky and his motor. The motor is in essence the very same as the Keeley motors of 1880s and the Dennis Lee (Fischer) motor reviewed elsewhere. This "new" motor was developed in Russia by Russian scientists independently of the work being done in this country. The functioning principle is the same as described by the Carnot cycle and that same technology which is currently so extant in heat pump technology.

Not only is this new motor development significant in and by itself but Dr. Marinov goes on to describe yet another motor also independently developed in Switzerland which also uses the Carnot and heat pump technology. This second inventor has been and is currently marketing his motors to third world countries as we speak. This inventor wishes to remain anonymous at present for obvious reasons.

Can there be any doubt in anyone's mind now that there is a new age in energy development about to explode upon the scene? Four people have independently from each other all succeeded in developing a "new" energy technology based on the same fundamental principles that work. Such workings have been verified by impartial outsiders on three different continents.

The motor I have under construction is also based on these same principles but has not been completed for lack of funds. Perhaps one day an open minded investor will present himself to complete this work. See **RADIATION CHEMISTRY**, **CARNOT**, **HEAT PUMP**

SERPENT: A brass instrument of a powerful character. It is of wood, twisted into a curved form, and covered with leather, with a mouth piece like a horn or trombone, with keys for the several notes to be produced. (125)

SESQUIALTERA: (1) Numbers in the proportion 3:2. (2) An organ stop consisting of several ranks of pipes, sounding the high harmonics for the purpose of strengthening the ground note. (125)

SESQUIOCTAVE: Sesquiotavos, an eighth in addition to the unity, that is $1+1/8$. (81)

SESQUIPARTIAL: Or superpartial, superpartians, relationship containing one part in addition to the unity, that is to say in the form $1+1/m$. (81)

SESQUIQUARTAN: Sesquiquartus; a fourth in addition to the unity, that is to say $1+1/4$. (81)

SESQUIQUINTAN: A fifth in addition to the unity, that is to say $1+1/5$. (81)

SESQUITERTIAN: Sesquitercius, a third in addition to the unity, that is to say $1+1/3$. (81)

SETTIMA, SETTIMO: The interval of the seventh. (125)

SETU: Connecting link between differentiated VAK or PRANA. In PRANA it is the SETU which holds all together in MUKHA – the chief. In VAK it is the AXIS or AKSA or DHUH and as such is called MADHYAMA – that which maintains the middle or mean measure. (126)

SEVEN: Each octave is composed of 3 primary and 3 secondary tones, with one - the seventh - the changing, the mystic, and "becoming" or the leading degree to another octave of expression. Plus the five half tones, giving a total of 12 degrees.

SEVENTH, CHORD OF THE: Chords are named on two principles: (1) by the largest interval contained in their component notes; (2) by the largest interval they contain when referred to their supposed fundamental-bass or root. On the former of these principles sevenths have been divided into *primary*

and *secondary*; primary being those which have the tonic or dominant for their bass note; secondary, those which have the second, third, fourth, sixth, and seventh of the scale for their bass. The seventh from the tonic sometimes ascends and sometimes descends. In the former case it is called the suspended leading-note or sub-tonic; in the latter, the chord of the tonic seventh. (125)

SEVENTH, MINOR OR MAJOR: See **INTERVAL**.

SEVEN WORLD ENIGMAS: In the famous speech which Emil du Bois-Reymond delivered in 1880, in the Leibnitz session of the Berlin Academy of Sciences, he distinguished seven world enigmas, which he enumerated as follows:

1. The nature of matter and force.
2. The origin of motion.
3. The origin of life.
4. The (apparently preordained) orderly arrangement of nature.
5. The origin of simple sensation and consciousness.
6. Rational thought, and the origin of the cognate faculty, speech.
7. The question of the will.

Three of these seven enigmas are considered by the orator of the Berlin Academy to be entirely transcendental and insoluble - they are the first, second and fifth; three others (the third, fourth and sixth) he considers to be capable of solution, though extremely difficult; as to the seventh and the last "world enigma", the freedom of the will, which is one of the greatest practical importance, he remains undecided. (121)

SEWING: The continuous welding of thin films or fabrics using ultrasonics. (102)

SEXQUIALTERA: See **SESQUIALTERA**.

SEXTUPLET: A double triplet, six notes to be performed in the time of four. (125)

SHADING OF PIPES: The placing of anything so near the top of an organ pipe as to affect the vibrating column of air which it contains. (125)

SHAKE: An ornament produced by the rapid alternations of two notes, either a tone or semitone apart, as the case may be. (125)

SHARP: (1) The sign # which raises a note one semitone above the normal or natural scale. A note so affected is restored to its normal pitch by the use of a natural sign. In old music sharps were often used to raise notes which had been previously flattened, for which purpose a natural is always used today. (2) An

augmented interval is said by some to be a sharp. In old writers a major third is called a sharp third. (3) Out of tune, by being higher in pitch than is just. (4) Shrill or acute, as sharp mixture, an organ stop. (125)

SHARPS & FLATS: The specific levity of notes increases in proportion to the number of times the ratios are multiplied in order to produce them, going upward by sharps; and their specific gravity increases in proportion to the number of times the ratios are divided in order to produce them, going downward by flats. The knowledge of this is attained when everything is in its perfect order. It is the discovery of the Law of Duality in music which shows the method of applying the ascending and the descending ratios so as to exhibit that perfect order of Nature. (8)

SHIN: The 21st Hebrew letter, Shin (S or Sh), means literally only a tooth, but being the 21st letter in the alphabet and 3 times 7 being regarded by all Kabbalists as an extremely sacred numerical combination, we must look below this surface definition to grasp the esoteric significance of this mysterious letter with which numerous mystical ideas and magical rites have long and frequently been associated. Shin has been engraven upon phylacteries to remind devout Jews of omnipresent Deity. This letter varies somewhat in form. When a dot is placed over the left prong it is rendered Sin, an old Oriental title of the Moon. Exodus tells us of the Wilderness of Sin and while they were still roaming the desert they received the Law of Sinai. (72)

SHORT OCTAVE: In old organs, in order to avoid the expense of large pipes which were not frequently used, only the most important notes between cc and ggg were employed. (125)

SI: The name of the seventh degree of the scale of C. It was first suggested as a solfeggio syllable by Erius Puteanus, or Dodrecht, in 1580, and again by Lemaire, of Paris, about the year 1690. In the scale as divided into hexachords by Guido, the seventh note as the first was called Ut; but the use of solmisation rendered a seventh name necessary. Za and Sa were both suggested at different times, the latter because it was a portion of the first syllable of the word sancte, one of the concluding words of the verse of the hymn which gave the names to the other notes. (125)

SIGHT: "The vibrations needed to produce sight are $\frac{1}{3}$ those for speech and equal to those of hearing." (5681-1) (2) See **SPEECH, TASTE, HEARING, LAWS OF BEING**

SIGNAL: Signal is the electrical waveform representing sound. (103)

SIGNAL ATTENUATION: The reduction in magnitude of a signal without changing the basic characteristics of the signal. Also, the amount of voltage reduction utilized to reduce large electronic signals down to full scale deviation on instruments such as FM tape recorders. This non-dimensional number us

usually in even steps of 0.5, 0.2, and 0.1. Attenuation results from the transmission of vibration energy from one machine part to another (e.g., shaft to bearing housing) and also from signal conditioning circuits for some applications. (100)

SIGNAL CONDITIONER: A device placed between a signal source and a readout instrument to change the signal. Examples: attenuators, preamplifiers, signal converters (for changing one electrical quantity to another, such as volts to amps or analog to digital), and filters. (100)

SIGNAL GAIN: The increase in magnitude of a signal. Also, the amount of voltage amplification utilized to enlarge small electronic signals up to full scale deviation on instruments such as FM tape recorders. This non-dimensional number is usually in even steps of 2, 5, and 10. (100)

SIGNAL RESOLUTION: A measure of the smallest amplitude signal that a system (a filter) can discern and condition to within some specified voltage or as a logarithmic ratio relative to a reference input voltage and impedance.

SIGNAL-TO-NOISE RATIO: Signal-to-noise ratio (sometimes abbreviated S/N) expresses the relative amount of interference with the signal in a sound system or in any one of its components. In the language of electronics, "noise" is any kind of unwanted signal that intrudes into, or interferes with, the desired signal. In high fidelity, noise takes many forms: the rumble of a turntable, the hum of an amplifier, the hiss of a tape recorder, or atmospheric "static" superimposed on a radio signal. Perhaps, the most consistently unappreciated pleasure of high fidelity is that all these forms of noise are held to a minimum by good equipment, and that the music emerges from a silent background. The signal-to-noise ratio is expressed as the loudness difference (in decibels) between the desired signal (usually measured at the equipment's full rated output under test or at some other standard value) and the interfering noise. In amplifiers, for instance, a specification reading "hum and noise -60 db" means that hum and other noises are at a level of 60 db below the desired signal reproduced at a given output level. A rating of -60 db is good - the higher the figure, the lower the noise. The signal-to-noise figures at high-gain inputs (such as tape-head or phono preamplifier) will always be worse than those of lower gain inputs, such as tuner or auxiliary. (103)

SIGNATURE: The signs placed at the commencement of a piece of music. There are two kinds of signature, the time-signature and the key-signature. (125)

SIGNATURE: Term usually applied to the vibration frequency spectrum which is distinctive and special to a particular machine or component, system or subsystem at a specific point in time, under specific machine operating conditions, etc. Used for historical comparison of mechanical condition over the operating life of the machine. (100)

SIGNATURE: Signs placed at the beginning of a composition indicating the key. (69)

SILENCE: A rest. (125)

SILVER: See **GOLD**.

SILVER STRINGS: The covered strings used on violins, tenors, violoncellos, guitars, etc. (125)

SIMICON: A harp with thirty-five strings, known to, and occasionally used by the Greeks. (125)

SIMILAR MOTION: See **MOTION**.

SIMPLE: (1) Not florid; as, *simple counterpoint*. (2) Not developed; as, *simple imitation*. (3) Not exceeding an octave; as, *simple interval*. (4) Containing only one group of notes; as, *simple measure*, *simple time*. (5) Without valves or pistons; as, a *simple tube*. (6) That which cannot be resolved into constituents; as, a *simple tone*. (125)

SIMPLE HARMONIC MOTION: Smooth, regular vibrational motion at a single frequency such as that of a mass supported by a spring. (75)

SINE WAVE: Sounds smooth and pure; has no harmonics. (69)

SINGLE AMPLITUDE: (Obsolete) See **ZERO-TO-PEAK** (100)

SINGLE ROW, DEEP GROOVE BALL BEARING: A rolling element bearing which will sustain both radial and thrust loads at high speed. It is available with seals and shields, so as to exclude dirt and retain runout. (100)

SISTRUM: A rattle used by the ancient Egyptians, the Greeks and Romans. It is not improbable sistrums were known also to the Hebrews, if the word *menaanaim* is correctly traced to a root signifying to "rattle." Its common form was that of a handle surmounted by a loop of metal having cross-bars on which rings were sometimes placed. (125)

SIXIEME: The interval of a sixth. (125)

SIXTEENTH NOTE: A semiquaver, the sixteenth part of a semibreve. (125)

SIXTH, CHORD OF THE: The first inversion of the common chord; it consists of a note with its minor third and minor sixth. (125)

SIXTHS: See **LAWS OF BEING**

SIXTHS: The interval comprised by the first and last of any six notes in a diatonic scale.

The sixth, like the third, of which it is the inversion, is an imperfect consonance. the term "sixth chord" is sometimes used in referring to the six-three

chord. See **AUGMENTED SIXTH, CHORD, INTERVAL.** (21)

SIXTHS, CONNECTIVE: See **THIRDS.** (11)

SKIP: A movement from any one note to another which is at a greater interval than one degree. (125) See **DISJUNCT MOTION.**

SLEW RATE: The specified large signal rate-of-change of output of a filter under specific operating conditions. Expressed in volts/microseconds, a linear approximation of the fastest rate at which a filter output can execute voltage level and even full scale output excursions to within predicted tolerances.

SLIDE: (1) An arrangement in the trumpet and trombone, by means of which the tube can be lengthened so as to generate a new series of harmonics. (2) To slide is to pass from one note to another without any cessation of sound, or distinction between the intervals. (125)

SLOTTED HORN: A horn that, due to its width, must be slotted to reduce vibrations at 90 degrees to the desired plane "Poisson's couplings." (102)

SLOW ROLL SPEED: Low rotative speed at which dynamic motion effects from such forces as imbalance are negligible. Used to measure shaft bow and runout. (100)

SMALL OCTAVE: Also called the lesser octave and is described by the small letters c, d, e. (125) See **SHORT OCTAVE; OCTAVE**

SOFT ROOM: [Acoustics] Room with highly sound absorptive surfaces. (85)

SOL: The note G. (125) See **SOL-FAING**

SOL: The Sun.

SOL-FA: A general name for the notes in music. (125) See **SOL-FAING**

SOL-FAING: A system of singing; a composition in which the names of the notes are employed instead of the words to which it may be set. Formerly only four of the seven names of the notes – Ut, Re, Mi, Fa, Sol, La, Si, were used, namely Mi, Fa, Sol, La. These were applied to every note in the scale, on the principle that it is naturally divided into two halves of similar proportions. In the scale of C, from Fa to Sol and from Sol to La are each a tone apart, and from Mi to Fa only a semitone; all tones in the scale were distinguished by these names for the purpose of Sol-faing. Mi was always used for the leading, or master note. This series, repeated to any extent, was supposed to express all the different tones and semitones in the diatonic scale. (125)

SOLID STATE: Solid state, in electronic parlance, is not a voting pattern but another way of saying

"transistorized." It means that the equipment in question has no tubes (which contain a vacuum), and that its circuits use transistors and semiconductor diodes, which are solid throughout. A semiconductor, by the way, is a type of material that, electrically speaking, is neither fish or fowl. There are a number of these materials, halfway between conductors and insulators, and they are the stuff of which transistors are made of. (103)

SOLID-STATE SUPERLATTICES: Artificially grown semiconductors. (36)

SOLMISATION: See **SOL-FAING.**

SOMNIA: 1) Dreams. 2) The invisible astral influences that one person may exercise over another in his dreams. A person may thus make another person dream what he desires him to perceive; or the astral body of one sleeping person may converse with that of another; or such astral bodies of living persons may be impressed or be made to promise to do certain things after awakening, and they will then keep such promises when they awake. (131)

SON: Sound, tone. (125)

SONG: "...in building of the pyramids, the house of records as well as the chamber in which the records are built in stone--- these were put together by song." (5253-1) (2)

SONITIC: See **SCALE OF FORCES, FRAUNHOFER LINES.**

SONITY: See **SCALE OF FORCES, FRAUNHOFER LINES.**

SONOCHEMISTRY: Sonochemistry began (officially) in 1927 when Richards and Loomis described two types of chemical reactions brought about by ultrasonic waves: (1) the acceleration of conventional reactions, such as the hydrolysis of dimethyl sulphate; and (2) redox processes in aqueous solution, such as the oxidation of sulphite. Reactions of type 1 are of interest in preparative chemistry. Ultrasound has an accelerating effect in many organic syntheses, sometimes less by-products are formed and the yield of the main product is increased, and reactions may be carried out at a lower temperature or lower excess pressure. Reactions of type 2 may play a role in the irradiation of biological important molecules in aqueous media. These reactions often resemble the ones that are initiated by ionizing radiations.

The third type of sonochemical reaction is the degradation of macromolecules in solution. Broholt first described the degradation of biological polymer in 1937. Schmid carried out the first experiments with synthetic polymers. He found that the rate of depolymerization was proportional to the difference, $P - P_f$, between the actual degree of polymerization, P , and the final degree, P_f , which is reached after long-term irradiation. The molecular weight distribution of a

polymer is greatly narrowed down during depolymerization. When a macromolecule is broken in the main chain, free macromolecules are often formed which can be used to initiate the polymerization of a vinyl monomer yielding a block copolymer. The macroradicals can also be detected by their reactions with scavengers, such as diphenylpicryl hydracyl and iodine. Their mutual deactivation reactions have also been investigated.

The fourth type of sonochemical reaction is the decomposition of organic liquids. In 1953 it was found that methanol solutions of diphenylpicryl hydracyl were decolorized, indicating the formation of free radicals. In 1958, the decomposition of chloroform, in which HCl was produced, was reported. Other products that indicated that free radicals and carbenes are present as intermediates were found much later. The next examples were described by Weissler, Pecht, and Anabar, who found that elemental chlorine was formed in the sonolysis of carbon tetrachloride and that various gases, such as N_2 , CH_4 and H_2 , were produced from acetonitrile. Examples of the studies in more recent times are the sonolysis of alkanes, metal carbonyls, nitrobenzene, the sonolytic polymerization of vinyl monomers and the sonolytic decomposition of diphenylpicryl hydracyl in various solvents. Finally, Webster gives a number of chemical processes such as oxidation, hydrolysis and depolymerization that are initiated or accelerated by ultrasound.

Recent investigations of sonochemistry usually use commercial devices producing ultrasound in the 20-40kHz range. The emitting titanium horn is dipped into the liquid to be irradiated. A field of standing waves is not generally formed and the chemical effects occur mainly close to the horn. Intensities of the order of 10-100 W cm^{-2} are often used. (105)

SONOLUMINESCENCE: [PHYS] "Luminescence produced by high-frequency sound waves or photons." (4) See **CHEMILUMINESCENCE**

SONOLUMINESCENCE: [PHYS] When studying the action of ultrasonic waves on the development of photographic plates, Marinesco and Trillat, in 1933, accidentally discovered traces of new latent images in silver halide emulsions on the plates immersed in water. They explained the action as due to the ultrasonic waves accelerating the processes of reduction which are taking place in the sensitive plate by the violent mixing of the reactants, by Frenzel and Schultes, who made similar experiments, believed that the effect was actually due to exposure to light.

Sonoluminescence is always accompanied by cavitation, and can be easily seen by the naked eye in a dark room if glycerine is cavitated by the velocity transformer attached to a 20-W, 20-kHz magnetostriuctive transformer. It appears as a bluish-white light.

Usually the sonoluminescence is so weak that photomultiplier tubes are used to detect it. This led to the discovery that the light appears as discrete flashes

which are periodic with the sound field. Work then proceeded to find out at what phase of the sound field, or volume of the cavitating bubbles, the flashes occurred. The definitive experiment on this was performed by Meyer and Kuttruff in 1959. They produced cavitation bubbles on the end face of a nickel rod magnetostrictively excited at 2.5 kHz. At this frequency the bubbles were large and they used the sonoluminescence flash to produce a voltage pulse which activated a flashlight. The end surface of the nickel rod was thus illuminated, and by delaying the activating pulse by various amounts, a series of photographs showing the life cycle of the cavitation bubbles was obtained. These photographs showed clearly that cavitation bubbles started to appear halfway through the sound period, grew to maximum and collapsed rapidly. The sonoluminescence flash occurred at the end of the collapse. (105) See **LUMINIFEROUS ETHER, LIGHT, NOUS, CHEMILUMINESCENCE**

SONOLYSIS: See **SONOCHEMISTRY**

SONOLYTIC: See **SONOCHEMISTRY**

SONOMETER: An instrument for measuring the vibrations of sounds. (125)

SONOROPHONE: A metal wind instrument of the Bonbardon class. (125)

SONOTHERMIC: See **SCALE OF FORCES, FRAUNHOFER LINES.**

SONOTHERMITY: See **SCALE OF FORCES, FRAUNHOFER LINES.**

SONUS: Sound. (125)

SORCERY: See **MAGIC**

SOUL: "The soul is an individual, individuality, that may grow to be one with, or separate from, the whole." (5749-3) (2)

SOUL SPHERE: See **A'KASA; KAMA LOCA**

SOUND: "Sound is an activity of those things that produce or bring vibrations to activity to be heard, and are communicable to those of the various attunements." (5756-14) (2) See **ACOUSTICS; FORCE-ATOMIC**

"I believe sound to be a real substance of unknown and wonderful tenuity, emanating as absolute corpuscles - interatomic particles - from matter when induced by percussion. Sound has a velocity of 20,000 feet per second in vacuo, in air, 1120 ft. per second. The substance thus disseminated is an actual component of the agitated mass and were this condition to continue indefinitely the mass would eventually be disintegrated. I think the true definition of sound is "a certain order of ætheric flow, consisting of actual radiant atomic corpuscles ruptured from a static condition by disturbance of atomic equilibrium."

"Every gaseous molecule is a resonator sensitive to any and all discordant sounds. Inaudibility is no proof of nonexistence of acoustic force. The ear could not hear the total acoustic force transmitted by 1,000,000,000,000 molecules."

"The molecule contains only harmony - discordance in any mass is only the result of differentiated chords. Any mass so differentiated can be brought into harmony or equated, by the proper chords, be that mass animal matter, vegetable matter or mineral, solid, liquid or gas. Discordance cannot exist in the molecule as a unit. That which we term discord exists in sound itself, not in matter."

"If our hearing were intensified a billion times, we might be able to hear the chord note of aggregate masses, the fundamental monotones of liquids, and gas volumes, the musical notes given off by electric streams and hear the streams of light as they come through a window, as plainly as we now hear the wind in the trees."

"There is still a vast region of the inaudible to be conquered, but the audible has been so conquered in my instruments as to put me in touch with the inaudible. It is now only necessary to ascertain the terrestrial chord masses, and when I have conquered the inaudible I shall be able to control this most subtle force and run sympathetic machinery."

He tested inaudible vibration by means of the magnetic needle and alteration of light frequencies to produce sound colors.

Pythagoras believed and taught that the laws of harmony control the movements of the heavenly bodies. Is it not proof of the wonderful outreach of the mind of this ancient philosopher that it has taken nineteen centuries to even indicate that this is a fact, and not merely a "poetic fancy?"

SOUND: [Acoustics] Sound is a vibrational disturbance, exciting hearing mechanisms, transmitted in a predictable manner determined by the medium through which it propagates. To be audible, the disturbance must fall within the frequency range of 20 to 20,000 Hz. (85)

SOUND ABSORPTION COEFFICIENT (a): [Acoustics] The dimensionless ratio of sound energy absorbed by a given surface to that incident upon the surface. (85)

SOUND BOARD: (1) A piece of fir or other resonant wood placed behind the strings of a piano for the purpose of increasing the power of the sounds. (2) In an organ, the sound board is that chamber of air into which the feet of the pipes are placed. (3) A wood screen placed behind a pulpit for the purpose of reflecting the preacher's voice; or over it, to prevent the sound from ascending into a lantern-tower, or a dome. (125) See **SOUND BOX; RESONANCE BOX**

SOUND BODY: Sound box. (125) See **SOUND BOX; RESONANCE BOX**

SOUND BOX: A chamber for dampening sound emission to an ambient level. (102)

SOUND BY MODIFYING LIGHT FREQUENCIES: "By interposing pure hydrogen between soap films as an accelerating medium a vibrational frequency is induced by the 'enharmonic third' that can only be represented in sound colors and 'cannot be set down in figures.'" Keely invented instruments demonstrating in many variations the colors of sound, and registering the frequency of each variation.

Keely mentions demonstrating by sound colors the following frequencies: The Harmonic thirds, producing molecular frequency of 100,000,000. The Enharmonic sixths, producing molecular frequency of 300,000,000. The diatonic ninths, producing a molecular frequency of 900,000,000. The dominant ætheric sixths, producing a frequency of 8,100,000,000, and the intertheric ninths, producing a frequency of 24,300,000,000 per second.

"By interposing hydrogen gas between soap films of the differential diameters of thirds illuminated by a sunbeam after passing through a prism, and adjusting the spectrum to an 'arch' of three feet, makes a researching instrument for inaudible vibrations. The ideal conditions are: isolated location free from audible sounds, a pedestal nonconductor of sound, set deep in the earth as a base for the instruments, a highly resonating room, and devices for neutralizing all vibrations from the operator. Such an instrument reveals the hidden world of inaudible sounds as the microscope reveals the hidden visible world. The soap films register inaudible vibrations 'deep down' and indicate the frequency or frequencies of simple or compound vibrations by the dissolving and re-dissolving of certain of the colors of the arch. The setting up of the component parts of this researching combination is quite easy in comparison to the difficulty in holding the film. By this means all wave propagations, electro-magnetic or otherwise, can be refracted and their frequency measured, all of these vibrations being 'introductorily subservient' to the luminous æther."

The transmissive sympathetic chord of "B flat third octave" when "passing into inaudibility" would induce "billions of billions" of vibrations, represented by sound colors on a screen illuminated by a solar ray. It is almost impossible to hold hydrogen between the two films long enough. Keely made over 1200 trials before he succeeded in inducing the "intense blue field" necessary. He worked on the experiments four hours daily for six weeks and believed that if he ever could get a film that will stand, he would be able to register the range of motion in all metallic mediums.

The inaudible atomic, ætheric and intertheric vibrations, which control and direct the movements of

the Universe, must of necessity from the magnitude of their results, be the most powerful of all sounds. Gravity is simply transmissive interetheric force under immense vibration.

As well as using the above method for investigating inaudible vibrations by means of sound colors, Keely also tested them by their effect on the magnetic needle.

Concerning the Trexar (the sectional three metal transmitter) he says "It as unerringly indicates the sympathetic vibratory interchange between the earth's neutral center and its envelope, as the magnet indicates the dominant flow."

"After vain attempts to come more closely to what I term a radiophonic vibratory position with microphonic adjustments, I have only been able to reach a few true and standard positions which I can satisfactorily analyze. There is one principle underlying all and this principle is the key." (11)

SOUND COLORS: "Mr. Keely did experiments which enabled him to show on a disk the various colors of sound, each note having its color, and to demonstrate in various ways Mrs. Hughes' own words "that the same laws which develop musical harmonies develop the universe." Chapter 9 of (1)

SOUND COLOURS: Sounds are "communicated" when they are merely conveyed from one sounding body to another, and this can take place in a noise as well as a musical sound. Sounds are "excited" under two circumstances: when a body which is sounding and that to be excited have the same note and the vibration of one produces sympathetic vibration of the other, the bodies are mutually called "reciprocating", while of the vibration of one produces its harmonics in the other, the latter is said, with regard to the exciting body, to be "resonant". According to Helmholtz, "timbre" or "quality" depends on definite combinations or certain secondary sounds or harmonics with a primary or fundamental sound, and such combinations he calls "sound colours". (125)

SOUND, INTENSITY: "The intensity of sound depends on the density of the air in which the sound is generated and not on that of the air in which it is heard. (6) pg 40. "The intensity of sound is proportional to the square of this maximum velocity." page 41 (6) See **AMPLITUDE**

SOUND POWER: [Acoustics] The acoustic power of a sound source, expressed in watts. (85)

SOUND POWER LEVEL (Lw): [Acoustics] The acoustic power radiated from a given sound source as related to a reference power level (typically 10^{-12} watts) and expressed in decibels as:

$$Lw = 10 \log(W/10^{-12}) \text{ dB or} \\ Lw = 10 \log W + 120 \text{ dB}$$

where W = acoustic power in watts. By definition, one watt therefore corresponds to 120 dB for Lw. (85)

SOUND PRESSURE: [Acoustics] Fluctuations in air pressure caused by the presence of sound waves. (85)

SOUND PRESSURE: "If a source of sound that produces the same sound level at all frequencies at a given point in the open air is placed in a room, the sound pressure at the same distance from the source no longer will be constant with frequency but will be much higher at the resonant frequencies of the enclosure." (4) See **POWER OF HARMONICS, RESONANCE, RESONANT AMPLIFICATION**

SOUND PRESSURE LEVEL (Lp): [Acoustics] The ratio, expressed in decibels, of mean square sound pressure to a reference mean square pressure which by convention has been selected to be equal to the assumed threshold of hearing.

$$Lp = 10 \log_{10}(P/P_{ref})^2 = 20 \log(P/P_{ref})$$

where:

Lp = sound pressure level

P = root mean square sound pressure

Reference pressure:

$$P_{ref} = 2 \times 10^{-5} \text{ N/m}^2 = 0.0002 \text{ dynes/cm}^2 =$$

$$0.0002 \text{ microbars} = 20 \text{ micropascals (rms)}$$

(85)

SOUND RECEIVER: [Acoustics] One or more observation points at which sound is evaluated or measured. The effect of sound on an individual receiver is usually evaluated by measurements near the ear or close to the body. (85)

SOUND SOURCE: [Acoustics] Equipment or phenomenon which generate sound. Source room: room containing sound source. (85)

SOUND, VELOCITY: "The velocity of sound is directly proportional to the square root of the elasticity of the air; it is also inversely proportional to the square root of the density of the air. (6) pg 54 See **HARMONICS-RATES-OF**

SOUND WAVES: Sound waves, writes Keely, are only propagated by multiple interferences, and may be expressed as echoes of the introductory impulse of sound itself, made audible to the tympanum by such interferences. (99) See **ACOUSTICS §3.**

SPACE: Q.: In occult chemistry it is given that force was begun in the interstices or bubbles in space and therefore space is the negation of force or matter.

A.: "This is just what is given here, in how these negations are formed in that as is called a bubble or becomes a sphere, in its attractability to the forces as are in formation within our own sphere, see? That's the creation of worlds - that's the creation as is kept in

force, see?" (see **GRAVITATION DIFFERENTIATION**)

Q.: This being so, gravity drawing everything to the center, according to density, there comes a position from without a planet where space and lightest ætheric matter meet - and the planet together with its atmosphere revolve through space. The planet, consisting of all degrees of vibrations - even to the lightest ætheric matter - have no relationship to space. An example somewhat similar on objective plane can be given as to the passage of ætheric matter through what we term as solid substance. Is this theory correct?

A.: "That's the atomic theory! That is the theory as is seen - not theory, but the actual conditions as exist, as has been given and shown here in the activity of how forces build in their radiation without the application of space (as physically known), and how that there is the radiation through the forces as they move about one another." (197-57) (2) See **ATOMIC THEORY, FORCE-ATOMIC, FORCE-RADIAL, ATOMIC RADIATION ANGLE, GRAVITY, GRAVITATION, PRIME NEUTRAL CENTER, IMPULSE-CREATIVE**

SPACE: "The nature of space has long been a question which has defied man's attempts to comprehend it. In the past, men have tried to explain their space in geometric terms, but this has left much unaccounted for and has led to considerable error. The main assumption which needs to be made before space can be understood is that there is something which defines its position with respect to other higher realities. If this fact can be accepted, then all of the various fields, effects, motions and phenomena observed in the real world will fall into place in a single unified scheme.

The substance which defines the space of the real world is a tenuous material with properties of elasticity. Its basic nature allows it to stretch, to contract, to flow as a current of water does, and to carry vibrational wave disturbances. This substance permeates all of the three-dimensional matrix. There is no location in the physical universe which does not contain the substance in one of its many forms.

In the 19th century men speculated that there was a material of this kind extending through all of space, because they could not see how light could be transmitted if not on a medium of some kind. They named this hypothetical medium the æther, and in this book the same designation will be maintained. In essence, the scientists of that century were correct in their assumption, but they did not extend their reasoning far enough to grasp the full significance of this miraculous substance. If they had done so, they would have realized finally that all matter of every form is composed of the æther in one of its states of condensation or expansion, and that every phenomenon observed by man in the real world is accounted for by one or more of the properties of the ætheric matrix. It is the purpose of this chapter to show how the æther is distributed and to discuss some of the properties which allow it to give rise to material manifestation.

Space is not three-dimensional only. The space which man conceives is but part of the totality of creation. It exists within a larger space with a greater number of dimensions. The best analogy that can be made to allow a partial glimpse of the distribution of the æther is that which has been called Flatland. It is possible to imagine a two-dimensional space similar to a thin film or sheet, having extent in two mutually perpendicular directions but having virtually no extent in the third dimension, which would correspond to the thickness. It can also be conceived that this space would support beings within its surface, who would also be only two-dimensional. Such beings could conceive only of objects which in turn were two-dimensional because they would not have any experience of objects with a larger number of dimensions. If we could communicate with a Flatlander, we would not be able to describe, in terms he could appreciate, what a cube or a chair were like.

Let us now suppose that we wish to give the Flatlander a complete universe in his two dimensions. We could extend the flat film which defines his space indefinitely in all directions, but this would not be the neatest way to go about it because there would always remain the question of the free edges and what happens beyond these edges. However, the problem can be solved in another way. The universe of Flatland could be made as the surface of a very large balloon or ball so that space would be of limited area but without a limit in the sense of a free edge. In such a universe the Flatlander could travel as far as he wished in any direction without coming to the "edge" of his space. But it would not be necessary to provide an indefinite amount of the material of his space in order to give him that freedom. The only drawback would be the confusion on his part when, after traveling a certain distance in what he thinks is a straight line, he would end up back where he started from. Even this difficulty can be minimized by making the balloon of his space so large that he is not likely to be able to complete one circuit around its periphery. Another advantage of giving the spatial balloon a very large diameter is that the local space in the Flatlander's immediate area would be virtually flat and would not exhibit any significant curvature. This would mean that the geometric relationships in a localized region of the Flatland universe would remain true in the sense of plane geometry. For example, a triangle set up in the curved Flatland universe would have its three angles sum to almost exactly 180°, with the difference being too small to detect with the Flatlander's instruments. Of course this would give him the impression that his space was not curved, because he could reason that a significant curvature in his space would falsify the triangular relationship.

The skin of the Flatland universe corresponds to the æther of the real universe. The æther is curved upon itself to define a spherical shape as pictured from four dimensions, and this hypersphere has an immense diameter, far beyond the possibility of any physical being to travel even a portion of its girth in the normal lifespan. (22)

SPACES: The intervals between the lines of the stave. The stave consists of five lines and includes four spaces, but notes in spaces between leger lines above and below the stave, are employed. (125) See **STAVE; LEGER LINES**

SPACETIME: See **VACUUM, SPATIOTEMPORAL, VOLTAGE POTENTIAL, ZERO, CHARGE, LEVITATION.** (48)

SPALL: A flake or chip of metal removed from one of the races or from a rolling element of a bearing. Spalling is evidence of serious bearing degradation and may be detected during normal bearing operation by observing increases in the signal amplitude in the high-pass or **FLAW DETECTION** region of a **RE-BAM** system. (100)

SPANDA: Full and perfect-wise. An aspect of **MADHYAMA.** (126)

SPATIAL FILTER: See **COLD TRAP.**

SPATIAL HOLE: See **VACUUM.** (48)

SPATIOTEMPORAL: See **VOLTAGE, VACUUM, ELECTROSTATIC POTENTIAL.** (48)

SPATIUM: A space on the stave. (125) See **STAVE; SPACES**

SPECIFIC-CONDUCTANCE: ($\hat{A}sp$) The specific conductance, or conductivity, of a conductor of electricity is the conductance of the material between opposite sides of a cube, one centimeter in each direction. The unit of specific conductance is ohm-1 or ohm cm-1.

SPECTRAL BOND PRODUCT: See **BOND MASS NUMBER-BOND SPECTRAL ENERGY PRODUCT; EMISSION LINE ENERGY**

SPECTRAL ENERGY: Spectral energy is here used as a generic term for the energy involved in emission phenomena. This energy is what Amaldi calls the electromagnetic forces involved in the electromagnetic interaction. (5) See **EMISSION LINE ENERGY**

SPECTRAL ENERGY DENSITY: Spectral energy density is the total spectral energy of a molecule divided by its molecular weight in grams. It is expressed as kilocalories per gram. (5) See **EMISSION LINE ENERGY**

SPECTRAL ENERGY STRUCTURE: The spectral energy structure of a molecule is the assemblage of emission line energy values of its atoms, one value for each atom of the molecule. These are emission line energies selected from the multiplet sets of previous reference. (5) See **EMISSION LINE ENERGY**

SPECTROGRAPH: Instrument with an entrance slit and dispersing device that uses photography to obtain a record of spectral range. The radiant power passing

through the optical system is integrated over time, and the quantity recorded is a function of radiant energy. (5)

SPECTROMETER, OPTICAL: Instrument with an entrance slit, a dispersing device, and one or more exit slits, with which measurements are made at selected wavelengths within the spectral range or by scanning over the range. The quantity detected is a function of radiant power. (5)

SPECTROMETRY: Branch of physical science treating the measurement of spectra. (5)

SPECTROPHOTOMETER: Spectrometer with associated equipment, so that it furnishes the ratio, or a function of the ratio, of the radiant power of two beams as a function of spectral wavelength. These two beams may be separated in time, space, or both. (5)

SPECTROSCOPY: "When this force, decreasing in vibrations to light and light waves, enters a spectroscopy, they will emerge as colors. Evidence of flames and metals on fire on the sun and stars is in all probability due to ætheric vibrations being broken into color by formation of a natural spectroscopy at the sun or satellite under observation. Pressure of metals on earth could be accounted for by the breaking up of solar rays through formation of natural spectroscopes during formation era of the planet earth." (195-70) (2) See **ELECTROMAGNETIC SPECTRUM, GRAVITATION DIFFERENTIATION, RATE OF VIBRATION, NOUS, MASS, FORCE-RADIAL**

SPECTRUM: [Acoustics] A quantity expressed as a function of frequency, such as sound pressure versus frequency. (85)

SPECTRUM: Presentation of the amplitude of a signal as a function of frequency. (100)

SPECTRUM: A "recipe" that gives the frequency and amplitude of each component of a complex vibration. (75)

SPECTRUM DISPLAY UNIT: An instrument which displays an XY presentation of vibration frequency (X) versus vibration amplitude (Y). This presentation is called a vibration frequency spectrum and is usually presented on a CRT, with hard copy capability, plotter outputs, and/or computer interface connections. Also called spectrum analyzer. (100)

SPECTRUM PLOT: An XY plot where the X axis represents vibration frequency and the Y axis represents vibration amplitude. (100)

SPEECH: "The vibrations needed to produce speech are three times higher than those for hearing or sight. They are the highest in the body." (5681-1) (2) See **TASTE, SIGHT, HEARING, LAWS OF BEING**

SPEED: The rate at which distance is covered; equal to distance divided by time. (75)

SPHERE: "Every time we double the diameter of a spherical structure, we increase its contained atmosphere eightfold and its enclosing surface only fourfold." (35) See **SPACE, NEUTRAL CENTER, CORPUSCLE, PROTOPLASM, PITCH, MUSIC**

All hollow spheres, of certain diameters, represent, as per diameters, and their volumes of molecular mass, pure, unadulterated, sympathetic resonance towards the enharmonic and diatonic thirds of any, and in fact all, concordant sounds. In tubes it is adversely different, requiring a definite number of them so graduated as to represent a conflation by thirds, sixths and ninths, as towards the harmonic scale. When the conditions are established, the acoustic result of this combination, when focalized, represents concordant harmony, as between the chord mass of the instrument to be operated and the chord mass of the tubes of resonance. Therefore the shortest way towards establishing pure concordance, between any number of resonating mediums, is by the position that Nature herself assumes in her multitudinous arrangements of the varied forms and volumes of matter -- the spherical. (Snell Manuscript page 21) See **TUBE RESONATOR, SPHERE, DYNASPHERE, CHORD OF MASS**

SPHERE RESONANCE: "All masses can be resonated by the "compound mechanical devices" which I use for that purpose, which fulfill one general condition - the fundamental laws of sphere resonance. It would seem that the infinite variations of mass chords necessitate an infinite number of different musical scales but this is not the case.

"All hollow spheres of certain diameters are resonant to the enharmonic and diatonic thirds of any and all concordant sounds. Nature gives this effect from her perfect form, the sphere, but not from resonance tubes. The shortest way to pure resonance between any number of resonating mediums is through use of the sphere." (11)

SPHERE ROTATED BY VIBRATIONS: "The great difficulty in constructing a sphere that will revolve when vibrations are applied, is in equating its interior volume, which is altered on insertion of the shaft and accessories, with the chord of mass of the shell itself. The differentiation induced in the interior volume must be equated so as to harmonize with the sphere mass chord. Concordance is established between both through certain conditions of differentiation and in accordance with the laws of harmony."

"If the mass chord of the sphere is B flat, and the internal parts when introduced displace the internal volume $\frac{1}{20}$ th, this $\frac{1}{20}$ th represents an antagonistic $\frac{1}{20}$ th against the concordance of the sphere mass and the internal parts must be so graduated as to get at the same chord an octave or more nearest approaching the concordance of the internal volume. No intermediates between octaves would ever reach sympathetic union."

"For example, we have a spun shell of 12 inches internal diameter and 1.32 inches thick, having an internal volume of 904.77 cubic inches. The resonance of the internal volume is found to be B flat and the mass chord B natural. This, or any other antagonistic chord between the sphere mass chord and the volume resonance, will not interfere, as it will come under subservience."

"A steel shaft $\frac{1}{2}$ inch in diameter is now passed through the center of the shell, displacing a portion of the volume. The volume resonance is now found to be altered so as to be antagonistic to the mass chord. To correct this condition the shaft must be turned or filed until the volume resonance reaches the next lower B flat chord. In so doing we neutralize the first line of interference and the parts are left in the same pure sympathy as at first."

"We now introduce a ring of $\frac{2}{3}$ the diameter of the sphere, fastened by arms to the axis and attach seven adjustable tube resonators, each measuring 3 inches by $\frac{3}{4}$ inches. Each tube is then set on the chord of B flat by adjusting its diaphragm. This arrangement compensates for the total displacement of the ring, tubes and arms, it not being necessary to alter the volume on account of this second operation. This completes the second equation of resonance and displacement."

"One end hemisphere is now painted black and the other white, and a rubber atomizer bulb placed over the end of the shaft next to the dark hemisphere, to prevent equation of vibrational energy by molecular bombardment when the antagonistic vibrations are transmitted."

"All hollow spheres of certain diameters are resonant to the enharmonic and diatonic thirds of any and all concordant sounds. Nature, working with her perfect form, the sphere, gives this effect, but not so with tubes. The shortest way to pure resonance between any number of resonating mediums is through use of the sphere."

"Only two vibratory conditions can be so associated as to excite sympathetic affinity between two physical organisms - the ætheric chord of B flat, third octave - and on ætheric sympathetic transmission the chord of E flat, with 3rd dominant, 6th enharmonic and 9th diatonic, with octave enharmonic."

"The chord of resonance of the sphere was the sympathetic ætheric chord of E flat, 3rd octave, and is highly sensitive to concordance, against the neutral sevenths of the mass chord, whether that concordance be physical or mechanical or the two combined. When the chord of resonance is harmonized with the mass chord, the highest degree of susceptibility is manifested to negative antagonism. Antagonistic chords actually move and accelerate the sphere, demonstrating the perfection of Nature's laws governing the sympathetic flow."

The dark hemisphere, which represents 50% of the full internal area of pure concordant harmony, receives the negative Thirds, Sixths and Ninths, the bombardment of which disturbs the equilibrium of the sphere and induces rotation. The speed of rotation is directly in proportion to, and controlled by, the relative volume of the negative antagonistic chords. Even with no wire transmission of vibrations, an ordinary mouth organ, which is constructed tuned to thirds, will cause the sphere to slowly rotate.

The sympathetic flow is directed to the center by the seven resonators and is redistributed during rotation to keep intact the sympathetic volume and thus prevents equation of forces, which would stop rotation. The discordant thirds are also concentrated by the dark hemisphere on the neutral center, and the interference at the neutral center of the concordants focalized by the white hemisphere and the tubes, and the discordants of the dark hemisphere, cause the inherent property of disturbance of equilibrium in the neutral center to assert itself, causing rotation. This is simply the effort put forth by the neutral center, controlled by the dominant principle, causing redistribution of the chord of resonance and avoidance of the interference nodes.

When receiving concordant sounds the sphere is entirely quiescent, but when discordance is set up within its volume it rejects this repulsive state or condition by rotation.

Under date of 5/20/1885 he writes of an experiment in which he attached a safety arrangement to his Liberator, and also his strongest resonator, and "within two minutes the shell (probably the musical sphere) attained a rotation of 1500 times per minute. I then retracted to the negative and brought it down to 150 revolutions per minute, when two of my safety shells and a vibratory indicator blew up, causing intermission."

Keely never claimed or considered this invention as a source of power. It was constructed simply to prove his theory regarding receptiveness of the neutral center, and through it he came into a fuller understanding of the cause of the earth's rotation, which he concluded arise from the conflict between the positive and negative sympathetic streams, or solar tensions against terrestrial condensations. (11)

SPHERICAL ROLLER THRUST BEARING: A rolling element bearing which has a single row of rollers which roll on a spherical outer race so as to be self-aligning. This bearing is designed to carry high thrust loads in one direction. (100)

SPIKE ENERGY: Energy in the form of short duration vibration acceleration spikes generated from bearing defects or spalls. Similar to shock pulses except the term "spike energy" has been applied more specifically to a bearing evaluation method which uses an accelerometer as the transducer observing spike harmonic energy in the 25 kHz to 35 kHz spectral region. (100)

SPIN: The property of an elementary particle analogous to the rotation of the earth on its axis. (116)

SPIN WAVE: "A sinusoidal variation of that angular momentum which is associated with magnetism (mostly spin momentum of the electrons) is called a spin wave." (4) See **MAGNETISM, PHONON, THEORY-QUANTUM, VORTEX MOTION, ATOMIC THEORY-KEELY'S**

SPINDLE EXPANSION: See **DIFFERENTIATION EXPANSION.** (100)

SPINDLE POSITION: See **AXIAL POSITION.** (100)

SPINOR: [MATH] 1. A vector with two complex components, which undergoes a unitary unimodular transformation when the three-dimensional coordinate system is rotated; it can represent the spin state of a particle spin $1/2$. 2. More generally, a spinor of order (or rank) n is an object with $2n$ components which transform as products of components of n spinors of rank one. 3. A quantity with four components which transform in such a way that if it is a solution of the Dirac equation in the original Lorentz frame it remains a solution of the Dirac equation in the transform frame; it is formed from two spinors (definition 1). Also known as Dirac spinor. (4)

SPIRIT: "Spirit is the vibrating energy which underlies the manifestations of all matter." (Lewis)

SPIRIT: This term is used very indiscriminately, a fact that may cause great confusion. In its true meaning spirit is a unity, a one living universal power, the source of all life; but the word spirit and spirits is also used very often to signify invisible, but nevertheless substantial things – forms, shapes, and essences, elementals and elementaries, shades, ghosts, apparitions, angels, and devils. (131)

SPIRIT: "Mr. Keely affirms, with other philosophers, that there is only one unique substance, and that this substance is the Divine spirit of life, and that this spirit of life is God, who fills everything with his thoughts, disjoining and grouping together these multitudes of thoughts in different bodies called atmospheres, fluids, matters, animal, vegetable, and mineral forms." Bloomfield-Moore; See **PSYCHIC LIBERATION, NEUTRAL CENTER, CHORDS**

SPIRIT: "Spirit is the First Cause, the primary beginning, the motivative influence, - as God is Spirit.

"Spirit is the First Cause. Mind is an effect, or an active force that partakes of spiritual as well as material import. Mind is an essence or a flow between Spirit and that which is made manifest materially.

"God, the First Cause, in spirit, created in spirit the separate influences or forces that are a portion of, and manifested in the spirit of, God. In that essence, to become materially manifested through the evolution of the spirit of God, sin first began.

"The first concept as may be had of that in materiality is that it is an essence, without form, save as it begins to manifest, - as would be gas, odor, wind, smoke, - yet that it has with it the will, the mind, the power to make manifest by that with which, in which, it manifests, - as does also odor, gas, wind and the like.

"Thus - as the activities came - we may assume that the First Cause was Spirit, Mind, Will." (262-123) (2)
See **FIRST CAUSE, NEUTRAL CENTER**

"The spirit is the impelling influence of infinity, or the one active source, force, that is manifest." (5749-3) (2)

SPIRIT ENERGY: "Spirit is a universal essence pervading all nature, even unconscious matter, and manifesting in many ways, such as cohesion, adhesion, etc. It is a Divine, universal, essence-like Soul, but of a lower rate. Spirit essence makes its first material manifestation in the formation of electrons, which enter into the composition of atoms. Soul, as an essence, can manifest only psychically, because of its very high rate of vibration." See **FORCE-SPIRIT, COHESION**

SPIRIT ENERGY: "And when it is realized that that portion in matter that is taken into the body of man from plant life, and from the active forces, is from this very essence (that universal force called Spirit) that the experimentations are to be made upon, how much more effective, how much closer are the experimenters or operators to the very force or vitality in the body to which the experiments are to be carried for an effectual activity in the affairs or in the life of the body or man itself." (440-13) (2)

SPIRIT FORCE: See **VITAL LIFE FORCE, SPIRIT, SPIRIT ENERGY, FORCE-SPIRIT, FORCE-GOD**

SPIRITUAL: Ideal, pure, ethereal. (125)

SPIRITUAL HEALING: See **FORCE-ATOMIC HEALING**

SPIRITUAL SCIENCE: Physical science, of course, is not without its faults or shortcomings but we have in this day and age has been in existence primarily, for the most part, for less than one hundred years. The faction which is missing in the present-day physical science is the acceptance of the spiritual sciences as a workable essential relativity in the life of man. Heretofore, and until the present time, this correlation has been primarily the task of some highly developed clairvoyants or mediums. These things may have been taken into consideration in such spiritual channels as the Spiritualist churches or in such various obscure demonstrations of individuals or groups throughout the world. (117) See **RELIGIOUS SCIENCE; OCCULT SCIENCE**

SPIRITUS ANIMALIS: Astral power, by which the will of the higher principles in man is executed on the sensual and material lane; instincts. (131)

SPIRITUS VITAE: The vital force; a principle taken from the elements of whatever serves as a nutriment, or which may be imparted by "magnetism." (131) See **FORCE, VITAL**

SPOT WELDING: The process of creating small localized bonds between two parts. (102)

SPRING CONSTANT: ("stiffness") The strength of a spring; restoring force divided by displacement. (75)

SPUTTERING: Sputtering is not a new concept; the phenomenon was first described in 1852 by Sir William Robert Grove, who referred to the process as "cathode disintegration."

The first reported commercial application of sputtering did not take place until 1928. Western Electric Company used cathode disintegration for the manufacture of phonograph records and contacts for microphone transmitters.

The process has been refined considerably during the past decade, and its use has been extended to include deposition of dielectric materials. It is widely used in modern industrial production processes for the deposition of dielectric thin films used in microcircuitry. These thin film techniques are rapidly replacing the less controllable vacuum deposition processes used previously.

Application of the sputtering process to the manufacture of strain gage pressure transducers was pioneered by CEC in 1977. This major technological advance still offers outstanding performance advantages over all other methods of strain gage construction to date.

Sputter deposition takes place in a vacuum.

During sputtering or cathode disintegration, molecules of the gage and insulating material are ejected from an electrode held at a negative potential by the impact of positive gas ions bombarding the surface.

The ejected molecules strike the target area with kinetic energy several orders of magnitude greater than any other deposition method. The high energy impact of the molecules creates the superior adherence associated with the sputtering process.

To obtain the necessary ionization, a gas discharge is maintained between the anode and cathode (target). An inert gas (such as argon) is continuously introduced into the vacuum chamber to provide the discharge. The pressure in the chamber is maintained in the range of 10 to 1,000 microns. The spacing between anode and cathode is typically 2 to 3 inches, with a potential between them in the range of 1,000 to 10,000 volts.

In the equilibrium state, an electron is emitted by the cathode and is accelerated toward the anode. The

electron, by collision with the argon molecules, produces positive ions that strike the cathode and eject another electron. The gas ions are accelerated with enough energy that bombardment of the cathode actually physically displaces molecules of material.

The cathode is composed of the material determined to be ideal for the application. Sputtering permits a virtually unlimited choice of gage and substrate materials. These molecules are accelerated toward the anode and impinge upon it with the force of several thousand electron volts, as opposed to simply condensing on the surface.

The basic sputtering process described is called diode sputtering. It can be used for sputtering conductive materials, but cannot be used for dielectrics due to the buildup of a surface charge on the cathode which stops the sputtering process. In order to sputter dielectric materials such as the insulating layer in a thin-film strain gage, RF sputtering is employed.

To produce a sputter deposited strain gage pressure transducer, the metallic surface of each strain diaphragm first must be highly polished. An extreme polish is required since the dielectric substrate layer is deposited as a thin film less than one-half thousandth of an inch thick. Any surface defect would penetrate the thin layer and cause a short of the strain gage elements.

Following the mechanical polish, the pressure diaphragms are arranged in the sputtering chamber and the system is evacuated. The remaining steps of the manufacturing process take place in a vacuum environment, and thus avoid exposure of the sensor elements to contaminants.

The diaphragm surfaces are further cleaned by sputtering-etching a small amount of metal from each active face using a reversed potential. This prepares the surface for the thin insulating layer to be applied by RF sputtering.

Next, the dielectric insulating layer is deposited as a thin film over the entire diaphragm surface. No mechanical masking is needed. After the dielectric insulation has been applied, the first cathode is moved aside and the gage cathode (material source) is positioned. Both sources are present in the chamber throughout the procedure, to accomplish deposition of both layers without exposing the sensors to ambient conditions.

The excellence of performance of a sputtered gage pressure transducer is primarily its stability with time over a broad temperature range.

The gage attachment method eliminates epoxy, solder, or other interface bonding materials; the strain gages exactly follow the strain produced in the pressure diaphragm, precisely reproducing pressure fluctuations. All gage creep, that otherwise might reduce accuracy and stability, is completely eliminated. (20)

SQUARE LAW: [Radio] Contrary to Ohm's Law as voltage is increased, resistance is decreased. (16) pg 497

SQUARE WAVE: Sounds hollow and reedy. Square wave is a special kind of pulse wave. (69)

SROUTIS: The name of the twenty-two parts into which the Hindu scale is divided. (125)

STABILIZATION: "Now, respecting the conditions regarding motor, and motive forces or powers in the activity of that as is set forth, both in that as builded and that as contemplated - while it becomes necessary for the stabilizing of the energy that is created in the active forces of the integration and disintegration of the elements, in the active force of gravitation produced in the motive energy that is to be expanded in motor - it is well that these be changed to meet the needs of such stabilization, and with the ability to control the force and power created. But to change from the chemical activity, that brings the force to act with the expansion in gravitation, would be to defeat the purpose of that as being created. While the drawings, and the constructive force, may carry out the principle in action, there must be that motive power to create the first active force. And this will only act in the way as has been set up.

"Make stabilizing power or element stable, and not to leave out the chemical reaction that must begin the activity from the place of the operating element. When one pulls, the other must pick up, and it must be at the gravitation in its action to create this." (195-61) (2) See **INTRODUCTORY IMPULSE, GRAVITATION DIFFERENTIATION, CHEMICAL GRAVITATION, IMPULSE-CREATIVE, FORCE-ACTIVE, DIS-INTEGRATION, INTEGRATION**

STAFF: See STAVE

STAKING: The process of melting and forming the upper portion of a stud or boss in such a manner as to capture and hold another material, usually metal. (102)

STAND: The unit that houses the converter and horn in a rigid mounting, allowing it to move up and down either mechanically or pneumatically and applying a predetermined pressure on the workpiece. (102)

STANDARD AVERAGE SPECTRAL ENERGY: The standard average spectral energy (SASE) is the average spectral energy of the atoms of the element in its diatonic standard state at 25 deg. C. These are written as "SASE-X" where X is the letter(s) symbol for the element; e.g., "SASE-H" is the standard average spectral energy for hydrogen. (5)

STANDARD PITCH: See PITCH

STANZA: A station or resting place. (1) A series of metrical lines forming a verse or subdivision of a poem. (2) A strophe. (125)

STATE VARIABLE FILTER: Based upon classical differential equation solutions, this technique employs active electronic integrators to realize complex filter functions.

STATIC DATA: Data which contains only information on the amplitude of a signal. It can be expressed as a single value. (100)

STATIC ELECTRICITY: Charge without amps or massless charge. See **SCALAR, SYMPATHETIC OUTREACH**

STATIC TREND PLOT: A plot of static data versus time. (100)

STATISTICAL MECHANICS: See **EQUIPARTITION THEOREM**

STAVE: A term applied to the five horizontal lines in music, upon which the notes or rests are supported. (125)

STEADY-STATE DYNAMIC DATA: Dynamic data which is acquired while the machine is on line, under relatively constant operating conditions (speed, load, etc.). Typical displays include vibration wave forms, shaft orbits, spectrums, dynamic stiffnesses, rotative speeds, amplitudes, and phases. (100)

STEINER ON SVP: Another enigma no less fascinating is that of Rudolph Steiner. Through his series of inspired lectures we are given another wonder filled glimpse of the universe. Again, Steiner's concepts are not necessarily similar to the ones held to by classical physics. He gave a particularly interesting lecture in 1918 summarized and translated below by Mr. Wim A. M. Leys of The Netherlands.

"In the ages to come, humanity will develop three new occult faculties, in the same natural way as it developed her mental faculties in the past. These will be:

1. The material occultism. (Or mechanical occultism.)
2. The hygienic occultism.
3. The eugenic occultism.

These faculties will not be developed by all people in the same degree; in fact they will be found separately in three regions of the earth.

I. The "West-people" of England and North America will develop the material-mechanical occultism. They will be able to create machines, mechanical devices which work with hardly any human effort; which work with the help of the "Laws of Sympathetic Vibrations." These machines will do about 90% of the work, and all the social and material trouble of work as we know it now, will cease to exist.

II. The "Middle-people" of Europe, east of the Rhine and west of Russia, will develop the hygienic

occultism. This is the inborn faculty to heal the bodily and mental diseases. It will be clear to these people that life from birth till death is analog to a slow developing disease, and they will be able to use the life-and-health-giving-forces of their own bodies to overcome the diseases which now still harass mankind.

III. The "East-people" of Russia, India and the Asiatic peoples between, will develop the eugenic occultism. This means they will be able to know by intuition, at which planetary constellation conception, the act of impregnation, the sex-act, will have to be employed to attract the right souls and give them their right bodies. Also it will be known how to attract (or hold back) the wicked souls. Thus the societies of the "East-people" will become gradually better harmonized and more spiritual.

Now the situation will be so that the "West-people" (English and American) will not be able to develop out of themselves or by themselves the two other occult faculties. The "Middle-people" also will only have their faculty, and need the West and the East for the others. And in the same way the "East-people" won't possess the material and the hygienic faculties, only the eugenic.

Now for Mankind to reach it's spiritual goal it is necessary that these separate occult faculties will not separate humanity in three opposing groups. Because for instance if the "West-people" only develop their material-mechanical occultism and keep it for themselves, even use it to oppress the other peoples, and hold them in their (economical) power, the West will become "soulless", bound to the material side of life on this planet.

If the "East-people" will feel hatred for the West, because of the colonial past, and economic dependence, they will become one-sided, and drift away from this earth, so also not developing with her any more. It is therefore extremely important that there will be a close, intimate cooperation between all the peoples of the earth and humanity be able to continue their evolution.

In addition to this it should be held in mind that these three occult faculties belong to the bodies. The difference between them are thus comparable to differentiations and races. The souls are above these differences, and if they realize this above mentioned brotherhood, and not only stick to their own kind, they will pass through incarnations in all the three groups.

Lastly it should be stated that, to realize the progress of the right development of these three faculties in cooperation, it is necessary that over the whole earth religion and science go together. Atheistic, materialistic science and unscientific superstitious religion are a hindrance on the path of evolution, and will obstruct the cooperation of the three occult faculties."

(Translator's Note: Already one can see the intuition

of the North American peoples for their future, in the invention and development of computers and robots. These already do a lot of work for man, though this is not yet the mechanical occultism which is meant above. It is a foreshadowing.)

STEM: The line attached to the head of a note. All notes but the semibreve, or whole note, have stems; quavers and their subdivisions have stems and hooks. (125)

STEP HORN: A horn having a sharp step in cross-sectional area, usually in the nodal region. (102)

STEP JOINT: A joint similar to the butt joint, with the exception of a raised shoulder portion which provides built-in location or alignment. (102)

STEP RESPONSE: The time required for the output of a filter to assume a new value, to within a stated percent of full scale, in response to a step-change of input voltage.

STEREO: Stereo is a method of sound reproduction employing two separate channels to convey a three-dimensional sonic replica of the original performance. Stereo conveys not merely the sounds of the performance, but also a sense of the relative location of the various instruments in the orchestra and of the total acoustic environment in the studio or concert hall. Stereo is not something different from high fidelity, but is a further extension of the art of hi-fi sound reproduction. (103)

STOP: (1) The pressure by the fingers of the strings upon the fingerboard of a stringed instrument. (2) A fret upon a guitar or similar instrument. (3) A collection, register, or row of pipes in an organ. (125)

STOPBAND: All frequencies outside the passband at which attenuation exceeds a specified amount of dB. Usually bounded by upper and/or lower 3dB frequency.

STOPBAND ATTENUATION: Specifies the minimum amount of attenuation a filter will exhibit at a designated frequency or set of frequencies which lie outside the passband. Monotonic rolloff rates should be specified if required.

STOPPER: The plug inserted in the top of an organ pipe, in order to "close" it. (125)

STOPPING POWER: The rate at which the moving electron loses energy is one quantity that is precisely known, at least for electrons of energy exceeding a few hundred electron volts. It is usually expressed as the amount [of energy] lost per unit distance traveled and may be denoted by $-dE/dx$. This quantity is called *stopping power* by physicists, and *linear energy transfer* or LET by radiobiologists. (115) **See also HARMONIZATION, SYMPATHIZATION.**

STOPPLES: Plugs inserted in some of the ventages

of the flute in order to accommodate its scale to some particular mode. (125)

STORAGE RINGS: Devices in which accelerated particles are kept moving in circles by magnetic fields. (116)

STRAIGHT LINE: "The course of this sympathetic flow is governed by the full harmonic chord; and, consequently, moves in straight lines; thus transmitting its sympathy free of molecular interferences." **See FULL HARMONIC CHORD, MAGNETIC FLOW, TERRESTRIAL FLOWS.**

STRAIN GAUGE: A transducer which reacts to changes in strain, typically through changes in resistance. (100)

STRANGENESS: The property of elementary particles that governs the speed at which they decay. (116)

STREAM: **See TRIUNE STREAM, LAWS OF BEING**

STRESS: A force acting on a body (e.g., shaft) per unit area. Usually measured in terms of lbs./in.² or Newton/meter². (100)

STRIA: [[pl.]] STRIAE, [LATIN, a furrow, channel, flute.] A slight furrow or ridge; a linear marking; a narrow stripe or streak, as of color or texture, esp. one of a number in parallel arrangement. (47)

STRIA: [BIOL] A minute line, band, groove, or channel. (4)

STRIATION: [ELECTR] A succession of alternately luminous and dark regions sometimes observed in the positive column of a glow-discharge tube near the anode. (4)

STRIATION TECHNIQUE: [ACOUS] A technique for making sound waves visible by using their ability to refract light waves. (4)

STRIKING REED: A percussion reed. (125) **See REED**

STRING: Prepared wire or catgut, plain or covered, used for musical instruments. Strings of steel or brass wire are used for all instruments which are struck with hammers or plectra, as dulcimers, pianos, etc. Violin strings are made of catgut, each string being of a different thickness according to the tone and tension required, the fourth string being covered with a fine wire either of silver or white metal; hence it is called the silver string. (125) **See SILVER STRING**

STRING GAUGE: A small instrument for measuring the thickness of strings for violins, guitars, etc., consisting of a disk or an oblong piece of metal, with a graduated slit and engraved table. (125)

STROBOSCOPE: A light that flashes at a regular

rate, making possible a photographic record of motion. (75)

STRONG FORCE INTERACTION: The force or interaction responsible for holding the nucleus together. (116) See **NEGATIVE ATTRACTION**

STRUCTURE BORNE NOISE: [Acoustics] Generation and propagation of time dependent motions and forces in solid materials which result in unwanted radiated sound. (85)

STYLUS: Stylus is the modern term for what used to be called needle in old-style phonographs. Unlike the short-lived steel needles used with old 78-rpm records, the modern diamond-tipped stylus is precision-ground and flexibly suspended so that it easily follows the contours of the record groove without damaging the disc or distorting the sound. (103) See **CARTRIDGE, COMPLIANCE, MIL.**

SUBCONSCIOUS MIND: See **MIND**

SUBDIAPENTE: The fifth below or the fourth above any keynote. (125)

SUBDOMINANT: The fifth below or the fourth above any keynote. (125)

SUBDOMINANT: See **POWER**

SUBDUPE PROPORTION: See **PROPORTION**

SUBHARMONIC: Sinusoidal component(s) of a vibration signal that is a submultiple (integer fraction) of a fundamental frequency. Harmonics generated from a fundamental below the fundamental. (100)

SUBMEDIANT: The sixth of the scale. (125)

SUBOCTAVE: A coupler in the organ which pulls down keys one octave below those which are struck. (125)

SUBSEMIFUSA: A demisemiquaver. (125)

SUBSEMITONE: See **LEADING TONE; TONIC**

SUB-SEQUIOCTAVE: The relationship of 8 to 9, the inverse of the sesquioctave relationship 9 to 8. (81)

SUB-SESQUIPARTIAL: The inverse of the sesquipartial relationship. (81)

SUB-SESQUIQUARTAN: The relationship of 4 to 5, the inverse of the sesquiquartan relationship 5 to 4. (81)

SUBSONIC: Below human hearing range; usually lower than 20 Hz. (69)

SUBSTANCE, THE SEVEN FORMS OF: There are seven and seven only, possible forms of sub-

stance, and these forms arise from the natural ratio in a sympathetic flow of $1 : 2 : 3$ ∴. The neutral center "0" is the primal form of all the others. These are $1 \times 2 \times 3 = 6 + 1 = 7$.

- 1: Molecular
- 2: Intermolecular
- 3: Atomic
- 4: Interatomic
- 5: Etheric
- 6: Interetheric
- 7: Compound Interetheric
- 8: Neutral Center (11) See **MATTER; LAW OF BEING**

All the seven subdivisions of substance are subject to the laws of gravity, neutral attraction, centripetal force, centrifugal force, etc. and none are imponderable. Solids, liquids, gases and all the subdivisions alike have this property, although in different degree. (11)

SUBSYNCHRONOUS: Component(s) of a vibration signal which has a frequency less than shaft rotational frequency. (100)

SUBTONIC: The leading note. Master note, the semitone below the tonic. (125)

SUBTRACTIVE SYNTHESIS: Filtering out certain frequencies to create new sounds. (69)

SUCCESSION: (1) The order in which the notes of a melody proceed. There are two sorts of succession, regular or conjoint, and disjunct. A regular or conjoint succession is that in which the notes succeed each other in the order of the scale to which they belong, either ascending or descending. In a disjunct succession the melody is formed of intervals greater than a second. (2) A sequence is sometimes spoken of as a succession, and passages of similar chords or progressions are described as a succession of thirds, fourths, fifths, sixths, sevenths or octaves, as the case may be. (125)

SUCCUBUS: See **INCUBUS**

SUDDEN MODULATION: See **MODULATION**

SUMMATION OF IDENTICAL SOUND SOURCES: [Acoustics] The total sound level generated by N identical sound sources. (85)

SUMMATION TONES: Summation tones are negative or Enharmonic while Difference tones are positive and the Dominant.

The negative half of a chord. Summation tones occur simultaneously with Difference Tones but are lower in power and have a "negative" connotation, or discordant quality. See **LAW of SUPERPOSITION, DIFFERENCE TONES, BEATS, LAW OF THE TRIANGLE (DALTON), HARMONIES OF TONES & COLORS, OVERTONES** see especially **RESULTANT TONES; ACOUSTICS §19.**

SUN: Q.: What argument would be most conclusive to prove that sun is not hot at surface? **A.:** "The breaking up of the rays, just as has been described, in that it takes BACK as well as gives off, being both positive and negative." (195-70) (2) See **SUN-CORONA, POSITIVE, NEGATIVE, SPECTROSCOPY, HEAT, LIGHT, CELESTIAL, VACUUM**

"See the immediate center of our solar system. Thou wouldst call it a dynamo, the great dynamo of the system. Right wouldst thou be, and wrong also. The attempt to define the sun as an analogue to a dynamo-electric machine has much to support it. But to define it as identical is erroneous. The trouble with that theory is the trouble which lies at the root of and weakens all other theories to account for sun-heat and sunlight. It is that science does not assign a sufficiently high value to the sun. The combustion theory is invalid; the solar mass contradiction theory is but partially tenable and meteoric showers do not account better than the first two. Neither does the electric-dynamo theory. Truly, the latter explains how sun-heat and sunlight may coexist and not be inharmonious with the awful degree of cold between earth, the planets and the sun. It explains that which denies the simple combustion theory so completely, viz. that the farther one goes from the earth center, either in a balloon or on a high mountain, the colder and colder the air gets, so that interstellar space is several hundred degrees below zero, and black as midnight, with the sun a luminous disc, without rays. But the dynamo theory does not explain the solar spectrum, nor the bands of spectra, nor coronal "flames," nor "sun spots," nor solar nor lunar eclipses."

"I have said that the value accorded by astronomers is too small. Seeing fire, they would seek to explain by its means the sun. Finding this untenable, and aware that a contracting mass gives off heat, they next essay explanation on that hypothesis. But this will not do, nor will meteoric showers, nor any hypothesis based on facts now known, all are too low in aim; the Infinite cannot be explained by the finite, nor will less explain greater; fire is energy, and electricity is energy, and God is energy. But fire will not solve the query, "What is electricity?" nor will electricity answer "What is God?" but God will explain both the others, for the sum of the parts is equal to the whole. But as man does not know the full number of the parts, the partial sum he does know will not explain God."

"Nature has a dual aspect, is double, is positive and negative; that the great positive side is the side known as mundane science, while the other or negative, or "Night-Side," or, as it was once known in the earth by the men of Atla (Atlantis), "Navaz," is a side all unknown, and scarcely questioned in the most exceeding flights of speculation, left unbroached, secretly kept by a few, who know not that they entertain an angel, an angelic wisdom that in a century more, yea, less time! shall overturn much of the face of terrain things, shall bestow aerial vessels, and all else once known to those men of Atla of whom I spoke."

"The suns of systems are centers of forces of the Night Side of Nature whereof I spoke, and are force, and matter of a higher value than are planets and satellites, just as water above a cataract is water, truly, but being above and mobile, flows over and down, developing energy. In other words, out of the cold, dark, negative side, or "Night Side," force emerges, drawn to the positive polarity which constitutes in its outgoing flow that termed Nature, and develops in its fall, magnetism, electricity, light, color, heat and sound, in order of descent, and lastly solid matter, for this latter is a child of energy, not its parent. When the Navaz forces drop to light, if the light waves enter a spectroscope, they will emerge as colors; these will correspond to the various spectrum bands, and will, as the descend progresses, give the noted lines of the solar spectrum, as the great "B" line of oxygen, the conspicuous "1474" line, and the brilliant "H" and "K" violet bands."

"Thus the evidence of flames, and metals on fire, and all that leads astronomers to think sun and stars flaming hells. But their "fires" will not decrease, for the Father is immanent, and the forces of "Navaz" are perpetually fed by Him. The graphic picture of a burned-out sun is a dream, never to be fulfilled. A day will come again in the earth when instruments will be made which Atlantis once well knew, when the prismatic rays from a spectroscope will be found to be a source of heat, and of sound, so that the so-called "flames" of the sun, and of the stars will produce music, harmonious divine. Yea, further, for going down, the dark green solar spectrum of iron will be made to yield iron for use in the arts, and so with the other bands and lines, the intense greens, blues, and blue-greens give copper, lead, antimony and so on. It is by these Navaz currents that the circulation in the universe is kept up, as blood in a man's arteries. The suns are the systemic hearts. But thou art tired, my brother, or I would explain yet more, that the planets which receive all these currents must return their equivalent. And thus would another vast field open before thy sight. This last would explain that which so worries science on earth, the molten terrain interior. That also is something of an error. All the phenomena which seem to declare the earth to be in a melted condition inside do not prove it so in truth; all point to the return currents, the positive; all exhibit the venous currents of our universe, back to its hearts." (24) See **ONE SUBSTANCE**, see also **SUN & HEAT** below for Cayce's explanation describing the sun as the heart of the solar system.

SUN CORONA: Q.: What could be given as cause for appearance of corona of sun? **A.:** "Just as has been explained (see **SUN**), in that the forces as are thrown off by the various activities of the forces in all - that is, the planets, the stars, and those about it that are thrown off from same in their active principle, as draws to and throws off at the same time - these may be seen as the forces which produce or cause the various effects as seen." (195-70) (2) See **FORCE-RADIAL, DIFFERENTIATION, POSITIVE, NEGATIVE, LAW OF ASSIMILATION, LAW OF OCTAVE, HEAT, SPECTROSCOPY, CELESTIAL**

SUN & HEART: "The heart in the human body may be compared to the sun of a solar system. Then by analogy the sun is the center of forces of the solar system. Similarly to the blood flowing from the heart through the arterial system, Force emerges from the sun drawn to the opposite polarity of the planets and in this outgoing flow it would be possible to develop magnetism, electricity, light, color, heat, sound, and lastly matter, in the order of lessening dynamic degrees of vibration. Matter then would be the offspring of energy and not the parent, as is often thought." (195-70) (2) See **SUN, RATE OF VIBRATION, ELECTROMAGNETIC SPECTRUM, NOUS, DIFFERENTIATION, FORCE-RADIAL, SPECTROSCOPY**

SUN STONE: Cordeirite; Crystal turns from yellow to dark blue when natural molecular alignment is set at right angles to plane of polarized sunlight. See (33)

SUPER: Above, over. *Superdominant*, the note next above the dominant. The sixth of the scale. *Supertonic*, the second of the scale. (125)

SUPERFLUOUS INTERVALS: Those intervals greater by a semitone than major or perfect. (125) See **INTERVAL**

SUPERHARMONIC: Sinusoidal component(s) of a vibration signal that is an integer multiple of a fundamental frequency. (100)

SUPERPARTIAL: See **SESQUIPARTIAL**. (81)

SUPERSYNCHRONOUS: Component(s) of a vibration signal which has a frequency greater than shaft rotative frequency. (100)

SUPPOSED BASS: A term applied to any bass note forming one of the inversions of a chord, in contradistinction to the real bass or generator. (125)

SUPPRESSION: The practice of using electronic circuitry to arithmetically subtract (suppress) the amplitude of an unwanted signal (noise). It is not recommended for vibration measurement and/or monitoring because most noise sources are vector, not scalar quantities. (100)

SURFACE VIBRATIONS: Raleigh vibrations. See **ACOUSTICS §14; LONGITUDINAL VIBRATIONS; SURFACE VIBRATIONS; TRANSVERSE VIBRATIONS; TRIUNE POLAR STREAM; VORTEX**

SUSAMA: Symmetrical. See **PRANA, SANKALPA**. (126)

SUSPENSION: The holding or prolongation of a note in any chord into the chord which follows, thereby often producing a discord. (125)

SUSTAIN: In synthesis, describes the level of the held part of a note in relation to the attack. (69)

SUSTAINED NOTE: A name given to prolonged notes which partake of the character of a pedal-point

by their immunity from ordinary harmonic rules, but which cannot with propriety be called pedal-points owing to their occurrence in the middle or upper part. (125)

SWAGING: A forming of plastic material, which serves to capture and hold another part. (102)

SWEEP FREQUENCY FILTER: A typical band-pass filter which is automatically swept (tuned) through a frequency range of interest. An instrument which incorporates this type of filter can be used to generate a vibration frequency spectrum as long as the frequency content of the measured signal remains constant throughout the time required to sweep through the frequency range. (100)

SWIRL RATIO: A dimensionless ratio of the average rate of rotation of a liquid or gas (in a bearing or seal clearance) or in rotor-to-stator periphery in direction of rotation divided by rotative speed. (100)

SYLPHES: Elementals residing in forests; the Dusii of St. Augustine; fauns. (131)

SYLPHS: See **NENUFARENI**

SYMPATHETIC ACOUSTIC IMPULSE: See **THIRDS**. (11)

SYMPATHETIC ASSOCIATION: See **SYMPATHETIC FLOW, MOLECULAR DISSOCIATION, LAWS OF BEING**

SYMPATHETIC CONCORDANCE: When two things are of the same coincident activity, or the same "notes" or "harmonics" there of but on different octaves, they may be said to be in Sympathetic Concordance. Also **SYNCHRONICITY**. See **COINCIDENT ACTION, HARMONY, RULING MEDIUM, DOMINANT, LAWS OF BEING**

SYMPATHETIC CONCORDANT: "Pure sympathetic concordants are as antagonistic to negative discordants as the negative is to the positive; but the vast volume the sympathetic holds over the non-sympathetic, in ethereal space, makes it at once the ruling medium and re-adjuster of all opposing conditions if properly brought to bear upon them." Chapter 7 of (1) See **SYMPATHETIC CONCORDANCE**

SYMPATHETIC FLOW: "The sympathetic flow is not electric or magnetic (as we understand them), but the ætheric sends its currents along our nerves; that the same influence (sympathetic association) holds true with solids, liquids & gases, and embraces all the kingdoms, animal, vegetable and mineral, that the only true medium existing in nature is the sympathetic flow, that the sympathetic flows from the brain comes on the order of the fifth and seventh positions of the atomic subdivision." (Keely)

"If metallic mediums are brought under the influence of this sympathetic flow they become organisms to carry the same influence with them." (Keely) See

DIFFERENTIATION, SCALAR, POLARITY, SYMPATHETIC OUTREACH

SYMPATHETIC INDUCTION: A cord in vibration tends to induce in another cord placed near it, a vibration of corresponding frequency, whether or not the receptor corresponds in frequency to the generator. This property, called "sympathetic induction" belongs to all vibrating mediums and the "order" or "degree" of sympathetic induction" is directly as the resonance of the receptor. "Sympathetic induction" is simply "forced vibrations."

By use of the dominant mode, which is allied to the "order" of ætheric vibrations, we can induct, "sympathetic negative attraction" or "sympathetic positive propulsion" in any mass, according to its mass chord. (11)

SYMPATHETIC NEGATIVE ATTRACTION:

"Is the same as cohesion (qv): it is not the resultant of electrical sympathization, but it includes the full triune flow; the dominant being the leader and associate of the celestial. The sympathetic outreach, of negative attraction, is the power that holds the planetary masses in their orbital ranges of oscillatory action. It is born of the celestial and reaches from planet to planet. Magnetism has no outreach." page 279 of (1) See **MAGNETISM, SYMPATHETIC OUTREACH, COHESION, NEGATIVE ATTRACTION, POSITIVE ATTRACTION, LAWS OF BEING**

SYMPATHETIC NEGATIVE INTERFERENCE:

"The order of vibration associated with the transmission of odor acts by sympathetic negative interference; and, consequently, moves in circles, with a velocity of 220,000 per second, at least." (Keely) See **VIBRATORY MODES, CIRCLE, MOLECULAR DISSOCIATION**

SYMPATHETIC OUTREACH: "Sympathetic outreach is not induction. They are quite foreign to each other in principle. Sympathetic outreach is the seeking for concordance to establish an equation on the sympathetic disturbance of equilibrium. Moon to earth, magnet to keeper.

"In metals, the latent force, when excited, extends its range of neutral sympathetic attraction without corpuscular rupture, and reaches out as it were to link itself with the harmonic sympathizer, as long as its exciter is kept in action. When its exciter is dissociated, its outreach nestles back again into the corpuscular embrace of the molecular mass that has been acted upon." (1) pg 302 See **NEUTRAL SYMPATHETIC ATTRACTION, DISINTEGRATION, NEGATIVE ATTRACTION, FIRST CAUSE, GRAVITY, GRAVITATION, MAGNETISM, COHESION, LAWS OF BEING**

SYMPATHETIC NEGATIVE ATTRACTION:

"Sympathetic negative attraction is not the resultant of electrical sympathization, but it includes the full triune flow, the dominant being the leader and associate of the celestial. The sympathetic outreach of negative attraction is the power that holds the plane-

tary masses in their orbital ranges of oscillatory action. Magnetism has no outreach, but it pervades all terrestrial masses, all planetary masses. It is highly electrical in its character, in fact, magnetism is born of electricity, whereas negative attraction is not, but it has a sympathetic outreach for magnetism. Magnetism is static. Sympathetic negative attraction reaches from planet to planet, but electricity does not, nor does magnetism. Sympathetic negative attraction is born of the celestial, and impregnates every mass that floats in space, seeking out all magnetic or electric conditions, and all these masses are subservient to celestial outreach. All the magnets in the world could not induce rotation, no matter how differentiated, but polar negative attraction induces rotation." (11)

SYMPATHETIC NEGATIVE POLAR STREAM: The same as **GRAVITY**; See **MOLECULAR DISSOCIATION**

SYMPATHETIC NEGATIVE TRANSMITTER:

"Keely had shown him (Professor W. Lasselles Scott) a peculiar apparatus, which he called a 'sympathetic negative transmitter.' It had been taken all to pieces for his benefit and put back together again. Imagine a globe in which is a vibrating disk, which Keely calls a 'cladna;' also, a series of tubes which, under certain circumstances, act like small organ pipes. Professor Scott said he could get from Keely no connected account which satisfied his English sense as to what these were but he found that a sensitive ear or hand could appreciate the responsive vibrations from these pipes and the apparatus appeared to be regulated upon something like a definite order or plan. For instance, he discovered that the sympathetic transmitter was sensitive to what is known as B flat, D natural and F and that it was also apparently sensitive to the notes D, F sharp and A. By questioning Keely he found that he regarded the first three notes and their combinations as having a tendency in one direction, which he called a polar force, and the other three notes a tendency in an opposition direction, which he called a depolar force." Public Ledger, Philadelphia, April 16, 1896

SYMPATHETIC NEUTRAL AFFINITY: "I hold that the sympathetic neutral flow which exists in this remote region is the latent power that, under the disintegration of water, is liberated, showing immense volume and infinite pressure. The same condition of latent power exists in metallic masses and paradoxical as it may seem, exerts its force, under the proper exciter, only in a negative attractive way, while in water in a positive one. In minerals under liberation this latent power seeks its medium of tenuous equilibrium, leaving behind an impalpable dust, that represents molecular dissociation.

In order to get at the conditions which govern and give introductory impulses to that peculiar force which acts on the sympathetic medium that associates matter with matter, inducing magnetic antagonisms, it will be necessary to explain the triune conditions that govern sympathetic streams, as also the triune conditions of corpuscular association.

All forces in nature are mind forces; magnetic, electric, galvanic, acoustic, solar, are all governed by the triune streams of celestial infinity, as also the molecular, intermolecular, atomic and interatomic. The remote depths of all their acoustic centers become subservient to the third, sixth and ninth position of the diatonic, harmonic and enharmonic chords, which when resonantly induced, concentrate concordant harmony, by reducing their range of corpuscular motion, drawing them as if towards each other's neutral center of attractive infinity.

The sympathetic acoustic exciters, or impulses are: 1st, the third diatonic, 2nd, the harmonic sixths neutralizing affinity, 3rd, the enharmonic ninths, positive acceleration, which induces infinite trajectory velocity from neutral centers, in other words, neutral radiation.

Every molecule in nature represents, without variation, the same chord. Variations that show up in the mass chord of different visible aggregations, are accounted for by the non-uniformity of their molecular groupings. If all were molecularly homogeneous, the chord masses of all structures would be perfectly alike in their resonant impulses." (11) **See CHORD OF MASS**

SYMPATHETIC NEUTRAL FLOW: "I hold that the sympathetic neutral flow which exists in this remote region is the latent power that, under the disintegration of water, is liberated; showing immense volume and infinite pressure. The same condition of latent power exists in metallic masses and, paradoxical as it may seem, exerts its force, under the proper exciter, only in a negative attractive way, while in water in a positive one. In minerals under liberation this latent power seeks its medium of tenuous equilibrium, leaving behind an impalpable dust, that represents molecular dissociation." (Keely) **See MOLECULAR DISSOCIATION**

SYMPATHETIC OUTREACH: Sympathetic outreach is an inherent attribute of all matter, arising from the sympathetic radiating and incoming flows from and towards the neutral center. "Seeking of external concordance to equate or establish the balance of internally disturbed equilibrium in the neutral center, constitutes sympathetic outreach." The sympathetic flow is simply the medium through which the sympathetic outreach works. There are several varieties of sympathetic flows.

Sympathetic outreach is not induction. They are quite foreign to each other in principle. Sympathetic outreach is the seeking for concordance to establish an equation on the sympathetic disturbance of equilibrium. When a magnet is brought into contact with a keeper, there is no induction of magnetism from the magnet into the keeper. The static force of the magnet remains unchanged, and the action between the two may be compared to a sympathetic outreach of a very limited range of motion. The sympathetic outreach of the moon towards the earth, has a power

strong enough to extend nearly a quarter of a million of miles to lift the oceans out of their beds. This is not the power of induction.

The sympathetic envelope of our earth owes its volume and its activity entirely to celestial radiating forces. Reception and dispersion are kept up by atomic and interatomic conflict, as between the dominant and the enharmonic.

Silver represents the 3rd, gold the 6th, and platina the 9th, in their links of association, one to the other, in the molecular range of their motions, when submitted to vibratory impulses.

If an introductory impulse, representing the sympathetic chord of transmission say B flat, or any other chord, be given to a sectional transmitting wire, the molecular triple, that is carried sympathetically along the path of such transmitter by the differentiation induced, excites high sympathy with the polar terrestrial stream. The polar terrestrial, being triune in its character, requires a triune sympathizer to meet its differential requirements: silver the harmonic, gold the enharmonic, and platinum the dominant. When this triple metallic condition is properly sensitized, by any chord on the dominant, combined, molecular, differentiated action is induced, showing a condition approaching magnetism in its development of related sympathy, without having the conditions that are truly magnetic as this term (magnetic) is understood by all physicists.

Magnetism is not polar negative attraction, any more than polar negative attraction is magnetism, for polar negative attraction shows positive sympathetic outreach, of a high order, which is a condition entirely foreign to magnetism.

Sympathetic negative attraction is not the resultant of electrical sympathization, but it includes the full triune flow, the dominant being the leader and associate of the celestial. The sympathetic outreach of negative attraction is the power that holds the planetary masses in their orbital ranges of oscillatory action. Magnetism has no outreach, but it pervades all terrestrial masses, all planetary masses. It is highly electrical in its character, in fact, magnetism is born of electricity, whereas negative attraction is not, but it has a sympathetic outreach for magnetism. Magnetism is static. Sympathetic negative attraction reaches from planet to planet, but electricity does not, nor does magnetism. Sympathetic negative attraction is born of the celestial, and impregnates every mass that floats in space, seeking out all magnetic or electric conditions, and all these masses are subservient to celestial outreach. All the magnets in the world could not induce rotation, no matter how differentiated, but polar negative attraction induces rotation. (11)

SYMPATHETIC POLAR WAVE: **See ELECTRICITY**

SYMPATHETIC REACTIONS, HEALING:

"Through the activities of the jejunum, colon, the alimentary canal, the organs of the pelvis and the activity of these, - these we find in SYMPATHETIC reaction to all of the disturbances." (1771-1) (2) See SYMPATHETIC VIBRATIONS-HEALING

SYMPATHETIC STREAMS: Sympathetic streams are the highest attribute of matter of the physical Universe. The origin of all these streams or sympathetic flows is the "Center of the vast realm of the compound luminous." From the "Celestial Intermediate" that is, the stellar aggregates composing the "Brain of Deity" proceed the sympathetic flows that give vitality to the polar terrestrial flows, in other words, to all the earth currents.

The sympathetic stream from the sun to earth, by its positive and negative interchange with the earth's neutral center, keeps intact the magnetic force in the "polar envelope" making this "polar envelope" a great magnet of itself.

All Nature's forces are MIND FORCES governed by the triune streams of celestial affinity (attraction for exterior centers). Each neutral center responds to the triple thirds by alteration or corpuscular motion. Sympathetic streams are only modifications of the ONE FORCE in Nature, each stream being of a triune nature, i.e., consisting of triple flows, the intensity of each being in a certain harmonic ratio. The flow in the terrestrial envelope is controlled by the dominant as shown by the static position which the magnetic needle assumes. The harmonic and enharmonic portions of the magnetic flow are here, obliged to coordinate themselves to the controlling dominant.

The substance which acts as the governing medium for a magnetic or sympathetic flow is of such tenuity that odor particles, which exist in the atomic subdivision, are crude in comparison. The tenuity of the medium of the sympathetic flows, or of the magnetic flow, comes to and above that of sound.

An explanation is necessary of the triune laws governing the propagation and transmission of the triune sympathetic streams, and the triune conditions governing "corpuscular aggregation" before we can understand the response by inducted "magnetic antagonism" of that sympathetic medium which interconnects all matter. Otherwise we cannot understand the laws governing the propagation and transmission of the disintegratory vibrations.

"All sympathetic streams are triple, whether cerebellic, gravital, magnetic or electric and are the governing agents of all "celestial" and "terrestrial" orders of positive radiation and negative attraction. There is no flow of gravity, which should instead be spoken of as "triple connective links" as its transmission is instantaneous.

"The power and velocity of the sympathetic streams as they focalize towards the neutral center

and the propagation from the neutral center of its sympathetic outreach by means of these streams, exceeds by thousands of times the power of our highest explosives. An atmospheric stream moving with the velocity of these sympathetic streams would atomize a steel warship. As these streams come from celestial space they come in contact with the earth's dense atmospheric envelope and by their infinite velocities and inreach for the neutral centers, wrest from atomic confinement those latent energies we call heat and light."

"The relative frequency of all sympathetic streams is in the ratio 3:6:9. Those whose relative frequencies are 3:9 are mutually attractive, while those having the relation of 6:9 are mutually repellant."

"I do not recognize light and heat as coming from the sun, for I have found both to be the emanations from atomic and inter-atomic interference when molecular vibration is induced by the "celestial attractive" (dominant) through the medium of sympathetic ætheric vibration. Physicists have not taken into consideration the sympathetic evolutions of Nature. They have been working in the wrong direction. I see nothing phenomenal in my explanation or theory, it only seems phenomenal to them from their theoretical view point of mechanical physics."

"The attractive vibration of the solar sympathetic flow is "coincident to" and diverts, the terrestrial magnetic sympathetic flow. This force is the "celestial current" (dominant) the prime third of the triune electric flow. This "celestial current" induces "aqueous disintegration" and "thermal concentration" which "two prime conductors" display a "coincident sympathetic chord" with the "celestial current". "Aqueous disintegration" and "thermal concentration" are the link with the celestial (ætheric dominant) without which there would exist nothing but a luminous radiance like the Aurora, a reaching out for concordance without an answering "sympathetic attractive diversion" to create "unstable equilibrium" of terrestrial magnetism, resulting in the polar current. Were there no "aqueous disintegration" and "thermal concentration" to link the ætheric dominant, the absence of the sun on one side would result in terrestrial magnetism and electricity remaining static or stable - the highest degree of chaos."

"Disturbance of equilibrium" and "sympathetic equation" are the dual powers by means of which all forms of motion and of terrestrial life are governed. These two dual forces are in turn moved and regulated by electricity and magnetism."

"The course of the magnetic flow comes under the "first interatomic" and as it is governed by the full harmonic chord, moves in straight lines, its sympathetic transmission free from molecular interference."

"Electricity is the result of three differentiated sympathetic flows, brought together by combining the celestial flow with the terrestrial flow through a

certain degree of "negative attractive assimilation". Electricity is one of Nature's efforts toward restoring "attractive differentiation" for it has the highest degree of assimilative affinity."

"All electrical action of any character is born sympathetically of the "polar harmonic current" by the "intervention" of the dominant (celestial) as all sympathetic flows are triune. They achieve association only near the "junction of terrestrial interference". The great vacuous flow between the planetary ranges (orbits) holds this portion of the ætheric flow free from all antagonism until the associative point is reached, when instant electric evolution occurs as the dominant seeks its terrestrial negative attractive center. "This intervention" I call "atomic, intermolecular and molecular density". When the triune sympathetic stream combines with the same medium light and heat are evolved as the resultant of these "corpuscular confictions" with the "sympathetic celestial" and "the focalized terrestrial centers" of "neutral radiation". Light is an ætheric evolution propagated by "sympathetic conflict" between the "terrestrial" and "celestial" outflows - terrestrial condensation against solar tensions. True luminosity is induced in no other way. The solution of the mystery of light and heat, which are interchangeable and in a certain sense one and the same, is that the sympathetic ætheric stream bombards the dense portion of the molecular in seeking the sympathetic-concordant-focalized-neutral-center of the mass, whether it be planetary or molecular. Light and heat can only be accounted for by considering sympathetic streams under high velocity as being interchangeable both to and from the focalized negative attractive centers."

The triple flow, or triune structure of any sound cannot be detected by the human ear, but since this also is a sympathetic flow, and likewise governed by the triune laws of sympathetic flows, it must correspond in having a threefold structure. If the sympathetic flow in acoustic vibratory transmission were not triune, polarity could not thereby be changed and rotation caused in the magnetic needle as demonstrated in Keely's experiments.

When a chord is transmitted through the Trexar, the molecular triple is carried along sympathetically in inducted differentiation and in turn excites high sympathy with the "polar terrestrial stream". The polar terrestrial stream is triune in character and requires a triune sympathizer, which is satisfied by the constitution of the Trexar. When this Trexar is properly sensitized by "any chord on the dominant" the sympathy inducted by molecular differentiation approaches magnetism in character, but without the presence of actual magnetism.

He constructed instruments for the purpose of determining the triune vibratory nature and laws of the "polar terrestrial stream" in its sympathetic association with the "celestial stream" - the "luminiferous track" or "compound ætheric field". He thought the polar stream or "magnetic electric terrestrial enve-

lope" with its "high vitality" to be necessary to the existence of all organisms. (11) See **MOLECULAR DISSOCIATION, LAWS OF BEING**

SYMPATHETIC TRANSMISSION: "In setting the conditions of molecular sympathetic transmission by wire," writes Keely, "the same law calls for the harmonious adjustment of the thirds, to produce a non-intermittent flow of sympathy. Intermission means failure here. That differential molecular volume is required, in two different mediums of molecular density, to destroy differentiation of sympathetic flow, seems at first sight to convert the very law established by the great Creator, which constitutes harmony - a paradoxical position which has heretofore misled physicists who have propounded and set forth most erroneous doctrines, because they have accepted the introductory conditions, discarding their sympathetic surroundings. The volume of the neutral center of the earth is of no more magnitude than the one of a molecule: the sympathetic condition of one can be reached in the same time as the other by its coincident chord." (Keely) See **NEUTRAL NEGATIVE CENTER, CHORD, THIRDS, DIFFERENTIATION**

SYMPATHETIC VIBRATION: "The driving of a mechanical or acoustical system at its resonant frequency by energy from an adjacent system vibrating at this same frequency. Increasing the dampening of a vibrating system will decrease the amplitude of its sympathetic vibration but at the same time widen the band of frequencies over which it will partake of sympathetic vibrations." (4) See **RESONANT FREQUENCY**

Norman Lockyer, in his book "The Chemistry of the Sun" says that, in dealing with molecules one feels as if dealing with more a mental than physical attribute - "a sort of expression of free will on the part of the molecules." Also "The law that connects radiation with absorption and enables us to read the riddle set by the sun and stars, is then simply THE LAW OF SYMPATHETIC VIBRATION."

The first quotation simply refers to the "dominant" or controlling property of matter, and the latter quotation aptly states Keely's identical theory of the constitution of matter, the principle of which is the cornerstone of his experimental researches. (11)

SYMPATHETIC VIBRATION: Sounds are "communicated" when they are merely conveyed from one sounding body to another, and this can take place in a noise as well as a musical sound. Sounds are "excited" under two circumstances: when a body which is sounding and that to be excited have the same note and the vibration of one produces sympathetic vibration of the other, the bodies are mutually called "reciprocating", while of the vibration of one produces its harmonics in the other, the latter is said, with regard to the exciting body, to be "resonant". According to Helmholtz, "timbre" or "quality" depends on definite combinations or certain secondary sounds or harmonics with a primary or fundamental sound, and

such combinations he calls "sound colours". (125)
See **EAR; SOUND COLORS**

SYMPATHETIC VIBRATIONS-HEALING: Q-8:
What is causing the pain in [niece's 143's] ear?

A-8: "Mostly from a sympathetic condition." (900-461) (2)

"Hence we find both the liver and the spleen involved in the condition; the spleen sympathetically, the liver rather scant in activity through the bile ducts that act upon the lacteal forces that are created for assimilation in the body." (475-1) (2)

"Each individual has its own individual problems. Not all are physical. Hence there are those that are of the sympathetic nature, or where there has been the possession by the very activity of same; but gold will destroy desire in any of them." (606) (2)

"Hence stimulating ganglia from which impulses arise - either sympathetically or functionally - must then be helpful in the body gaining an equilibrium." (902-1) (2)

"These are purely SYMPATHETIC conditions, and with the removal of the pressures and with the activities to the body as will produce the NORMAL activity of the organs disturbed, or the nerve system disturbed, we will restore normalcy for the body.

"The heart's activity is near to normal.

"Digestive system we find at times upset. Naturally, from glandular reaction there are periods when there are disagreements as to combinations in foods; there is the lack of the assimilation in the lacteal ducts as of a sympathetic nature." (1490-1) (2)

"In the organs of the pelvis or the genitive organs, as indicated, are rather sympathetic conditions; and with the alterations in diet, in the activities through the portions of the system indicated, these should be the nearer normal." (657-1) (2)

"These, as we find, are sympathetic conditions, and more functional disorder than organic; though, to be sure, there must come organic disorders unless time, patience and persistence is given to the system to allow sufficient time for the recuperative forces of the body to act or respond to those things as may be set up in the system - see?" (1690-1) (2)

Q: "Have I any lung or bronchial trouble?

A: "Rather sympathetic conditions, and mostly indigestion." (1690-3) (2)

"Hence we find pressures or depressing feelings, as of an over amount of gas in the lung; not through the rest of the system except sympathetically." (1548-1) (2)

SYMPATHETIC VIBRATION THEORY: "That as given shows how sympathetic vibration in its simplicity is in activity as a usable force, as stated; yet, with the radial activity of the latent forces given in the sympathetic, or synthetic, or syncothetic conditions, brings then the proper relations, which makes same into a usable force. Build upon the principle here set forth. Set out in that as the active principle, the combination of relativity of elements with the active force of sympathetic vibration bringing the two into relations that make a usable motive force, as may be applied in the various forms to any active principle." (4665-13) (2) See **ACTIVE PRINCIPLE, FORCES-LATENT, SYNCOTHETIC, SYMPATHETIC VIBRATIONS, ATOMIC THEORY-KEELY'S, LAWS OF BEING**

SYMPATHETIC VIBRATORY PHYSICS; FOUNDATION PREMISE: "Humankind (in its present manifestation and activity) cannot know EVERY thing about any ONE thing much less everything about everything. At best he can know some thing about some things and draw comparative reference values from that which he thinks he knows and make comparisons and inferences thereto."

Premise - The First

"Every THING* in the Universe° vibrates†."

This premise is a common and accepted determination of those things that we know or think we know about. This premise, as near as we are able to make such a determination, is an absolute. From this premise I propose to develop a comprehensive and wholistic paradigm that demonstrates our existence and the probable existence of Immutable Natural Laws that create and govern all that there is ... so far as we are able, as frail humans, to know such things.

* THING means: materialized objects, from organized structures, molecules, atoms and all forms of sub-atomic particles. Since matter is bound up energy and energy is liberated matter a THING can also be all forms of FORCE and ENERGY such as Sound, Light, X-rays, etc.

° Universe means: All those things which are observable, knowable and known. To be "observable" any THING that registers a significance to the mind of Man either through the so-called five standard senses or that registers on his/her instruments designed to detect and display any frequency (or range of frequencies) of vibration or manifestation that lies outside of the range of these five senses.

† Vibrate means: A periodic change of state from an energetic (positive) state through a non-active (neutral) state to a centralizing (negative) state. [A sine wave is NOT a vibration but a simple representation, measurement and graphic display of energy levels referenced to the calibration of the detecting and displaying instrument.] A vibration can be infinitely quick such as are active in Light or very slow as in cycles of orbits of planets.

Premise - The Second

"Since every THING in the Universe vibrates it holds that vibration is the connecting (common) link between and within all THINGS."

Premise - 2.1

"Energy = Mass * Speed of Light²"

(This is a gross over simplification of a complex and interwoven state of affairs.)

Premise - 2.2

"Energy manifests itself in periodic changes of state."

Premise - 2.2.1

"Energy assimilates itself to itself in successive moments."

(Aggregation or Crystalization: Forms into matter.)

Premise 2.2.2

"Energy dissociates itself from itself in successive moments."

(Repulsion: Forms other forms of energies.)

Premise - 2.3

"Matter assimilates itself to itself in successive moments."

(Forms ever growing larger bodies of matter.)

Premise - 2.4

"Matter assimilates itself to all other things in successive moments."

(Becomes differentiated in to forms of energies.)

Premise - 2.5

"Matter is capable of infinite subdivision."

Premise - 2.6

"There is no dividing of matter and force into two distinct terms, as they both are ONE, FORCE is liberated matter. MATTER is force in bondage."

Premise - 2.7

"All motion is synchronous; no sound (vibration) or movement can be made but all that moves or sounds (vibrates) does so in harmony with something else."

Via sympathetic association and hence sympathetic vibration.

Premise - The Third

"No THING is or can be anything other than vibration either centralized (negative* polarized), neutral (de-polarized) or decentralized (positive° polarized)."

*negative polarized means: polarized (phase differentiated) in an attraction mode where like attracts like.

°positive polarized means: polarized (phase differentiated) in a repulsive mode where like repels like.

Premise - The Fourth

"Every THING is a whole thing and is a result of its parts."

Premise - The Fifth

"Since the Universe is a WHOLE Universe it is a result of the individualized parts (they themselves being WHOLEs)."

Premise - The Sixth

"No THING can be a simple vibration (single frequency) as no THING can exist of and by itself in isolation (every THING is a part of the Universe). THINGS are therefore, in actuality, a combination of many (more than one) vibrations."

Premise - The Seventh

"Therefore if all of the above be true (excepting a narrowing of definitions, conceptual relativities, etc.) then it can be said that God is the causative force(s) or intelligence(s) that causes and regulates whatever a vibration is. Because the only thing there is is a complex and orderly realm of vibratory motions acting, interacting and reacting with and within themselves."

Premise - The Eighth

"These FIRST FORCES (that create and regulate vibratory motions) are Immutable Natural Laws to which all that there is (vibrations) is subservient to."

ERGO

"That which we call God is none other than that which guides and governs all that there is - Immutable Natural Law - since it is these laws - and no thing else that exists."

SYMPATHETIC VIBRATORY PHYSICS: (The Physics of Causes) Resonance: When a mechanical or acoustical system is acted upon by an external periodic driving force whose frequency equals a natural free oscillation frequency of the system, the amplitude of oscillation becomes large and the system is said to be in a state of resonance. There are three types of recognized resonance: **Phase, Amplitude & Natural resonance.**

Harmony: Harmony is the simultaneous vibration of two or more bodies whose harmonics do not produce discords, and whose fundamental pitches are harmonics of the lowest pitch, or are a unison with the resultant notes or overtones, or undertones, of any two or more of them.

Sympathetic Vibration: The driving of a mechanical or acoustical system at its resonant frequency by energy from an adjacent system vibrating at this same frequency. Two or more objects are said to be sympathetic to each other when their vibrations or oscillations are in harmony (without discords). The greater the degree of sympathy (harmony) between the two systems the less energy required to cause sympathetic action and reaction and vice versa. questions being answered below can be found under **NEWTONIAN PHYSICS**.

Answer to question 1: Consider two sub-electron sized particles side by side. Should each of these particles possess the same pitch of oscillation but in opposite phase (polarity) they will be drawn together. One will be creating a zone of rarefaction about itself as the other creates a zone of condensation, each phase in synchronization with the other. As one radiates outward the other condenses inward in perfect harmony or balance and resonance is established between and by the two and they will be drawn together.

Answer to question 2: This is just reverse from the above description. Should the two particles possess dissimilar oscillations or vibrations the discordant pitches will not synchronize causing mutually timed sequences of repulsion and attraction prohibiting the two particles from becoming synchronized and ultimately defeating union of motion and state.

Answer to question 3: Consider two electrons side by side as the two mechanical systems referred to above. If they are unsympathetic (discordant) in their vibration or oscillation of Natural resonant frequencies it will necessitate more energy to convey a charge (or common state) between them. In other words, one has to force the other into line with itself which necessitates a large quantity of energy. Should they be sympathetic (harmonious) one to the other, transmission or conveyance of charge or polarization will require considerably less energy - hence superconductivity. Hence superconductivity is caused by "cooling" or dampening the extraneous (discordant) vibrations or oscillations of both units and bringing them into a greater state of sympathy or harmony.

Answer to question 4: Substitute the two electrons above for two antennae, one a transmitting and the other a receiving antenna. The actions and reactions due to sympathetic and unsympathetic states are virtually identical.

Weight: Taking the above, weight must therefore be the degree of sympathy between sub-electron particles contained in the gravity causing body and the

gravitated body. *Weight is therefore an effect of subtler causes.*

Mass: Taking the above, mass must therefore be the degree of sympathy between the sub-electron particles composing a given aggregated body. Inertia is a *resultant* of direction of motion. *Mass is therefore an effect of subtler causes.*

Energy: The degree of sympathy of the Creative center of oscillatory or vibratory motion considered in relation to the Transmissive media and the Receptive center of oscillation or vibration.

Force: The degree of sympathy of the Receptive center of oscillatory or vibratory motion in relation to the Transmissive media and the oscillatory and vibratory characteristics of the Creative center of oscillatory or vibratory motion.

Gravitation: Taking the above, gravitation or the resultant action of gravity is the *result* an hence an effect of the mutual attraction between harmonious sub-atomic particles and is not a cause. The state of being in harmony is the cause of gravitation.

Relativity: It is the relationship between number of frequency (motion) or the pitch and direction of motion which determines any and all of the states above mentioned.

SYMPATHIZATION: See **STOPPING POWER, HARMONIZATION, LINEAR ENERGY TRANSFER.**

SYNAPHE: The conjunction of two tetrachords. (125)

SYNCHRONOUS: The component of a vibration signal that has a frequency equal to the shaft rotative frequency (1X). (100)

SYNCHROTRON: An accelerator in which magnetic fields and acceleration are synchronized to keep the particles moving in a narrow ring. (116)

SYNCOPATHIC: See **SYMPATHETIC COINCIDENCE**

SYNCOPATHICAL: "Harmonious vibrations. Harmonious doesn't exactly express what is meant; just as the harmony would carry the idea of a continued atonement - a tone - a center - a radial - while syncopathically a continuation of same in the gradual rise and fall, or (of?) certain in its correlation." (195-54) (2)

"They vibrate in their up and down motion without losing that syncopathical central syncopathetic action." (195-54) (2). See **FORCE-RADIAL, HARMONIC, HARMONY, NEUTRAL NEGATIVE CENTER, SYMPATHETIC VIBRATION THEORY, VORTEX**

SYNCOPATION: Suspension or alteration of rhythm by driving the accent to that part of a bar not

usually accented. Syncopation may be completed in a bar. Or it may be carried by sequence through several bars. Or it may be so that more than one bar is involved in the syncopation. Syncopated counterpoint is the fourth species of counterpoint. (125)

SYNCOPIREN: To syncopate. (125)

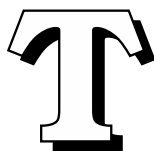
SYNCOTHETIC: "The variation in syncopathic and that of syncothetic is as the relation of the force as of a point would be to its radial center." (195-54) (2) **See SYNCOPATHIC, INTRODUCTORY IMPULSE, RELATIVITY OF FORCE, SYMPATHETIC VIBRATION THEORY, FORCE-RADIAL**

SYNCRONY: Synchronous, coincidental action, harmonious action.

SYNNEMENON: **See GREEK MUSIC**

SYREN: **See ACOUSTICS**

SYRENES: Singing elementals. Melusinae, attracted to and often keeping in the waters; half woman, half fishes. (131) **See UNDINES; MELOSINAE**



TA, TE, TE, TO: Syllables used by the Greeks for purposes of solimization. (125)

TABLATURE: (1) A general name for all the signs and characters used in music. (2) A peculiar system of notation employed for instruments of the lute class, for viols, and certain wind instruments. (125)

TABOR: This instrument, under the name *toph* (Arabian, *aduf*), is several times mentioned in the Bible. It is probable that it only differed from the tambourine by being without jingles in the hoop. It is often associated with a word which some translators give as *pipe*, but which in the authorized version of the Bible is rendered *dancing* or *dances*. (125)

TACHYONS: Hypothetical particles that move faster than the speed of light. (116)

TAIL-PIECE: That part of an instrument of the violin kind to which the strings are fastened at the lower end. The tail piece is usually of ebony. (125)

TAKT: [Ger.] Time, measure, bar. (125)

TAMBOURA: An instrument of the guitar species, with strings of wire struck with a plectrum. The neck is long, and the body, of gourd shape, is often beautifully ornamented. The Tamboura is found in Persia, Turkey, Egypt, and Hindustan, and it was known to the Assyrians and Egyptians under various names. The Egyptians called it *nofre* or *nefer*, a term said to be synonymous with *nebel*, the Hebrew word for a stringed instrument. (125) See **NEBEL**, **NEFER**

TANGENT: The striking pin of a clarichord. (125)

TAPE DECK: A tape recorder designed to be permanently installed as part of a sound system, as contrasted to a portable recorder. Because it always plays through the amplifier and speakers of the main sound system, the tape deck usually has none of its own. (103)

TAPE TRANSPORT: A tape-playing device without recording facilities, intended for playback only through an external amplifier and speakers. (103)

TAPERED ROLLER BEARING: A rolling element bearing using conically shaped rollers and races

so as to allow simultaneous radial and axial loads. These bearings are separable in that their cones (inner races) with rollers and their cups (outer races) are mounted separately. (100)

TARTINIS TONES: See **ACOUSTICS §19; RESULTANT TONES**

TASTE: "The rate of vibration needed to produce sensation of taste in the brain is 3 million times less than are needed for hearing and sight." (5681-1) (2) See also **SIGHT, HEARING, SPEECH, LAWS OF BEING**

TAU: The 22nd and final Hebrew letter, Tau (T or Th), is an ancient form of the Cross. All students of comparative religion and art know well how universally employed has been this much venerated, disputed and execrated emblem. Volumes could easily and profitably be written upon every one of its manifold significations, among which the 2 of utmost importance are the ideals of unification and of sacrifice. As Tau (the sign of the cross) stands at the end of the sacred alphabet it immediately suggests a finished work or completed initiation, therefore has it been continually affirmed that an initiate dies upon the cross to his old estate when he attains hierophancy and quickly rises to a new and far more glorious condition than any he has enjoyed previously. Taking up the cross and following the Master involves passing through all the initiatory stages of hieroglyphically portrayed by the employment of the 22 Hebrew letters in an esoteric or mystical manner. Alchemy rightly understood, as it was by Paracelsus and other profound philosophers in Europe a few centuries ago, was no mere art of converting copper, silver, and other less valuable metals into material gold, though we by no means deny the possibility of literal transmutations in chemical or alchemical laboratories. The last letter of the Hebrew alphabet suggests death upon the cross as a gateway to a new and higher life and closely associated with its deeper meanings is the truth conveyed in those sublime utterances of some great seer and sage of ancient Israel, "Better is the end of a thing than its beginning" and "Better is the day of birth." Such sublime sayings as the latter of these are apt to strike the unthinking as pessimistic, because the shallow mind thinks not of death (properly transition) as only a step out of one state of conscious existence into another. Death and end, in the Kabbalistic

meaning of those words, refer only to the termination of some certain stage or process in development, literally the achievement of some definite end we have had in view, then having reached that end we are ready for an entirely new beginning, but one that would have been impossible for us had it not been for all the disciplinary experience which preceded it and led up to it. (72)

TELE-GEODYNAMICS: Motion of earth forces at a distance. See **TESLA'S EARTHQUAKE**

TELEOLOGY: The theory of design in nature. (121)

TELEPHONE NOISE MEASUREMENT FILTERS: Includes C-Message Weighting and C-Message Notch filters per Bell Systems Technical Reference 41009 in the U.S., and Psophometer filters per C.C.I.T.T. Vol. V REC P.53 in Great Britain and other overseas countries with similar telephone systems.

TELEPORTATION: See **FORCES-ATOMIC, LEVITATION, GRAVITY, FORCE-GASES**

TELIC: Purposive. (121)

TELLURIC WAVES: Energy waves originating within the earth.

TEMPERAMENT: The division of the octave. The problem is, to divide the octave into a number of intervals such, that the notes which separate them shall be suitable in number and arrangement for the purposes of practical harmony. The simplest form of temperament is that in common use, which divides the octave into twelve equal semitones. It is most convenient to express all intervals in terms of these semitones. The perfect fifth contains 7.019550008654 semitones; the perfect third 3.863137138649 semitones. Five places are enough for all *practical* purposes.

In all harmonious music the fifth to any given note may be required at any time. Hence all systems provide series of fifths of a more or less complete character. If a series of perfect fifths be constructed starting from c, octaves being disregarded, it will not return exactly to c again. Taking the fifth to be 7.01955 semitones, each note in the series lies further than the last from the equal temperament note of the same name; and this departure increases by .01955 for each step in the series, the equal temperament fifth being seven semitones. Thus the c to which we return after twelve fifths is higher than that from which we started by $12 \times .01955 = .23460$ of a semitone. This interval is called the comma of Pythagoras.

Regular systems consist of notes which form a continuous series of fifths, e.g., the system of perfect fifths.

Regular cyclical systems consist of notes which form a continuous series of fifths, and divide the octave

into a certain number of equal intervals.

Primary regular cyclical systems are those in which the departure of twelve of the approximate fifths of the system from the starting point is equal to one unit of the system. Secondary systems are those in which the departure of twelve fifths from the starting point is two units, and so on.

Positive systems have fifths sharper than equal temperament fifths; **negative** systems have fifths flatter than equal temperament fifths.

The division of the octave into 53 equal intervals furnishes an important primary positive system; into 118, a secondary positive system; into 31, a primary negative system; into 50, a secondary negative system. (125)

TEMPERATURE: Compression creates heat. Rarefaction creates cold. (6) pg 57 See also (18). See **NEGATIVE, VACUUM, HEAT, LIGHT**

TEMPO: Time or measure. (125)

TEMPO: Speed. (69)

TEMPUS: Time, one of the three early divisions of mensurable music, which were: (1) Mode: *Modus* was the division of a maxim into longs, or of a long into breves; (2) Time: *Tempus* was the division of a breve into semibreves; (3) Prolation: *Prolatio* was the division of a semibreve into minims. (125)

TENOR CLEF: The C clef placed upon the fourth line of the stave. (125)

TENTH: A compound interval comprising an octave and a third, nine conjoint degrees, or ten sounds. The tenth is the octave of the third, and may be major or minor, diminished or augmented. (125) See **INTERVAL**

TERCET: A triplet. (125)

TERMINAL FILTER IMPEDANCES: Input impedance (usually high) is the loading a filter imposes upon its input signal source. The output impedance (ideally zero) is the impedance a filter presents to its load.

TERNARY FORM: Rondo form. (125)

TERNARY MEASURE: Triple time. Perfect time. (125)

TERRESTRIAL: Same as "B" polarity or what comes from the earth as opposed to the sun (celestial). The Negative, Mundane aspect.

TERRESTRIAL BRAIN MATTER: As associated with **CELESTIAL MIND FORCE** See page 303 of (1)

TERRESTRIAL ENVELOPE: See **MAGNETIC**

CURRENT, TRIUNE POLAR STREAM**TERTIA:** See TIERCE.**TESLA WAVE:** See SCALAR, VECTOR, SYMPATHETIC OUTREACH**TESLA'S EARTHQUAKE MACHINE:** Tesla's Earthquake from New York World-Telegram July 11, 1935

Dr. Nikola Tesla, physicist and inventor, will have not one but three startling discoveries to announce at a press luncheon on the occasion of his seventy-ninth birthday tomorrow, he said today at the Hotel New Yorker.

Mr. Tesla said that one of these discoveries is a new way of transmitting energy, an entirely new principle nothing like wireless. The second has to do with a new method of housing cosmic rays, and the third concerns a problem which scientists and inventors have worked on for seventy-five years but which every one has given up as utterly impossible.

Dr. Tesla is 79 years old, and he is one of the true geniuses of this time. Nevertheless, twenty-odd newspapermen came away from his Hotel New Yorker birthday party yesterday, which lasted six hours, feeling hesitantly that something was wrong either with the old man's mind or else with their own, for Dr. Tesla, serene in an old-fashioned Prince Albert and courtly in a way that seems to have gone out of this world, announced that:

1. He had discovered the so-called cosmic ray in 1896, at least five years before any other scientist took it up and twenty years before it became popular among scientists, and he is now convinced that many of the cosmic particles travel fifty times faster than light, some of them 500 times faster.

2. He has found a way to produce a direct electric current by induction and without the use of a commutator, which is something the experts in electricity have considered impossible for the past hundred years.

3. He has invented an "absolutely impossible" machine which will impart vibrations to the earth which, with proper receiving apparatus can be picked up anywhere on the earth's surface, and that this mysterious machine will allow scientists to explore the deep interior of the earth, will enable practical geologists to discover gold, coal and petroleum, and at the same time will give ships the means of navigating without compass or sextant.

Dr. Nikola Tesla has 600 to 700 patents to his name. He invented the rotary field motor, and is admittedly the seer and father of all modern electrical development. As has been his custom, he arranged his own birthday party, drank only hot milk as his part of the celebration, and made his announcements with the superb certainty of a man who knew what he was

talking about, even if none of his quests did.

He said, among other things, that he expects to have \$100,000,000 within two years, and he revealed that an earthquake which drew police and ambulances to the region of his laboratory at 48 E. Houston St., New York, in 1887 or 1898 was the result of a little machine he was experimenting with at the time which "you could put in your overcoat pocket."

The bewildered newspapermen pounced upon this as at least one thing they could understand and "the father of modern electricity" told what had happened as follows:

"I was experimenting with vibrations. I had one of my machines going and I wanted to see if I could get it in tune with the vibration of the building. I put it up notch after notch. There was a peculiar cracking sound.

"I asked my assistants where did the sound come from. They did not know. I put the machine up a few more notches. There was a louder cracking sound. I knew I was approaching the vibration of the steel building. I pushed the machine a little higher.

"Suddenly all the heavy machinery in the place was flying around. I grabbed a hammer and broke the machine. The building would have been about our ears in another few minutes. Outside in the street there was pandemonium. The police and ambulances arrived. I told my assistants to say nothing. We told the police it must have been an earthquake. That's all they ever knew about it."

Some shrewd reporter asked Dr. Tesla at this point what he would need to destroy the Empire State Building and the doctor replied: "Five pounds of air pressure. If I attached the proper oscillating machine on a girder that is all the force I would need, five pounds. Vibration will do anything. It would only be necessary to step up the vibrations of the machine to fit the natural vibration of the building and the building would come crashing down. That's why soldiers break step crossing a bridge."

His early experiments in vibration, he explained, led to his invention of his "earth vibrating" machine. Tall and thin and ascetic face, his eyes sunken but humorous under protruding brows, he was cagey about describing what his new machine is, although he believes it will be "the chief thing of my many inventions posterity will thank me for".....

TETH: The 9th Hebrew letter, Teth (T), literally a serpent, and as 9 is the highest of our single numerals and the serpent is allegorically an emblem of great and universal importance in the history of human regeneration - because all that the serpent stands for must be lifted up by a transmutative process in order that regeneration may be completed - much value is attached by Kabbalists to this letter. The Greek equivalent letter, Thaita, meaning a servant, truly explains the rightful place of the reptilian element in

human economy. All that the serpent connotes must be rendered subservient to the higher principle in humanity, and when this right relatedness is accomplished the serpent-force, which works so much havoc when dominating or uncontrolled, becomes a valuable and necessary base upon which a glorious superstructure of noble character and high achievement can be upraised. (72)

TETRACHORD: A scale-series of four notes. The word in its modern sense signifies a half of the octave scale. (125)

TETRACHORDAL SYSTEM: The early form of the system now known as Tonic Sol-fa. (125)

TETRACTYS: 1+2+3+4=10

TETRAHEDRON: Solid with six triangular sides all equilateral.

TETRAPODA: Four-footed. (121)

TeV: Abbreviation for tera (10^{12}) electron volts of energy. (116)

THANATISM: Disbelief in personal immortality. (121)

THEORIST: One who studies the nature of sound or the principles of musical art. (125)

THEORY, ATOMIC: See **ATOMIC THEORY**

THEORY OF MUSIC: The science of music. The speculations arising from a knowledge of the principles of sound. The rules for composition and arrangement of music for voices and instruments in rhythm, melody, harmony, counterpoint, and instrumentation. (125)

THEORY, QUANTUM: Radiation is emitted intermittently in bundles consisting of integral multiples of a fundamental amount. $E=h\nu$ where h is Planck's Constant 6.6×10^{-27} ergs sec. and ν is the frequency of the radiation.

$$E = C/wl5(ec/wlT^{-1})$$

where C is a constant, wl the wave length, e the base of the natural logarithms, c another constant, and T the absolute temperature.

$$h = 6.57 \times 10^{-34} \text{ joule sec.}$$

The size of a photon (quanta) depends upon the frequency of the radiation and is expressed in units of energy as hF , when h is Planck's Constant and F is frequency in cycles per second. See **PLANCK'S CONSTANT, LAW OF ASSIMILATION**

THEORY OF RELATIVITY: See **$E=MC^2$, RELATIVITY OF FORCES, FORCE-ONE**

THEORY OF SYMPATHETIC VIBRATIONS: See **SYMPATHETIC VIBRATION THEORY**

THEOSOHIA: Supreme wisdom, acquired by practical experience by which it is eminently distinguished from merely speculative philosophy. (131) See **THEOSOPHY; OCCULT SCIENCE**

THEOSOPHY: Theosophy is a philosophic attitude embracing both a scientific and a religious approach to an understanding of man and the universe, and carrying within it the germ of its own expansion, since it holds as basic that the mind of man is evolving. Thus it regards no conclusion as final but allows for the continuous introduction of new knowledge and dynamic insights into the arena of the mind's activity.

Theosophy postulates an "omni-present, eternal, boundless and immutable substance-principle" as the fundamental Reality underlying all manifested existence. This is indefinable in finite terms and therefore incomprehensible to the finite intellect. Yet it is not unknowable in terms of direct experience, since all things, including man, partake of its nature.

Man is defined as "that being in the universe ... in whom highest spirit and lowest matter" (considered two poles of the same reality) "are joined together by intelligence". In him universal spirit is focused through a psycho-spiritual organism, in appropriate mento-emotional and physical vehicles, from which action can take place in the phenomenal world. The spiritual point is seen as capable of infinite expansion, not in terms of physical space, but in terms of self-realization, which may be conceived of as the space of consciousness.

In the theosophical view, all life emanates from a supreme Source and ultimately returns to that Source. This going forth and return constitutes the field of involution and evolution, wherein life finds its way into densest matter in the mineral kingdom and works its way upward through aeons of time in each of the other kingdoms of nature, finally reaching self-consciousness in the human kingdom. This brings individual responsibility for obedience to a law, called karma, under which man must meet and learn to deal with the consequences of his own actions and, eventually, come to full self-knowledge and self-direction. Theosophy regards complete fulfillment of the human estate as far in the future for the vast majority of mankind. It suggests, however, that within each individual is infinite potential for development and that there is an age-old path, as taught in all the religions, by which man may achieve mastery over himself and enter into the next, the superhuman, stage of evolution. The lives of the great Teachers and Seers of all ages – Jesus, Buddha, Sri Krishna, among others – have given testimony to this possibility.

Theosophy sees the process of involution and evolution as guided by Intelligences which are the product of previous cycles, and holds as a necessary corollary

that those humans who achieve superhumanity by the end of the present cycle will assist in the development of future cycles. The universe is therefore regarded as a field of action for intelligent forces which man observes as the operation of natural laws.

Considered as a corollary growing out of the concept of cyclic unfoldment is the doctrine of reincarnation, or the successive embodiment of the human entity in physical form with the accompanying emotional, mental, and psychic responses to experience. Since all life constantly renews itself through periods of activity and rest, this must hold true for the individual as well as for the universe. The perceptive individual therefore finds in the process a boundless field for exploration and opportunity for endless growth.

Theosophy is of ancient origin and emerged in modern times with the establishment of The Theosophical Society, in New York City, in 1875. The founders of the Society were Helena Petrovna Blavatsky (1831-1891), Henry Steel Olcott (1832-1907), William Quan Judge (1851-1896), and others. The Society maintains an open platform, based on the freedom of each individual to seek truth for himself. The objectives of the organization include the recognition of the brotherhood of humanity; the encouragement of the study of comparative religion, philosophy, and science; and the investigation of the laws governing man and nature. The movement has attracted a considerable following, and today branches exist in more than 50 countries. International headquarters were established at Adyar, Madras, India, in 1882 and continue to be maintained there. Headquarters of The Theosophical Society in America are located at Wheaton, Illinois.

THERM: "In physics, a unit of heat or thermal capacity; a thermal unit, as the small calory or the large calory, or unit equal to 1,000 large calories; sometimes, a unit equal to 100,000 British thermal units." (47)

THERMAL CALIBRATION: Temperature calibration is the recording of the stabilized zero and full range output readings at: 1) Room temperature (77°F +/-2°F), 2) The lower extreme of the compensated temperature range, 3) Room temperature, 4) The upper extreme of the compensated temperature range, 5) Room temperature; respectively. The data obtained from this test sequence is used to calculate the performance of the unit for thermal sensitivity shift, thermal zero shift, thermal sensitivity stability, and thermal zero stability. (20)

THERMAL ELEMENT: See **RADIATION, HEAT, LIGHT & HEAT, FORCE-ATOMIC, RADIATION-CELESTIAL-SYMPATHETIC**

THERMAL NEUTRON: [NUCLEO] One of a collection of neutrons whose energy distribution is identical with or similar to the Maxwellian distribution in the material in which they are found; the average kinetic energy of such neutrons at room temperature is about 0.025 electron volt. Also known as

slow neutron. (4)

THERMAL SENSITIVITY SHIFT: Thermal sensitivity shift is defined as the maximum change in sensitivity over the compensated temperature range divided by room temperature FRO and the algebraic span of the compensated temperature range. Thermal sensitivity shift is expressed as a percentage error per thermal degree. (20)

THERMAL SENSITIVITY STABILITY: Thermal sensitivity stability is defined as the maximum deviation between any two room temperature full range output values obtained during a temperature calibration expressed as a percentage of FRO. (20)

THERMAL VIBRATIONS: See **PHONON, RATES OF VIBRATIONS, HEAT**

THERMAL ZERO SHIFT: Thermal zero shift is defined as the maximum change in zero output over the compensated temperature range divided by the room temperature FRO and the algebraic span of the compensated temperature range. Thermal zero shift is expressed as a percentage error of FRO per thermal degree. (20)

THERMAL ZERO STABILITY: Thermal zero stability is defined as the maximum deviation between any two room temperature zero output values obtained during a temperature calibration expressed as a percentage of FRO. (20)

THERMIONIC EMISSION: "The emission of electrons from a electrode caused by heating the electrode. The electron emission current density increases rapidly as the temperature is increased." (4)

THERMISTOR: An electrical device used for temperature measurement. Thermistors have coefficients of resistance that are either positive or negative, that is, with an increase in temperature, the resistance may increase or decrease for a given type. (100)

THERMOCOUPLE: A temperature sensing device comprised of two dissimilar metal wires which when thermally affected (heated or cooled) produce a proportional change in electrical potential at the point where they join. (100)

THERMOELECTRIC EFFECTS: In 1834, Jean Peltier, a French watchmaker and amateur scientist, discovered that the passage of an electric current through the junction between two dissimilar conductors in a certain direction produces a cooling effect. There is a heating effect, that is quite distinct from the more familiar Joule resistance heating effect, when the current is passed in the opposite direction. Peltier hardly realized the true meaning of his observations, let alone the significance that they would have more than a century later as the basis of a new method of refrigeration.

Peltier's experiments followed those of Thomas See-

beck, who in 1821 discovered that an electromotive force could be produced by heating a junction between two metals. It is not surprising that the Peltier and Seebeck effects are closely related to one another. What is perhaps more remarkable is the William Thomson (later Lord Kelvin) in 1855 not only derived the relationship between the effects from thermodynamic arguments but, in so doing, he predicted a third thermoelectric effect, then unknown.

Thomson obtained the two equations, that are now known as the Kelvin relations and connect the three thermoelectric coefficients, by applying the first and second laws of thermodynamics to a simple thermoelectric circuit, assuming it to be a reversible system. The validity of this approach is questionable (as Thomson well understood) since the thermoelectric phenomena are always accompanied by the irreversible effects of Joule heating and thermal conduction. However, the more reasonable application of the theory of irreversible thermodynamics to this problem also leads to the same relations. The Kelvin relations not only have a sound theoretical basis but they are also well proven experimentally. One of the most convincing practical demonstrations of the validity is the successful use of Harman's method for measuring the thermoelectric figure of merit. (122)

THESIS: The downward wave of the hand to denote the absence of accent. (125)

THICKNESS OR AVERAGE RADIUS OF ION ATMOSPHERE: (k-1) The average distance of the ion atmosphere from the reference ion in angstrom units. This average distance decreases in magnitude with the square root of the ionic concentration. Mathematically, k-1 is the distance at which the average charge, dq, in a spherical shell of volume $4\pi r^2 dr$ reaches a maximum using continuous density, $\rho(r)$, approximation.

THIN: (1) Meagre and scanty harmony. (2) A poor quality of tone in a voice or on an instrument. (125)

THIRD: See INTERVAL; THIRDS

THIRDS: The sympathetic acoustic impulses are: the DOMINANT - a diatonic third - the HARMONIC - the connective "sixth" - and the ENHARMONIC - or diminished seventh - which Keely calls a ninth - inducing "infinite trajectory velocity" or "neutral radiation" from neutral centers.

The relations of the components of the electric streams are: Dominant E flat, harmonic A flat, enharmonic C double flat.

The keynote of electromagnetic sympathy in "transmissive combinations" is:

THIRDS ON FIRST OCTAVE SUBDIVISION B FLAT DIATONIC

SIXTHS ON SAME SUBDIVISION OF THIRDS

OCTAVE HARMONIC

NINTHS ON SAME SUBDIVISION OF SIXTHS OCTAVE ENHARMONIC

Through concordant disturbance of molecular oscillations, the relations of the component vibrations of matter may be altered by sounding the third, sixth and ninth of the scale.

Of these the third or DOMINANT, acting on a harmonically resonant mass, completely rearranges the modes of oscillation, either transforming the mass into its component initial forces or into some other form of matter.

The sixth or HARMONIC, through reduction of the range of molecular oscillation increases concentration or solidification.

The ninth or ENHARMONIC accelerates and extends molecular oscillation, causing molecular dissociation. This takes place when oscillation approaches, if not fully reaches, two-thirds of the molecular diameter.

The properties of the third and ninth are only displayed after use of the harmonizing concentrative chord of the sixth.

He states the "full harmonic chord" governs the magnetic flow and he infers from this that the magnetic flow moves in straight lines, free from molecular interference.

"In trexar vibratory transmission, any chord on the dominant will induce sympathetic affinity by molecular differentiation, the phenomena of which are similar in many ways to magnetism, but without a trace of true magnetism being present."

By means of the ninths, of which he was constructing an "infinite series" he believed he could perfect his "mechanical conditions" so far as to establish sympathetic affinity with pure, polar negative attraction minus magnetism. He writes "The infinite ninths I am now endeavoring to graduate to a sympathetic mechanical combination (his magnetic engine) will, if I succeed, complete my system and close my researches in sympathetic physics." (11)

THIRDS: "The first third is controlled by the molecular, the next progressive third by the atomic and the highest third by the ætheric." (1) See MINOR, DIFFERENTIATION, TRIUNE POLAR STREAM, MAGNETIC CURRENT, SYMPATHETIC TRANSMISSION, LAWS OF BEING

THIRDS: The interval comprised by two notes written on adjacent lines or spaces. A major third has two whole tones, a minor third a tone and a semitone, and a diminished third a whole tone.

The mode of a triad is determined by its third, as is

the mode of a scale, since the sixth and seventh degrees are treated as variable in the harmonic minor and melodic minor scales. The diminished third is most often used as the inversion of the **AUGMENTED SIXTH, INTERVAL, IMPERFECT INTERVAL** (21)

THIRTEENTH, CHORD OF: A chord called by some a suspension; by others, a secondary seventh. It consists generally of the 3rd, 7th, and 13th of the dominant, and is used both in the major and minor modes. (125) See **SEVENTH**

THIRTY SECOND NOTE: A demisemiquaver. (125) See **QUAVER; SEMIQUAVER; TIME**

THOMSON EFFECT: A phenomenon discovered in 1854 by William Thomson, later Lord Kelvin. He found that there occurs a reversible transverse heat flow into or out of a conductor of a particular metal, the direction depending upon whether a longitudinal electric current flows from colder to warmer metal or from warmer to colder. Any temperature gradient previously existing in the conductor is thus modified if a current is turned on. The Thomson effect does not occur in a current-carrying conductor which is initially at uniform temperature. See **PELTIER EFFECT, HALL EFFECT** (4)

THORACIC: Of the chest. (121)

THREE: Is the smallest number representing a complete form of harmony.

THREE REVOLVING BODIES: See **GEOMETRY, ASTRONOMICAL CIRCLES** See also (12)

THRESHOLD: The smallest change in the measured variable that will result in a measurable change in an output signal. (100)

THRESHOLD OF HEARING: [Acoustics] The lowest continuous sound pressure levels which will create an auditory sensation for the average human ear. Any sound below these levels will be inaudible and any sound above the threshold will vary in loudness depending on intensity. (85)

THRUST POSITION: See **AXIAL POSITION**. (100)

TIDES: Diurnal variation of the Magnetic needle coincides with the tides.

TIE: A curved line placed over two or more notes in the same position on the stave. The tie is also called a bind, and the curved line, when used over notes representing different sounds is called a slur. (125)

TIERCE: (1) A third. (2) An organ stop tuned a seventeenth above the diapason. (3) The natural harmonic produced by $\frac{1}{5}$ of the vibrating string. (125) See **ACOUSTICS**

TIMBRE: Quality of tone or sound. (125) See

ACOUSTICS §16

TIMBRE: All those qualities of a sound that make it distinctive. (69)

TIMBRE: Sounds are "communicated" when they are merely conveyed from one sounding body to another, and this can take place in a noise as well as a musical sound. Sounds are "excited" under two circumstances: when a body which is sounding and that to be excited have the same note and the vibration of one produces sympathetic vibration of the other, the bodies are mutually called "reciprocating", while of the vibration of one produces its harmonics in the other, the latter is said, with regard to the exciting body, to be "resonant". According to Helmholtz, "timbre" or "quality" depends on definite combinations or certain secondary sounds or harmonics with a primary or fundamental sound, and such combinations he calls "sound colours". (125) See **SYMPATHETIC VIBRATION; SOUND COLORS; EAR; RESONANCE; HARMONICS**

TIME: (1) The division of musical phrases into certain regulated portions measured with regard to the value of the notes with respect to the semibreve, which, in modern music, is held to be the standard of time. There are two sorts of time, duple with two, four, or eight beats in a bar, and triple with three beats in a bar. There is also compound time, or time formed of the union of triple with duple, and triple with triple, each having a distinctive time signature. (2) The pace at which a movement is performed is called its time. (125)

TIME-MASS: See **LEVITATION**.

TIME REVERSAL: The mathematical operation analogous to running a movie film backwards. (116)

TIME & SPACE: "Time, space, and patience, then, are those channels through which man as a finite mind may become aware of the infinite." (39) See **FORCE-ONE, RHYTHM, SPACE, GRAVITY (annihilated by), MUSIC**

TIME & SPACE: "Know, all time is one, - as is space, as is patience." (2012-1) (2) See **FORCE-ONE**

TIME BASE: See **WAVEFORM**. (100)

TIMER: See **PROGRAMMER**. (102)

TIMING MODULE: The electronic module controlling the pneumatic and electronic functions. (102)

TIMPANI: Kettle drums. (125)

TINTINNABULUM: A rattle formed either of small bells or little plates of metal. (125)

TIRADE: The filling up of an interval between two notes with a run, in vocal or instrumental music.

(125)

TON: (1) Tone, sound. (2) The interval of a second. (125)

TONAL FUGUE: See **FUGUE**

TONALITY: Relationship of the pitches defining a "key." (69)

TONARION: A pitch pipe used by the Latin orators for the purpose of regulating the pitch of their speaking voice, called also *fistula eburneola*. (125)

TONDICHTER: [Ger.] A composer. A poet *in sounds*, as a painter may be described as a poet *in colors*. This word has been badly rendered "tone poet". (125)

TONE: (1) Sound. (2) Quality of tone. (3) The interval of a second. See **ACOUSTICS §16; INTERVAL**

TONE ARM: The part of a record player that holds the cartridge and guides it across the record. It is precision made to move with minimal friction and to maintain correct stylus pressure on the record. (103)

TONE CONTROLS: Tone controls are usually two but sometimes four separate controls that adjust the treble and bass response of the stereo channels. The controls enable the listener to boost or cut (weaken) high or low notes to attain pleasing musical balance. (103)

TONE GENERATOR: See **ROOT; FUNDAMENTAL; TONIC**

TONE, SIMPLE OR COMPOUND: A Simple Tone is one that cannot be analyzed into two or more sounds of different pitch.

A Compound Tone or Clang is a tone which is made up of two or more Simple Tones of different pitch.

Almost all sounds employed in modern music are compound.

The Simple Tones that form part of a Compound Tone are termed *Partials* or *Partial Tones*. The lowest Partial of a Compound Tone is termed the *First Partial*; the next above, the *Second*; the next, the *Third*; and so on.

The first partial of a compound tone is also called the *fundamental tone*, and the others, *overtones*; thus the second partial is termed the *first overtone*; the third partial, the *second overtone*, and so on.

In almost all the compound tones used in modern music, the vibration numbers of the partial tones, starting with the fundamental, are in the ratios of

1:2:3:4:5:6:7:*etc.*

Any one or more of these partials, however, may be absent in any particular tone. Thus, for example, the even numbered partials are absent in the tones of cylindrical stopped pipes.

The relative intensities of the partials of compound tones vary almost infinitely. As a general, but by no means universal rule, the higher the order of the partial, the less is its intensity; that is to say, the first partial is generally louder than the second; the second louder than the third, and so on.

Approximately simple tones may be obtained from carefully bowed tuning forks mounted unsuitable resonance boxes; or from flutes and wide stopped organ pipes, gently blown.

If two pure musical tones are of the same pitch and of equal intensities, all those respects in which they yet differ, are included under the term *quality* or *timbre*.

The quality of a compound musical tone depends upon the number, order, and relative intensities of its constituent partials. Helmholtz has demonstrated this proposition by the analysis and synthesis of compound tones.

Just as pitch depends on wave length, and intensity on amplitude; so the quality of a tone (that is, the number, order, and relative intensity of its partials) depends on wave form.

A simple tone is the result of pendular sound waves or pendular vibrations, that is, of vibrations similar to those of a simple pendulum.

A compound tone is due to the combination of two or more pendular vibrations, or waves.

Every compound tone may be resolved into a certain number of simple tones, whose relative pitch follows the law of the partial series.

Similarly, every compound wave may be resolved into a certain number of simple pendular waves, whose lengths are in the ratios of

1: $\frac{1}{2}$: $\frac{1}{3}$: $\frac{1}{4}$: $\frac{1}{5}$:*etc.*

The form of the sound wave, therefore, determines the number, order, and relative intensities of the partials, that is, the quality of the resultant sound. On the other hand, given the quality, it is not possible to determine the corresponding wave form, since for any one such quality, there is an infinity of wave forms, due to the infinite number of relative positions or phases in which the constituent pendular waves may start.

The ear does not perceive a compound tone as such, but analyses it into its constituent pendular waves, each of these latter producing the sensation of a simple tone at its own particular pitch and intensity. (68)

TONE, MINOR OR MAJOR: See **INTERVAL**.

TONIC: (1) The keynote of any scale. The ground tone or basis of a scale or key. (2) The key-chord in which a piece is written, and with which it concludes. (125)

TONIC: The center fifth of a key-system composed of three fifths. (8)

TONIC SOL-FA: A letter system of notation. Many attempts have from time to time been made to produce a simpler notation than the stave, clefs, signature, etc. of the so-called "Old Notation". (125)

TONKUNST: [Ger.] The art and science of music. (125)

TONOX: A material used for the tip of a proximity probe which can be used in highly caustic (basic) environments. Tonox is a base-cured epoxy fiber resin which is inert to caustic environments. Tonox has been replaced by Rytan for some Bentley Nevada probe designs. (100)

TOOL: See **HORN**. (102)

TOP QUARK: The as yet undiscovered quark that is the partner of the bottom quark. (116)

TOPH: [Heb.] A drum. (125) See **TAMBOR**

TORCELLI: A name anciently given to organs in Italy. (125)

TORQUE: A torque is a concept which may be simply expressed as the effectiveness of a force in setting a body into rotation. 1. For a single particle with respect to a particular origin. This is expressed by the vector relation $L = r \times F$, where L is the torque, r is the position vector relation respect to the origin, and F is the resultant force. The torque is equal to the time rate of change of the moment of momentum. 2. For a rigid body, the torque respect to a set of axes is expressed by the relation:

$$L = vr \times Fv dv$$

where Fv is the resultant force per unit volume due to external forces on the element dv , and r is the position vector of the volume element. For a rigid body undergoing free rotation about a single axis, the torque $L = I$, where I is the moment of inertia and is the angular acceleration. 3. In engineering mechanics usage, a torque often refers to the torsional or twisting moment or couple which tends to twist a rigidly fixed object such as a shaft about an axis of rotation. (100)

TORSIONAL VIBRATION: Amplitude modulation of torque measured in degrees peak-to-peak referenced to the axis of the shaft rotation. (100)

TOTAL ABSORPTION: [Acoustics] Total absorption of a surface is the product of the absorption coef-

ficient of that surface and surface area. $A = S\alpha$ where units of A are Sabins if S is in square feet, and metric Sabins if S is in square meters. (85)

TOUCH: (1) The resistance made to the fingers by the keys of a piano or organ. Thus the touch of the keyboard may be hard or light accordingly as the resistance is great or little. (2) The peculiar manner in which a player presses the keyboard, whether light, pearly, heavy, clumsy, firm, etc. (125)

TOUCH TONE DETECTOR: See **DUAL TONE MULTI-FREQUENCY** (DTMF) systems. Achieves virtually error-free detection of tone pairs in DTMF signalling systems.

TRACHEA: See **LARYNX**

TRACK: Up to four separate recordings lie side-to-side on the same tape - each of these is called a track. On standard four-track tape, each track occupies slightly less than one-fourth the width of the tape. When track is used as a verb (to track) it means the ability of the stylus to follow the record groove accurately. (103)

TRACKING ERROR: Tracking error is an expression describing a less-than-optimum angle of the phonograph cartridge with respect to the record groove as the arm glides across the disc. Ideally, the cartridge should always remain perfectly tangent to the groove; practically, this is impossible because the arm does not move across the record in a straight line but in a slight arc as it swivels on its pivot. The deviation from the position of true tangency at any point on the record is called the tracking error. It is expressed as the angle between the true tangent to the record groove and the length-wise axis of the cartridge. The geometry of a well designed tone arm - its curves and dimensions - is carefully calculated to reduce the tracking error to a minimum and to keep it minimal all the way across the record. A low tracking error reduces distortion, particularly at the inner grooves of a record, where the mechanical problems of reproduction are particularly aggravated by the smaller arcs encountered. (103)

TRACKING FILTER: See **VECTOR FILTER**. (100)

TRACTUS: A melody sung in the Roman Catholic Church during Lent instead of the Alleluia. (125)

TRANSCRIPTION: The arrangement or modification of a composition for some instrument or voice other than that for which it was originally written. (125)

TRANSDUCER: A device for translating the magnitude of one quantity into another quantity. The second quantity often has units of measure different from the first and serves as the source of a useful signal. Vibration transducers convert mechanical motion into a proportional electronic signal (typically a voltage-proportional signal). (100)

TRANSDUCER: The component in the converter housing that converts electrical energy to mechanical energy. (102)

TRANSFERENCE (OR TRANSPORT) NUMBER: (t) The transference number of each ion of a solute (or electrolyte) in an electrolytic solution is the fraction of the total current carried by that ion, and is given by the ratio of the mobility of the ion to the sum of the mobilities of the ions of the solute constituting the electrolytic solution.

TRANSFORMISM: The evolution of species. (121) See **EVOLUTION**.

TRANSIENT DYNAMIC DATA: Dynamic data which is acquired while the machine is under changing conditions (speed, load, start-up, shutdown, *etc.*). Typical displays include Bod, polar, and cascade. (100)

TRANSIENT MODULATION: The temporary introduction of chords or progressions from an unrelated key. (125) See **MODULATION**

TRANSIENT RESPONSE: See **STEP RESPONSE**. The ability of a filter to cope with fast, nonsinusoidal waveforms. Often specified graphically, showing ringing and/or overshoots in the amplitude response versus time.

TRANSIENT SOUNDS: [Acoustics] Sounds which are audible for a limited period of time, *e.g.*, sounds from airplane flyover. (85)

TRANSIENT VIBRATION: Temporarily sustained vibration of a mechanical system. It may consist of forced or free vibration or both. Typically this is associated with changes in machine operating condition such as speed, load, *etc.* (100)

TRANSITION: (1) A modulation. (2) A passing note. (125) See **MODULATION**; **PASSING NOTE**

TRANSITION BAND: The range of frequencies that bound a passband/stopband interface.

TRANSLATIONAL BALANCE RESONANCE: A balance resonance during which the shaft dynamic mode shape assumes a simple single arc. Theoretically, below the translational balance resonance, the axis of rotation is the shaft geometric centerline - above the translational balance resonance, the axis of rotation is the shaft mass centerline (principal inertia axis) - and during the translational balance resonance region the axis of rotation translates (moves) from the shaft geometric centerline to the shaft mass centerline. Thus, a rotor corrects itself for its residual static mass imbalance distribution above this speed range. Again, theoretically, one nodal point will exist at each end of the rotor; however, depending on bearing stiffness, the nodes may be outside (outboard) of each end of the shaft. (100)

TRANSLATORY PENDULOUS MOTION: See **FRAUNHOFER LINES**.

TRANSMITTER WIRES: "The principal difficulty rests in equating the thirds of the thirds of the transmitters (*i.e.*, the gold, silver, and platina sections, of which the transmitting wires are composed) to free them of molecular differentiation. The full control of this force can never be accomplished, until pure molecular equation is established between the nodal interferences (that result in their manufacture) and the chord mass of their sectional parts. When this has been done, the chasm between the alteration of the polar forces, which now exists, preventing the inducing of polar and depolar conditions, will be bridged over and commercial benefits at once established as the result. The devices for inducing these conditions, primarily, are perfect; but the pure, connective link on transmission has to be equated, before continued mechanical rotation and reversion can be attained." (1) pg 334

TRANSMISSIVE ENERGY: "Transmissive energy is rhythmical motion of condensation and rarefaction produced by the vibrating or oscillating body in the medium in which it is immersed." (9)

TRANSMITTANCE: Ratio of the radiant power transmitted by a sample to the radiant power transmitted by a blank in an equivalent cell or by some other means of compensation for solvent absorption, reflection losses, *etc.* (not used: transmittancy or transmission). (5)

TRANSMUTATION, ELEMENTAL: See **NUCLEAR INTERACTION**. (67)

TRANSMUTATION BY SYMPATHETIC VIBRATION: Keely says "When the æther flows from a tube the negative center represents molecular subdivision and carries interstitially between the molecules the lowest order of liberated ozone. This is the first order of ozone, wonderfully refreshing and vitalizing to breathe. The second or atomic order ozone, releases a much higher grade of ozone, too pure for inhalation, for it produces insensibility. The third or ætheric order of ozone is used in the carbon register to produce the high vibratory circuit which breaks up cohesion - which I recognize as molecular magnetism."

Keely demonstrated to his own satisfaction that progressive subdivision evolves new and distinct elements "too multiple to enumerate." But he was not primarily interested in transmutation, and so intent was he on unlocking the vast storehouse of Nature's illimitable energy that he did not give the deeper significance of the transmutation going on in his disintegratory sphere, more than a passing thought. When cleaning out his sphere which he had used for some time in the disintegration of water, he found a gummy substance, which was tested, either by himself or some one else, in a flame and the emitted spectrum

examined. Whoever did the testing claimed that the lines of nitrogen were present, but in the comparatively crude knowledge of that day, they would have been unable to recognize even an isomer of oxygen or nitrogen, not to speak of an absolutely new element of gaseous form. Professor Crookes, on hearing the published news that Keely had discovered nitrogen in his disintegratory sphere, practically called Keely an impostor and ridiculed the possibility of obtaining nitrogen even, from hydrogen and water. But how prophetically has radium, the wonder element, changed the minds of the "scientific" generation that ridiculed Keely! Under the eyes that cannot doubt because they cannot fail to see the phenomena of radium that come within the ken of their puny intellects, this element, which belongs to the heaviest group in the Periodic Table, together with Uranium and two others which exist but are unknown, are commencing their long, long journey back to the source from which they originally came, Wanderers to the very outermost frontiers of the Objective Reality, having accomplished the utmost possible individuality possible to the imprisoned Will in Matter, they have heard the call of the Voice which bids them return. The ancient prophecy that the earth will be destroyed by fire is being accomplished under our very observation and the disintegration of radium is only the beginning of the conflagration that shall light our earth to a flame that shall be seen as far as Sirius, the Dog Star. This will take untold millenniums to accomplish, and in the meantime Man will lose the grossness and materiality that marks his present day character and will become ethereal in substance, so that he will survive as a Being of the Fourth, Fifth, Sixth and Seventh Dimensions, until he has accomplished the uttermost possible Universality in the other swing of the Cosmic Pendulum to the other Pole of Existence, the realization of the Inner Reality. Together with Transmutation of Matter comes the Transmutation of the Soul. (11)

TRANSCOPE: To alter the key in which a piece is set, by changing it into a higher or lower scale. (125)

TRANSPOSING INSTRUMENTS: A general name for all instruments which do not produce the exact sounds written on paper for them (125)

TRANSPPOSITION: (1) A change of key. (2) An inversion of parts in counterpoint. (125) See **TRANSCOPE**

TRANSPPOSITION: Changing from one key signature to another. (69)

TRANVERSE SENSITIVITY: See **AXIS SENSITIVITY**. (100)

TRANVERSE VIBRATION: See **ACOUSTICS §14; MATTER, LIGHT, VIBRATION MODE**

TRANVERSE VIBRATION: Vibration in which the principal motion is at right angles to the longest dimension. (75) See **ACOUSTICS §14**

TRARAMES: An invisible power that may communicate with man through sounds, voices, ringing of bells, noises, etc. (131)

TREBLE: (1) The highest vocal or instrumental part, sung by women or boys, or played by violins, flutes, oboes, clarinets, or other instruments of acute tone. (2) The treble or soprano voice is the most flexible of all vocal registers, its ordinary compass is from middle C upwards to the extent of a twelfth, its exceptional range a fifteenth, or even beyond this. (125) See **TRIPLEX**

TREBLE CLEF: The G clef on the second line of the staff, used for treble voices and instruments of high and medium pitch, such as flutes, oboes, clarinets, horns, violins, and trumpets. (125) See **STAVE; CLEF**

TREMOLO: Amplitude modulation. (69)

TREXAR: A wire made of sections of silver, gold and platinum, respectively, is peculiarly adapted to transmit concordant vibrations in the relations of thirds, their range of molecular oscillation being in the proportion of 3:6:9 respectively. The Trexar is this wire composed of: a first section of silver, a second section of gold and a third section of platinum, all uniform in size, which is used as a conductor in vibratory transmission and for the multiplication of vibrational frequencies.

Silver represents the third, gold the sixth and platinum the ninth, in their respective relative molecular oscillating ranges. This triune condition will equate thirds in vibratory frequencies, that is, chords in intervals of thirds will set up disturbances in the Trexar and these disturbances will be equated so as to be transmitted as thirds from the positive or farthest end of the wire.

"There is no medium used in vibratory research so unerringly exact in effecting sympathetic negative attraction as the Trexar. This combination as accurately indicates the action of the earth's sympathetic envelope in its triple focalized action towards the earth's neutral center, as the magnet unfailingly indicates the dominant electric flow."

"Differential molecular volume is required to equate differentiation of sympathetic flows. This condition is satisfied by the Trexar. Two differing molecular densities, represented by two different mediums, make possible the harmonious adjustment of the thirds."

"When an introductory transmissive sympathetic chord (say B flat) is conducted along a sectional transmitting wire the molecular triple (intermolecule) is carried along by induced differentiation and it in turn excites high sympathy with the polar terrestrial stream which, being triune in character, requires a triune differential sympathizer of the same ratio of frequency. This is satisfied by the Trexar, consisting

of sections of silver the harmonic, gold the enharmonic and platinum the dominant. When the Trexar is properly sensitized by any chord on the dominant, molecular differentiation is induced, the phenomena approaching magnetism is effect, but without a trace of true magnetism being present."

By means of sympathetic vibrations transmitted through the Trexar, which is elsewhere mentioned as consisting of "German silver, *etc.*" Keely elaborated a system of inducing great range of motion on metallic masses by sympathetic negative attraction, and by periodic vibratory change of their neutral centers instantly depolarized them, thus securing rotation. (11)

TREXNONAR: It took Keely eight years to perfect the Trexar and the Trexnonar (Trexar used with nine nodes, the first three of silver, the second three of gold and the third three of platinum). He states that during the time he was perfecting the Trexnonar the intermissions of vibratory transmission through the wire were so frequent and of such length, preventing continuity of mechanical motion, that he was about to give up when a seeming accident revealed the truth of his former theory of the law governing the atomic triplets in their association. He states that compound negative vibration of the neutral centers of the molecules in the Trexar and Trexnonar causes antagonism by differentiation and the attractive power of aggregation becomes radiant force with immense rotational velocity, carrying the "force" beyond the molecular inner one-third sphere of coincidence.

When using the Trexar or Trexnonar, a "slight tap on the Chladni wave plate" accelerates the normal molecular frequency from 20,000 to 180,000 or 9 times. The sectional ratio is 3:6:9 or $(9/3)^2$ or 9 times. Here the nine nodes touch the extreme end, and next to the mass being operated on, in which position they are not in use.

"Now if we shift a gold node along the third or platinum section the oscillatory multiplication will be 9×9 or 81 times the normal 20,000 or 1,620,000 oscillations per second. A gold node shifted over the extreme section will hold the frequency to 1,620,000 per second with the introductory chord of B third octave."

"When using nine nodes, silver, gold and platinum nodes come in the order given, but when associating the seventh node (Trisexar) the gold node comes first and platinum, its third higher, comes last. I always end with the triplet higher."

"Using the second node of platinum raises this frequency to the 81st power, or 1,620,000⁸¹ or far beyond computation and represents the effect of only two nodes."

"Transmitting the order of sympathetic atomic vibration through a three-node transmitter (Trextrinar) induces interatomic percussion resulting in triple atomic subdivision not by oscillation of the atoms

across their diameter but by infinite acceleration of the atomic film or ætheric capsule, and at the same time permitting the extension of atomic vibration far enough to set free the gaseous atomic element. (This last must refer to the force generated by multiplication of vibratory frequencies in the Trexar as used with the different node combinations. This disintegration Keely claimed was caused chiefly by accelerating the atomic envelope.)

"To rotate the neutral center indicator of the focalizing disk (of the magnetic engine) through a soft steel attractor requires transmission of the full triple-triple chord, or 156,057,552,198,-220,000 corpuscular oscillations per second, resulting in 110 revolutions per minute on the neutral center indicator. This is only multiplication by the one gold node."

"By using the second node of platinum we can raise this frequency to its 81st power, or 156,057,552,198,220,000⁸¹ or infinitely beyond computation. This frequency represents the effect of only two nodes."

"I have induced rotation up to 123 revolutions per second on a neutral indicator, which required billions of vibrations per second, but even this frequency is only a minute fraction of the frequencies governing the vitality of the far-luminous centers."

"The compounding of the triple-triple or chords in three octaves, will give from the ninth node a frequency that, set down in figures, would represent a number a mile long." (11)

TREXNONAR MEASUREMENT OF MOLECULAR OSCILLATING FREQUENCIES: Even if we could observe and follow with the finest researching instruments now in existence, the molecular oscillations under acceleration, we could not determine their frequencies. Direct observation is not only impossible, but would also, even if possible, be unreliable.

"My researches indicate but one reliable method of ascertaining the exact molecular frequencies and range of vibration. A wire should have placed on it a definite number of nodes of the three metals silver, gold and platinum, and an acoustic introductory impulse should be given. We must now compute the intermittent periodic disturbances (molecular vibration time intervals) by adjusting the spaces between the nodes to such a distance apart as will equalize by their respective frequency-multiplying power, the chord masses of the nodal interferences between the three nodal metals. (Nodal here refers to the metal beads, not the vibration nodes as set up in a vibrating string.) This will determine the rate of molecular oscillation induced beyond the normal and give definite values of vibrations thousands of billions of times exceeding the frequency of light."

When nodes of silver, gold and platinum, respectively, are placed upon a homogeneous wire acting as

a transmitter of resonant vibrations, these nodes indicate by the different orders of vibration, or induced frequencies, the atomic oscillating frequency of the transmitting wire. (11)

TRIAD: (1) A chord of three notes. (2) A common chord. Triads are said to be major, minor, augmented, and diminished. (125)

TRIANGLE: An instrument of steel bent into a three-sided form. It is usually held by a string in the left hand and struck with a small bar of iron or steel with the right. It is employed with effect occasionally as an orchestral instrument. (125)

TRIANGLE: "The circle and the equilateral triangle are opposite to one another in all the elements of their construction." (12) See **GEOMETRY, THREE, CIRCLE**

TRIASSIC: A geological period. (121)

TRIBRACH: A foot consisting of three short syllables. (125) See **METRE**

TRICINIUM: A composition in three parts. (125)

TRIGGER: Any event which can be used as a timing reference. A trigger for an oscilloscope will initiate the sweep of the beam across the face of the CRT. A trigger signal for a digital vector filter is a Keyphasor pulse which serves to align the center frequency and the band-pass filter to shaft rotative speed and to probe a reference from which to measure rotative speed, 1X amplitude, and phase angle. (100)

TRIGGER: Electronic impulse used most often to activate envelope generators. (69)

TRIHEMITONE: Interval of one and a half tones, undivided. (81)

TRILL: A shake. (125)

TRI NUMBERS: A classification of numbers similar to mod 3 numbers but lead through different channels to comply with the requirements of Quantum Arithmetic. A 2-tri number is a number in the form of $3n-1$. A 3-tri number is a $3n$ number. A 4-tri number is a number in the form of $3n+1$. (14)

TRIO: A composition for three voices or instruments. (125)

TRIOLET: A triplet. Three notes played in the time of two of the same name. (125)

TRIPHONIC: Having three sounds. (125)

TRIP MULTIPLIER: That function provided in a monitor system to temporarily increase the alarm (Alert and Danger) set point values by a specific multiple (usually two or three). This function is normally applied by manual (operator) action during start-up to allow a machine to pass through high vi-

bration speed ranges without excessive monitor alarm indications. Such high vibration speed ranges may include system resonances and other normal transient vibrations. Also called set point multiplier. (100)

TRIPLE CENTERS: "The triple centers are the foundation of the Universe, and mathematically considered, the respective and relative motion of these atomic triplets." (1) See **ATOMIC TRIPLETS, TRIPLE FLOWS, QUADRATURE OF THE CIRCLE, THREE REVOLVING BODIES**

TRIPLE CHORD: "The human ear cannot detect the triple chord of any vibration, or sounding note, but every sound that is induced of any range, high or low, is governed by the same laws, as regards triple action of such, that govern every sympathetic flow in Nature. Were it not for these triple vibratory conditions, change of polarity could never be effected, and consequently there could be no rotation. Thus the compounding of the triple triple, to produce the effect, would give a vibration in multiplication reaching the ninth, in order to induce subservience, the enumeration of which would be folly to undertake, as the result would be a string nearly a mile in length to denote it." (1) pg 180 See **ACOUSTICS §14; KEY-NOTE, CHORD**

TRIPLE CROCHET: A demisemiquaver. (125)

TRIPLE COUNTERPOINT: A counterpoint in three parts, so contrived that each part will serve for bass, middle, or upper part as required. (125) See **COUNTERPOINT**

TRIPLE CURRENTS:

1st Dominant : High Vibratory : Harmonic Tones (?)
2nd Sub-Dominant : Low Vibratory : Summation Tones
3rd Harmonic : Undulatory : Difference Tones

TRIPLE FLOWS: "All sympathetic streams, cerebellic, gravitation, magnetic and electric, are composed of triple flows, this fact governing all terrestrial and celestial orders of positive and negative radiation. In gravity it would be more correct to speak of triple connective links, as there is no flow of gravity." (1) See also See **ACOUSTICS §14; ATOMIC TRIPLETS, TRIPLE CENTERS, QUADRATURE OF THE CIRCLE, THREE REVOLVING BODIES, MOLECULAR DISSOCIATION, LAWS OF BEING**

TRIPLE ORDER OF VIBRATION: See **ACOUSTICS §14; WATER-DISSOCIATION, ORDERS OF VIBRATION, RATES OF VIBRATION**

TRIPLE TIME: Time of three beats or three times three beats per bar. (125)

TRIPLE VACUUM EVOLUTIONS: See **ATOMIC TRIPLETS, QUADRATURE OF THE CIRCLE**

TRIPLET: A group of three notes performed in the time of two. The triplet is always indicated by a slur and the figure 3. (125)

TRIPLETS: See **LAW of VIBRATING STRINGS-#4,**

ATOMIC TRIPLETS

TRIPLEX: The name originally given to a third part when added to two other parts, one of which was a *canto fermo*, the other a *counterpoint*. This additional part was generally the *upper part*, hence the word *treble* or *triplex* came to be applied to the *canto primo*. (2) A motet or other composition in three parts. (125)

TRISAGION: Thrice holy. (125)

TRISEXAR: See *Trexnonar*

TRITE: Implies third: third string of the tetrachord of the hyperbolaion and of the disjunct tetrachord, going from high to low. (81) See **GREEK MUSIC**

TRITONE: An augmented fourth, containing three whole tones. The use of the tritone was anciently forbidden in harmony or counterpoint, as it was regarded in the light of what is called a *false relation*. It was not permitted to be employed in the upper note of one chord and the lower note of the following. In each case it was called *mi contra fa*, the leading or sensitive note being known as *mi*, and according to the old rules, *mi contra fa diabolus est*. (125) See **FALSE RELATION; INTERVAL**.

TRIUNE POLAR STREAM: "Triune Polar stream is composed of three currents, the third is magnetic flow (as in a magnet). pp 314 of (1) See **MASS, MAGNETISM, GRAVITATION, VIBRATORY NEUTRAL NEGATIVE ATTRACTION, MOLECULAR DISSOCIATION**

TRIUNE STREAM: See **TRIPLE FLOWS, TRIPLE CURRENTS, LAW OF TRIANGLE, LAWS OF BEING**

TRIUNE TERRESTRIAL STREAM: See **HARMONIC ATTRACTIVE CHORD**

TROCHEE: A foot consisting of one long and one short syllable. (125) See **METRE**

TROLL: To take part in a catch or round, the voices succeeding each other at regulated intervals with the same melody. (125)

TROPISMS or TROPISMATA: Inclinations manifested by lowly organisms. (121) See **LATENT FORCE**

TSADI: The 18th Hebrew letter, Tsadi (Ts), means literally a fishing hook. The form of this letter is highly suggestive of this significance. We have found curious books on alchemy dealing with its connection with that mysterious Leviathan concerning which the searching question is raised in that wondrous epic poem known as *JOB*, "Canst thou draw out Leviathan with a hook?" (*Job XL, 1*). Tsadi, being the 18th letter, is said to share many of the qualities ascribed to the 8th letter Heth, but to possess these qualities on a higher plane and to express them in a more definitely spiritual manner. Tsadi has been termed the spiritual

hook ever baited and set in the sea of Heth. It may be remembered that the 18th figure in the Tarot, corresponding with Heth, is the Moon, which is there exhibited as standing or shining over a field in which we behold 3 living creatures - a dog, a wolf and a fish. The moon is represented as shedding blood upon the earth, and as blood contains the vital principle, in all schools it is taught that the symbol of pouring out blood signifies conveying vitalizing energy. (72)

TUBE RESONATOR: All hollow spheres, of certain diameters, represent, as per diameters, and their volumes of molecular mass, pure, unadulterated, sympathetic resonance towards the enharmonic and diatonic thirds of any, and in fact all, concordant sounds. In tubes it is adversely different, requiring a definite number of them so graduated as to represent a conflation by thirds, sixths and ninths, as towards the harmonic scale. When the conditions are established, the acoustic result of this combination, when focalized, represents concordant harmony, as between the chord mass of the instrument to be operated and the chord mass of the tubes of resonance. Therefore the shortest way towards establishing pure concordance, between any number of resonating mediums, is by the position that Nature herself assumes in her multitudinous arrangements of the varied forms and volumes of matter -- the spherical. (Snell Manuscript page 21)

In order that a column of air, in cylindrical tube open at both ends, may vibrate in unison with a given sound, the length of the tube must be approximately one half the length of the corresponding sound wave.

If the tube be closed at one end, its length must be one fourth that of the sound wave.

In both cases the diameter of the tube should not exceed one sixth the length. (68) See **ACOUSTICS §14, 15, 16**

TUNE: (1) A melody or air. (2) Just intonation. (125)

TUNER: Tuner refers to the section of a component system that tunes in radio broadcasts so that they may be played through the amplifier and speakers of the sound system. In contrast to ordinary radios, tuners are engineered for high-quality reception. They are available for all forms of broadcasting: AM and FM as well as stereo FM. (103)

TUNGSTEN: See **FORCE-ATOMIC**

TUNING: The act of setting filter corner or center frequencies by adjusting internal time constants. Designs tunable by external voltage, digital signals or resistive trim are standard commercial products.

TUNING: The adjustment of the sounds naturally produced by any instrument to some standard pitch and to their proper relation to each other. (125)

TUNING FORK: An instrument of steel with two

prongs, which when set in vibration gives out a musical sound varying in pitch according to the thickness of the metal or the length or width apart of the prongs. It was invented by John Shore, sergeant trumpeter to George I. There is a considerable variety in the pitch of tuning forks, arising from the absence of any recognized standard of tonality. The ordinary fork gives out a single note only, but one has been introduced from Germany which has a slider on each prong which can be moved up or down so as to alter the pitch. (125)

TUNING FORK: Explained in (6) pg 166-168

TUNING HAMMER: An instrument employed for tuning pianos or harps. It is shaped like a common hammer but has a head of wood instead of iron and a shank of iron instead of wood. (125)

TUNING THE SYSTEM: Matching electrical operating frequency to the mechanical resonant frequency of the transducer assembly and horn. (102)

TURBINE SUPERVISORY INSTRUMENTATION: A TSI system is a continuous monitoring system generally used on turbogenerator sets. It can include such measurement parameters as shaft radial vibration, shaft absolute vibration, axial thrust position, differential expansion, case expansion, valve position, eccentricity peak-to-peak, zero speed, and shaft rotative speed. The system may also include a vector filter which measures vibration phase angle for each vibration channel. The TSI system consists of measurement transducers, monitors, interconnecting wiring and usually strip chart recorders or a microprocessor-based data acquisition system. (100)

TURGOR: Pressure, turgidity - hydrostatic pressure on inside of cell walls. In plants regulated by auxin, in animal actin.

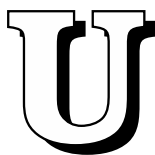
TURN: An ornament in music formed by taking the adjoining notes above or below the principal note, according to the position of that note in the diatonic scale. (125)

TWEETERS: Tweeters are loudspeakers that specialize in reproducing high notes. Since the physical requirements for producing high notes differ from those for producing bass, audio designers favor a division of labor in speaker systems, entrusting the top notes to tweeters while the lower range is handled by woofers. Sometimes there is a three-way division of frequencies, which requires the use of a special mid-range unit also. By thus dividing the sound spectrum between two or more speakers, treble and bass are kept from interfering with each other, and intermodulation distortion within the loudspeaker is avoided. To a great extent, the quality of the tweeter determines the overall character of sound in a speaker system. A good tweeter must be free of spurious resonances (response peaks) that would cause a shrill or otherwise harsh sound. Moreover, it must scatter the highs broadly, spreading them evenly throughout the

room. Wide-angle treble dispersion adds greatly to the stereo effect and to openness of the sound. Various methods are used in tweeters to achieve wide dispersion: dome-shaped diaphragms, flared horns, or sound-deflecting structures mounted in or in front of the tweeter cones. (103)

TWELFTH: (1) An interval of twelve diatonic degrees, the replicate of the fifth. (2) An organ stop tuned twelve notes above the diapason. (125)

TYRO: A learner or beginner in music or any other science. (125)



UGAB: The first wind instrument mentioned in the Bible, rendered organ in the authorized version. (125)

ULTRA-ACTINIC RAYS: See **FRAUNHOFER LINES**.

ULTRAMONTANISM: Allegiance to Rome. (121)

ULTRASONIC MEASUREMENT METHOD: For rolling element bearing analysis, a technique which uses a crystal transducer to detect energy in the 36 to 44 kHz spectral region and displays relative amplitude on an analog meter. It may be used with lower frequency signals that are provided to an operator on earphones. (100)

ULTRASONIC TESTING: [NDT] Ultrasonic testing uses the transmission of high-frequency sound waves into a material to detect imperfections within the material or changes in material properties. The most commonly used ultrasonic testing technique is pulse echo wherein sound is introduced into the test object and reflections (echoes) are returned to a receiver from internal imperfections or from geometrical surfaces of the part.

ULTRASOUND: Vibrations above the audible range of human hearing (18 kHz). (102)

ULTRAVIOLET: Produces Vitamin D. (40)

ULTRAVIOLET RAYS: The ultraviolet rays reflected from the snow are almost all that are present in sunlight. (41)

ULTRAVIOLET REGION: 10 to 380 nm. Usually refers to region from 200 to 380 nm. (5)

UMBRATILES: Shadows; astral appearances becoming visible and sometimes tangible (modern spiritualistic form manifestations); the Scin-lecca, or wraith, or the German Doppelgaenger of a person. They may become visible by attracting ethereal material elements from the body of a medium, or any other person in whom there is little cohesion of his lower elements in consequence of some diseases, or on account of inherited peculiarities of his organization; or they may attract them from the surrounding atmosphere. Their life is borrowed from the medium, and if it were prevented to return to the medium, the latter

would be paralyzed or die. (131) See **EVESTRUM; ECTOPLASM; FORMS, THOUGHT**

UN, UNA, UNO: One. (125)

UNBALANCE: See **IMBALANCE**. (100)

UNCERTAINTY PRINCIPLE: The principle that states that it is impossible to measure both the position and momentum of a particle with infinite accuracy. (116)

UNCOUPLED: A direction that the manual or pedal is to be detached from the row to which it was coupled. (125)

UNDECIMA: An eleventh. (125)

UNDERTONES: See **ACOUSTICS §19; FRAUNHOFER LINES; SUBHARMONICS**.

UNEQUAL TEMPERAMENT: See **TEMPERAMENT**.

UNDULATORY: See **ATOMIC THEORY-KEELY'S**

UNESSENTIALS: Notes not forming a necessary part of the harmony. Passing, auxiliary or ornamental notes. (125)

UNIFIED FIELD THEORY: A theory in which two or more interactions are seen to be different aspects of a single process. (116)

UNFED FLAME: See **NIGHTSIDE; NAVAZ; ONE SUBSTANCE; SUN; BROWN'S GAS; ETHER**

UNFILTERED DATA: See **STATIC DATA**. (100)

UNICELLULAR: Consisting of one cell. (121)

UNISON: (1) Having the same number of vibrations; homophonous. (2) Music in octaves for mixed voices or instruments. (3) Unisons; two or more parts playing in unison with each other, or at the octave, according to the character of the instrument or voice. (125)

UNITY OF MATTER: See **MATTER, UNITY OF**.

(88)

UNIVERSAL ACTIVE FILTER (UAF): An array of state variable filters connected as a miniature externally-adjustable multiple-output active filter building block. Several UAFs can be interconnected (cascaded) to realize complex filter functions.

UNIVERSAL FLUID: "It will be said that it is pantheism to assert that matter, under all the forms which it presents, is only groups of aggregates of sympathetic molecules, of a substance unalterable in its individualities; a thinking, acting substance. Let us not deny what we are unable to explain. God is all that is, without everything that is being individually God. ætheric force has been compared to the trunk of a tree, the roots of which rest in Infinity. The branches of the tree correspond to the various modifications of this one force, - heat, light, electricity, and its antagonistic force, magnetism. It is held in suspension in our atmosphere. It exists throughout the universe. Actual science not admitting a void, then all things must touch one another. To touch is to be but one by contiguity, or there would be between one thing and another something which might be termed space, or nothing. Now, as nothing cannot exist, there must be something between "the atomic triplets" which are, according to the Keely theory, found in each molecule. This something in the molecule he affirms to be "the universal fluid," or molecular æther. One thing touching another, all must therefore be all in all, and through all, by the sensitive combination of all the molecules in the universe, as is demonstrated by electricity, galvanism, the lode-stone, *etc.* If we account for the intelligent action of molecules by attributing it to what has been variously called "the universal fluid," "the electric fluid," "the galvanic fluid," "the nervous fluid," "the magnetic fluid," it will only be substituting one name for another; it is still some part or other of the organization which discerns and joins to itself a portion of one of the fluids referred to, or one of these fluids which discerns and mingles with the material molecules; it is still the life of the part, the life of the molecule, life individualized in all and through all.

"Admitting, then, that there is a universal fluid, it must exist in and through all things. If void does not exist, everything is full; if all is full, everything is in contact; if everything is in contact, the whole influences and is influenced, because all is life; and life is movement, because movement is a continual disunion and union of all the molecules which compose the whole. The ancient philosophers admitted all this."
(1) See **MONISM, ONE FORCE, ONE SUBSTANCE**

UNIVERSAL SUBSTANCE: See **MONISM, ONE FORCE, ONE SUBSTANCE, UNIVERSAL FLUID.**

UPBEAT: The beat of a bar at which the hand is raised. An accented beat. (125) See **ACCENT; ARSIS; METRE**

UPBOW: See **BOW**

UPPATURA: A song of a profane character, forbidden to be sung in church by the Constitution of the Carmelite order. (125)

URANUS: "Those activities in Uranus indicate extremes, as in combinations in music and arts." (3407-1) (2)

"In the Uranian influence, we will find the extremes." (2005-1) (2)

"...Uranian tendency toward extremes..." (2902-1)

"As for the aspects in the Uranian influence, we find the extremes ... at times very beautiful in character, at others very ugly; very beautiful in body and mind, at others the other extreme ..." (1958-1) (2)

UT: See **ARETENIAN SYLLABLES; NOTATION**

UTERUS: The womb. (121)

UT SUPRA: As above, as before. (125)

UVULA: See **LARYNX**



VACUUM: [Editor's Note: A vacuum is similar in principle to the female principle. Create a vacuum and something will fill it. There is no such thing as an absolute vacuum - there are always sub-atomic particles within even the hardest vacuum.]

"I am working in a new lead and propose to show my introductory evolutions in proof of the negatization of an ætheric substance to produce vacuum. Professor Rogers saw the operation of inducing these ætheric vacuums and pronounced the result wonderful I showed from one to fourteen lbs. during the evolutions." (Keely) See **IMPULSE, NEGATIVE ATTRACTION, LEVITATION, FORCE-ATOMIC**

VACUUM: The charge of vacuum spacetime is assumed to be zero, when in fact it is a very high value. Vacuum has no mass, but it has great massless charge and virtual particle charge flux. For proof that a charged vacuum is the seat of something in motion, (86). In fact, vacuum is charge, identically, and it is also "spacetime" and at least four-dimensional. (48)

VACUUM: Created by sound or vibration. (6) pg 179.

VACUUM: "With the assumption that their radial forces are thrown off this planet at or near Cancer and Capricorn, then it were possible when the vibrations of sun's rays at a certain deflection on passing through these emanating radial vibrations to set up a partial vacuum, thereby causing winds." (195-70) (2) See **FORCE-RADIAL TERRESTRIAL STREAM, ATOMIC ENERGY RADIATION ANGLE, FORCE-ATOMIC**

VACUUM HORN: A horn with a hole at its frontal surface and a vacuum pump connection on its side for holding small inserts by suction prior to assembly, assuring accurate placement. (102)

VACUUMS FROM VIBRATORY INDUCTION: About November 1884 Keely was conducting new researches in ætheric vacuums. He says: "Working in a new lead I propose to show my introductory evolutions in proof of the negatization of an ætheric substance to produce vacuums. Professor Rogers saw the operation inducing these ætheric vacuums and pronounced the result wonderful." At that time he evolved vacuums of from one pound to fourteen pounds per square inch, and he stated further: "As

soon as I combine all the positive and negative forces of ætheric vibration in the triple vibratory sphere engine (his disintegrator) my machine will be perfect." During the course of his researches he demonstrated "ætheric wave motion, concentration under vibratory concussion and negative vacuous tenuity." During the last part of his experiments along this line he succeeded in producing vacuums of from 30 inches to 57 inches of mercury in the ordinary barometer tubes used in measuring these vacuums, which would be utterly impossible by any mechanical means except genuine. Experimentally, these vacuums he produced are the strongest evidence that Keely actually discovered and which no one would believe because of the stock company fraud which was planned and put through by the stock speculators without his knowledge or consent. The very best vacuum that science, of Keely's day or this (1934), can produce, is 17.99+ inches of mercury, in view of which his maximum vacuum of 57 inches can, or should be, appreciated as quite as marvelous an achievement alone, as the discovering of America or the invention of the cinematograph.

Keely states that through neutral focalization there are three different degrees of vacuum evolution, corresponding to the three fundamental forms of matter; 1) Molecular and intermolecular ruled by the enharmonic chord; 2) Atomic and interatomic ruled by the harmonic chord; and 3) ætheric and interetheric ruled by the dominant chord. (11)

VALVE POSITION: A measurement of the position of the process inlet valves on a machine, usually expressed as a percentage of the valve opening; zero percent is fully closed. 100 percent is fully open. The measurement is usually made with an LVDT or RVDT and is incorporated as part of a TSI system. (100)

VAMP: To improvise an accompaniment. (125)

VAMPIRES: Astral forms living at the expense of persons from whom they draw vitality and strength. They may be either the astral bodies of living persons, or of such that have died, but which still cling to their physical bodies buried in the grave, attempting to supply them with nutriment drawn from the living, and thereby to prolong their own existence. Such cases are especially well-known in the southeast

of Europe – Moldavia, Serbia, Russia, etc. Well authenticated cases of vampires may be found in Maximilian Pery's works and in H. P. Blavatsky's "Isis Unveiled." (131)

VAN DER WAALS: "The origin of the van der Waals forces was once sought in gravitational attractions. These are now known to be much too small to account for the known intermolecular effects. The first conjecture (P. Debye) involved the assumption that one of the interacting molecules carries a permanent multi-pole, for example, a quadrupole, and induces by electric polarization a small multi-pole in the other. This action, known as the induction effect, was shown to lead to attractive forces. Although it does take place in many instances, it is too small to account for the full strength of the van der Waals forces in general.

"If both molecules have permanent polarity, the multipoles tend to align themselves and thereby give rise to attractive forces. This alignment effect (W.H. Keesom) is an important part of the van der Waals forces between polar molecules, but does not explain the forces between nonpolar structures.

"The missing factor is found upon application of quantum theory to molecular interactions. It may be described as follows: In general, the electrons in one molecule revolve rapidly and in a manner uncorrelated with the electronic motions in other molecules, but when two molecules are brought fairly close together, the electrostatic fields set up by the moving electrons constrain the motions in the two molecules to be more or less in phase, the phase agreement being closer the smaller the distance between interacting molecules. Attractive forces result, these forces being called dispersion forces (F. London). At large distances of separation, the potential energy associated with dispersion forces is proportional to $-R^{-6}$.

"A further development of the theory shows that the interaction involves not only the interplay between the rapidly fluctuating dipoles considered in the dispersion effect, but also the production of higher-order multipoles (H. Margenau). These give rise to asymptotic interactions proportional to R^{-8} (dipole-quadrupole interaction), R^{-10} (quadrupole-quadrupole and dipole-octupole interaction), and so forth.

"Only for symmetric molecules are the intermolecular forces independent of the orientation of the molecular axis with respect to the line joining the molecules. In general, they display features which are not indicated in the figure. They are functions of angles and therefore noncentral forces. Moreover, when more than two molecules interact, the total potential energy of the system is not necessarily the sum of the potential energies of all pairs. Additivity in this sense holds only for the simpler kinds in dispersion forces. (See **LAW OF SUPERPOSITION, BEATS, LONGITUDINAL WAVES**) Also, van der Waals forces between molecules carrying permanent multi-

poles and between atoms or molecules in excited states can be repulsive as well as attractive.

"The relative role played by the different constituents of the van der Waals forces is generally difficult to assess. There are only a few instances in which one type dominates all others. In the case of H_2O , at a distance of separation equal to the diameter of the molecules as given by kinetic theory, the induction, alignment, and dispersion effects are all of comparable magnitude. For dispersion forces, the terms proportional to R^{-6} , R^{-8} , and R^{-10} are of comparable importance." (3)

VANE PASSING FREQUENCIES: A potential vibration frequency on vane impeller compressors, pumps, and other machines with vane rotating elements. It is represented by the number of vanes (on an impeller or stage) times shaft rotative frequency. (100)

VAPOR-PROOF CONVERTER: A converter with an air-tight casing that requires an external air supply for cooling. (102)

VARIATIONS: Certain modifications with regard to the time, tune, and harmony of a theme proposed originally in a simple form. (125)

VAV: The 6th Hebrew letter, Vav (V), means a hook or peg; something upon which something else may be hung; the meaning extends to a central support. Symbolically Vav (or Vau) relates to Beauty, Charity and Love. Astrologers often associate it with Taurus and speak of it in connection with cervical strength, and as the neck unites the head with the rest of the body Vau has been mentioned with valve and mystically referred to as the blending point between upper and lower Manas in our interior consistency. (72)

VECTOR: A quantity which has both magnitude and direction. For example, measurements for rotative speed (1X) vibration for balancing will be specified as a magnitude of vibration (mils or microns) acting in a specific direction (degrees). (100)

VECTOR: A quantity that has both magnitude and direction. See **SCALAR, SYMPATHETIC OUT-REACH**

VECTOR FILTER: An electronic instrument that automatically adjusts a band-pass filter center frequency to coincide with the frequency determined by an external electronic input pulse (Keyphasor). Typically, a digital vector filter is used to automatically filter a vibration signal at rotative speed (1X) frequency, especially under transient rotor speed conditions. Among other functions, a vector filter provides the dc proportional signals necessary for Bode and polar plots. (100)

VELOCITIES OF SOUND:

Air

Unity

Water	4 x air
Hydrogen	4 x oxygen
Oxygen	.25 x hydrogen
Air	.25 x water
Carbonic gas	.8 x air
Coal gas	1.6 x air
Hydrogen	3.56 x air
Brass	10.86 x air
Steel	15.34 x air
Glass	15.25 x air
Copper	11.96 x air or 11.17 or 11.96
Steel wire	15.108 or 15.34

FT/SEC

Silver	8553
Gold	5717
Platinum	8815
Lead	4030 (68)
Silver	8553 (68)
Copper	11666 (68)
Iron	16822 (68)
Steel	16357 (68)
Wood (along fiber)	10,000 to 15,000 (68)
Wood (across fiber)	3,000 to 5,000 (68)
Air 32° F.	1090
Water @ 8° C.	4708

See **ACOUSTICS** §5

VELOCITY: The time rate of change of displacement. This is often expressed as V , x , or dx/vt ; velocity leads displacement by 90 degrees in time. Typical units for velocity are inches/second or millimeters/second, zero-to-peak. Velocity measurements are usually obtained with a mechanically activated velocity transducer and are used to evaluate machine housing and other structural response characteristics. Electronic integration of a velocity displacement signal. (100)

VELOCITY TRANSDUCER: A velocity transducer is a seismic transducer which converts velocity motion into a proportional electrical signal. Sometimes called "Seismoprobe". (100)

VENUS: "We find in Venus the nature of companionship, the nature of individuality." (2902-1)

"Venus gives appreciation of music, lectures on music and its attunement to the harmony it brings into the experience." (4084-1) (2)

"In Venus we find the ability for the entity to write." (5163-1) (2)

"In Venus we find a great influence, bringing a poetic temperament: the very nature of rhythm, beauty in many forms and manners -- in music and the like." (1700-1) (2)

"In Venus we find the influence of beauty; music and stringed instruments, including the piano but other instruments the more. Not the harp so much, but the harpsichord and the many stringed instruments."

(1958-1) (2) See **VIOLET**

VIBRAPHONIC TRAJECTION: See **ROTATION**.

VIBRATION: See **ACOUSTICS** §3

VIBRATION: [Mechanical] Vibration in engineering works is a fruitful source of deterioration of material, and if long continued produces fatigue of materials. The vibration produced by heavy caulking, hammering, *etc.*, on rivet heads and seams is also liable to lead to fracture or starting of joints and consequent leakage. To prevent vibration in machines doing heavy sawing, planing, drilling, shaping, slotting, *etc.*, the machine bases are bolted down to large stone or concrete foundations. Steam hammers are not only thus bolted down, but their anvils also are embedded on massive anvil blocks. The framings of heavy machines are made hollow the better to withstand vibration stresses; ties, struts, and distance pieces, *etc.*, are also introduced into structures for the purpose of minimizing the stresses due to vibration. (84)

VIBRATION: "Vibration is the rhythmical motion of a body within itself." (9)

"All force is vibration..." (900-422) (2) "So is matter." (1861-16) (2)

"All comes from one central vibration--taking different form." (900-422) (2)

"Everything is vibratory." (195-54) (2)

"Vibration is movement. Movement is activity of a positive and negative force." (281-29) (2)

"Vibration is that same energy, same power, ye call God." (2828-4) (2)

"As we see manifest in the electrical forces as used by man. This becoming only an atom in motion, and as the atomic force gathers this, producing such vibration as to create heat, light, and of the various natures, by the kind, class or nature of resistance met in its passage in the cycle given, reducing or raising the velocity, or better by the class of atomic force it vibrates, either with or against. These are examples of portions of universal forces." (900-17) (2)

"Electricity or vibration is that same energy, same power, ye call God." (2828-4) (2)

VIBRATION, ATOMIC: See **FORCE-ATOMIC-HEALING, WATER DISASSOCIATION, VIBRATION, RATES OF**

VIBRATION ENERGY; THE PHENOMENA, PROPERTIES AND LAWS OF: All that we know of energy is the different forms of its incorporation in matter and the phenomena of the interchangeability of energy in substance. Heat, light, magnetism, electricity, rotation, motion, gravity, *etc.* are all but

forms of energy. Concerning energy itself we have no knowledge. Modern physics says there is no such thing as abstract energy, or energy independent of matter. As is quite usual, however, modern physics is wrong.

The æther is the Universal Agent of energy, and only through it are motion, rotation and attendant phenomena produced. The æther may very properly be called the "Soul of Things."

Granting that Will can exert force or perform work as in muscular motion - how is this done? Between the conscious thought of motion and the muscular liberation of energy there is a gap in our knowledge. How therefore can we know or prove that a body CANNOT be moved without an act of Will through material contact? Keely states that all metallic masses when subjected to certain vibrations can be so moved.

Energy is a sympathetic condition inherent in all forms of aggregated matter visible and invisible, ever present in its latent condition. The entire physical Universe is simple energy manifesting itself rhythmically in its latent state in matter, and everywhere, at all times and under all conditions, is exactly the same. This rhythm Keely claimed exists in the mathematical relations of thirds. Since, therefore, every mass consists of vibrations in thirds, balanced in harmonic equilibrium, it stands in harmonic relation to every other mass, terrestrial or planetary. Thus all forms of matter, even as are all forms of energy, become of their very nature interrelated and mutually convertible, one into the other.

Energy is aroused by sympathetic disturbance of equilibrium and by this conservation becomes transferable. It is an infinite latent force. If it did not exist latent it could not be generated and there would be no energy to lose or conserve. The volume of latent energy in the Universe never increases and never grows less. It will remain tomorrow and forever same as yesterday and today.

LAWS OF VIBRATION ENERGY

All manifestations of Energy are modes of vibration:

1: RADIATING - ENHARMONIC - POSITIVE ATTRACTION - CELESTIAL

Attracted to the external Universe.

2: FOCALIZING - HARMONIC - NEGATIVE ATTRACTION - TERRESTRIAL

The intensification of individuality or materiality of matter.

3: **DOMINANT** - That controlling tendency governing the ascendancies of the first two.

All three of these must be present in every flow of energy and are always present in the ratio 3:6:9. (11)

VIBRATION FORM: The characteristics of vibration signals which may be observed on an oscilloscope. Typical displays are time base waveform and shaft orbit. See **ORBIT** and **WAVEFORM**. (100)

VIBRATION FRACTION: See **VIBRATION RATIO**. (68)

VIBRATION, HEALING: [Health]

Q-12: Please give a definition of vibration in relation to healing.

A-12: "...vibration is, in its simple essence or word, raising the Christ Consciousness in self to such an extent as it may flow out of self to him thou would direct it to. As, "Silver and gold I have none, but such as I have give I unto thee: In the name of Jesus Christ, stand up and walk!" {Acts 3:6} That is an illustration of vibration that heals, manifested in a material world. What flowed out of Peter or John? That as received by knowing self in its entirety, body, mind, soul, is one with that Creative Energy that is LIFE itself!" (281-7)

VIBRATION ISOLATION: [Acoustics] Reduction of force or displacement transmitted by a vibratory source. Often attained by use of a resilient mount. (85)

VIBRATION MODES: There are five primary wave-forms for the third mode or transverse vibration. These are responsible in various combinations for the creation of all the known elements, including those which are radioactive. (22)

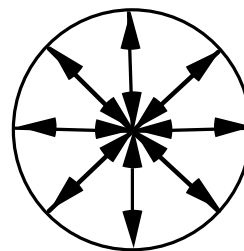
VIBRATION MODES:

Q-8:...what is meant by the three different vibrations, back and forth, side, and circular?

A-8: These are as the fundamental forces of vibration as it applies to the material and spiritual forces in all activities that become magnified in a material plane. (281-6) (2)

VIBRATION MODES: "The nature of light is not difficult to grasp. It is nothing but a vibratory wave disturbance in the æther. The æther is capable of three basic vibrational states.

The first involves movement of the ætheric sub-



Vibration

stance in the direction of wave propagation. This mode is identical to the propagation of sound in the atmosphere.

The second vibrational state involves movement in a direction perpendicular to the direction of wave propagation. This can be compared to vibrations in a mass of jelly when the point giving off the vibratory motion moves back and forth in a direction perpendicular to the wave direction.

The third mode is a vibration in which the medium itself moves in a direction transverse to the line of propagation. This can be compared to the movement undergone by a sheet or film when one edge is caused to move back and forth in the direction perpendicular to the film. It is somewhat like the motion of shaking out a rug, where an edge is grasped and moved rapidly up and down to cause ripples moving along the rug.

These three vibrational modes correspond to different specific phenomena observed in the real world.

The first vibrational mode, involving condensation and rarefaction, is experienced primarily as the longer wavelengths of electromagnetic radiation. These are the waves which are given off by radio and TV transmitting antennae.

The second mode of ætheric vibration is experienced as visible and near-visible light.

The third mode of vibration, in which the ætheric matrix itself supports vibrational waves which cause the æther to move in the fourth dimension, is experienced as a gravitational field.

Using the Flatland analogy for demonstration purposes, we could compare the first mode of vibration to a wave disturbance in the Flatland skin in which the skin itself undergoes vibration always in its own plane, and in a direction parallel with the wave propagation. Again this would be like the transmission of sound in the atmosphere.

The second mode of vibration in its Flatland counterpart would involve movement of the Flatland skin still within its own plane, but this time in a direction perpendicular to the line of wave propagation.

The third mode of ætheric vibration would correspond to a ripple wave passing along the skin of Flatland and causing the skin to move perpendicular to its own plane. It could be compared to the ripples on the surface of a millpond which expand out from where a stone is dropped into the water. (22) See **LIGHT** for rest of explanation.

VIBRATION NUMBER: The Vibration Number of a given musical sound is the number of vibrations per second necessary to produce a sound of that particular pitch. (68)

VIBRATION RATIO: The vibration ratio or vibration fraction of an interval, is the ratio of the vibration numbers of the two sounds forming that interval.

The vibration ratios of the principal music intervals have been exactly verified by Helmholtz's modification of the Double Syren.

It may be shown, by means of this instrument, that the vibration numbers of the three tones of a Major Triad, in its normal position - G, E, C are as 4:5:6.

Starting from this experimental foundation, the vibration numbers of all the tones of the modern scale can readily be calculated on any basis; and from these results, the vibration ratio of any interval used in modern music may be obtained.

Vibration ratios must never be added or subtracted.

To find the vibration ratio of the difference of two intervals, divide the vibration ratio of the greater interval by that of the smaller.

To find the vibration ratio of any interval increased by an octave, multiply by $2/1$; thus the vibration ratio of a Major Tenth is: $5/4 \times 2/1 = 10/4 = 5/2$. (68) See **INTERVAL**.

VIBRATIONAL COINCIDENTS: The vibrational coincident is the ratio of frequency induced in another substance as compared with the frequency of the generator or transmitter. It may be more and it may be less, but it always has a simple mathematical ratio.

"The molecular range of oscillation is affected in different degrees in different substances, although induced by the same vibrational frequency, and these ranges can be measured and expressed mathematically. This mathematical ratio is called the "coincident of transmission."

True coincidents exist between any two mediums. By experiment and measurement, Keely proved that true ratios of transmissive frequency exist between all substances, not only in the mineral kingdom, but in substances of the vegetable and animal kingdoms also. The sympathetic influence of mass attraction and the laws of sympathetic transmission control vibrational transmission from cartilage to steel in contact, and from steel to wood, from wood to stone and from stone to cartilage. Keely proved to his own satisfaction that the laws of vibration applying to solids control living matter in exactly the same manner as they control what we call inert or non-sentient matter. He also proved that the same vibrational laws hold true over solids, liquids and gases. (11)

VIBRATIONAL FREQUENCIES: By use of a resonant circuit and electric magnetic æther waves of very short length, Hertz produced frequencies of 100,000,000 per second, with waves of about one meter in length. Righi, with his oil oscillator for

electric current, produced frequencies of 11,000,000,000 with wave length of 2.6 cm. Lebedow Lampa and Boses produced with their electromagnetic waves, frequencies of 50,000,000,000 with wave length of .6 cm which are the highest known to science of the present day (1934). The longest radiant heat ray is .01 cm with a frequency of 3,000,000,000,000, orange colored light has a wave length of .00006, with frequency of 500,000,000,000,000, and the shortest ultra violet light ray, observed by Schumann and Lyman, is .00001, with frequency of 3,000,000,000,000,000.

Using only an atmospheric medium, Keely produced 519,658,633 vibrations per second. By passing the vibrations through hydrogen he states that on the enharmonic third a frequency is induced that can only be represented in "sound colors" and "cannot be set down in figures."

He mentions the following frequencies, measured in sound colors: Molecular frequency induced in homexar by harmonic thirds, 100,000,000 that induced by enharmonic sixths, 300,000,000, that induced by diatonic ninths, 900,000,000, that induced by dominant ætheric sixths, 8,100,000,000, that induced by inter-ætheric ninths, 24,300,000,000. In the trexar the "compounding of the triple-triple (chords in three octaves) will give a frequency from the ninth node that, set down, would make a "string of figures a mile long."

He says: "The highest range of vibrations I ever induced was in the experiment in which I liberated ozone by molecular percussion, inducing luminosity. A percussive molecular pressure of 110,000 lbs. per square inch was registered on the testing lever." The sphere and its accessories were so strained by the pressure that the decarbonized steel compressors moved as if composed of putty, and the machine was "unshipped" making repairs necessary before further experiments could be performed.

Concerning vibrations of the different states of matter, he says:

"The frequency of heat, a vibro-atomic element, is not more than 14,000 per second at its greatest intensity."

"The vibrational frequency governing the magnetic flow ranges from 300,000 to 780,000 per second. The order of the magnetic flow is the "first interatomic" and is the first order above odor."

"The diamagnetic receding movement of metallic silver, which it exhibits toward a magnetic field, is caused by "some 800,000 corpuscular percussions" per second, or "interatomic bombardment."

"The oscillating frequency of matter increases with its tenuity, according to the subdivision to which it belongs, the molecular frequency being the least. The molecular subdivision Keely claimed vibrates in

arithmetical progression, as:

$$1 : 3 : 9 : 27 : 81 : 243 : etc.$$

The atomic vibrates in geometric progression, as:

$$3 : 9 : 81 : 6561 : 43,046,721 : etc.$$

and soon passes into mathematical infinity. The same progression is believed to take place in all orders above the molecular. (11)

VIBRATIONAL INTERFERENCE: If a homogeneous disk of "proper proportions" of silver, gold and platinum were made the subject of magnetic interference in an alternating field, the molecular antagonistic thirds would cause a very erratic gyroscopic movement.

Differentiation of sympathetic flow, (*i.e.*, interference) as through a homogeneous wire, can be equated in the same manner as in the trexar. Two differing molecular densities of the proper ratio will harmoniously adjust chords of that ratio, *i.e.*, a ratio of 1:3 will adjust thirds, 1:4 will adjust fourths, 1: will adjust sevenths, *etc.* (11)

VIBRATIONAL RANGES, INDUCED: Keely states the induced vibrational ranges and corresponding pressures as follows:

When rotary atomic motion is established at 1333 $\frac{1}{3}$ times the normal diameter of the atmospheric molecule, a pressure is registered of 20,000 lbs. per square inch. The schedule is as follows:

1333 $\frac{1}{3}$ times normal dia., pressure = 20,000 lbs.

666 $\frac{2}{3}$ times normal dia., pressure = 10,000 lbs.

333 $\frac{1}{3}$ times normal dia., pressure = 5,000 lbs.

166 $\frac{2}{3}$ times normal dia., pressure = 2,500 lbs.

83 $\frac{1}{3}$ times normal dia., pressure = 1,250 lbs.

41 $\frac{2}{3}$ times normal dia., pressure = 625 lbs. (11)

VIBRATO: A tremulous quality of tone, as opposed to a pure equal production. (125)

VIBRATORY ASSIMILATION: Same as **NEGATIVE ATTRACTION, NEUTRAL NEGATIVE AGGREGATION**

VIBRATORY ETHERIC SCIENCE: "The mathematics of vibratory ætheric science, both pure and applied, require long and arduous research. It seems to me that no man's life is sufficient, with the most intense applications, to cover more than the introductory branch. The theory of elliptic functions, the calculus of probabilities, are but as pygmies in comparison to a science which requires the utmost tension of the human mind to grasp." (Keely)

VIBRATORY FORCES: "The vibratory forces is the active principle all radiate from." (195-54) (2)

VIBRATORY MODES:

Undulatory: Dominant

Straight Line: Full Harmonic Chord

Circular: As in Odor caused by SYMPATHETIC NEGATIVE INTERFERENCE. See SYMPATHETIC NEGATIVE INTERFERENCE, GRAVITY, GRAVITATION, WAVES

VIBRATO: Frequency modulation. (69)

VIBRATORY ETHERIC EVOLUTION: "The action of the mind itself is a vibratory ætheric evolution, controlling the physical, its negative power depreciatory in its effects and its positive influence elevating." (Keely)

VIBRATORY MULTIPLICATION: With his Generator, which was invented for the purpose of multiplication of vibrations, he secured higher frequencies by disturbance of equilibrium of mediums of different specific gravities, air as one, water as the other.

In the disintegration of water in his "Liberator" he produced the "ætheric order of ozone." This he is said to have used in a "carbon register" to produce a high vibratory circuit that proved sufficient to break up cohesion, which he states is simply molecular magnetism. At that time he used, in molecular dissociation, one tuning fork of 620 per second, setting chords on the first octave, in atomic separation, two forks, one of 620 and one of 630, setting chords on the second octave, and in ætheric separation used three forks, one of 620, one of 630 and one of 12,000, setting chords on the third octave.

"When a chord is transmitted through a sectional transmitting wire, the "molecular triple" (intermolecule) is carried along sympathetically by the induced differentiation and in turn excites high affinity with the "polar terrestrial stream." This "polar terrestrial" is triune in character and requires a triune sympathizer, which is satisfied by the structure of the Trexar - the differentiated sectional wire of silver, gold and platinum."

Frequency multiplication by Trexnor (Trexar with nine nodes) transmission proceeds by means of inducted corpuscular oscillations within the Trexar itself. On sounding the "introductory ninths" (normal oscillation being 20,000 per second and the vibrational molecular range $\frac{1}{3}$ their diameter) Keely states his procedure as follows: He tapped a "Chladni resonating disk" (probably producing a discordant series of sounds) and thereby multiplied the normal Trexar vibration 20,000 per second to 180,000 or 9 times normal. (The three nodes are as: 3:6:9, accelerating by $(9)/2(3)$ or 9 times.) Should we start with a gold node over the platinum section, which is last, the multiplication will be 9x9 or 81 times, or 1,620,000 per second. Shifting the gold node to the extreme

end or at the far end of the platinum section, will hold the frequency at 1,620,000 per second, with transmitted chord of B third octave.

To induce rotary action on the neutral center indicator, when focalizing on a disk through a soft steel attractor, requires transmissive multiplication of the triple triple or complete chords in three octaves, with the gold node over the extreme section, or 156,057,552,198,220,000 corpuscular oscillations per second. This causes the indicator to revolve 110 times per second and represents multiplication of the transmissive chord by only one gold node.

Using the second node of platinum together with the gold node coming first, both over the last section, raises this frequency to the 81st power, or 156,057,552,198,220,000⁸¹ or infinitely beyond computation.

Keely states he induced 123 revolutions per minute on a neutral indicator, which "represented billions and billions of vibrations per second."

He states that on sounding the "harmonic thirds" as an introductory impulse, the molecular vibration is increased in the Trexar from a normal frequency of 20,000 per second to 100,000,000. On the enharmonic sixths, the molecular vibrational frequency becomes 300,000,000. On the diatonic ninths it becomes 900,000,000 and on the dominant ætheric sixths, becomes 8,100,000,000. On the interetheric ninths this frequency becomes 24,300,000,000, all of which he states can be demonstrated and represented by sound colors. (11)

VIBRATORY NEUTRAL NEGATIVE ATTRACTION: "The suspension and propelling of an atmospheric navigator of any number of tons weight, can be successfully accomplished by thus exciting the molecular mass of the metal it is constructed of, and the vibratory neutral negative attraction evolved, will bring it into perfect control, by keeping it in sympathy with the earth's triune polar stream." page 315 of (1) See LEVITATION, NEGATIVE ATTRACTION, MASS, GRAVITY, GRAVITATION

VIBRO-ATOMIC: See HEAT

VIOL: A stringed instrument a little larger than the violin. (125)

VIOL D'AMORE: An obsolete instrument of the violin family. In addition to catgut strings, metal strings were placed under the finger board, which, by the production of sympathetic sound, gave a peculiar quality of tone to the instrument. (125)

VIOLET: Indigo and violet indicate seekers of all types, people who are searching for a cause or a religious experience. As these people get settled in their careers and in their beliefs, however, these colors usually settle back into deep blue. It seems that once the purpose is set in the right direction, blue is a

natural emanation of the soul. Those who have purple are inclined to be overbearing, for here there is an infiltration of pink. Heart trouble and stomach trouble are rather common to persons with indigo, violet and purple in their auras.

Venus is the planet of indigo, and la is its musical note. The moon is the planet of violet and to is its musical note. In the early church indigo and violet meant humiliation and sorrow. (73)

VIOLET: [Color Therapy] Use violet to alleviate: Nervous and mental disorders, neurosis, neuralgia, sciatica, and diseases of the scalp, epilepsy, cerebrospinal meningitis, concussion, cramps, rheumatism, tumors, kidney and bladder weaknesses, *etc.* (87)

VIRGINAL: A stringed instrument played by means of a keyboard, like the modern piano. The virginal, also called spinet, from the quills with which the string was sounded, was the precursor of the harpsichord, now superseded by the piano. (125)

VISCOSITY EFFECT: An alteration in the velocity of a given ion as a result of the contribution to the bulk viscosity owing to the ions of opposite charge. This effect applies to ions of large size.

VISIBLE REGION: Spectral range visible to human eye. 380 to 780 nm. (5)

VITAL LIFE FORCE: "Refers exclusively to that form of energy which vitalizes the human body at the moment of birth and which leaves the human body at the moment of transition. It has naught to do with spirit energy, which pervades all space and which does remain in the human body and active after transition, and which also exists in all living matter, whether conscious or not. The vital life force is from the same source as all energy but is of a distinct and different rate from that which constitutes spirit energy and soul energy." (34) See **SPIRIT, NOUS, LIFE**

VITALISM: The theory of a specific (non-mechanical) principle in living organisms. (121)

VITALISTIC: Biologists who admit the vital principle. (121)

VOCAL: (1) For, or by the voice; music intended to be sung. (2) Compositions so written as to be easy and effective for the voice. (3) The "singing" quality of tone obtained from an instrument. (125)

VOCALIZATION: (1) Control of the voice and vocal sounds. (2) Method of producing and phrasing notes with the voice. (125)

VOLANTE: Flying, applied to the execution of a rapid series of notes, either in singing or playing. (125)

VOLTAGE: Voltage and potential are often confused in the electrostatic case, or thought of as "com-

posed of the same thing." Therefore, voltage is regarded as "potential drop." Rigorously, the potential is the intensity of the virtual particle flux at a single point - whether or not there is any mass at the point - and both the pressure and the point itself are spatiotemporal (4-dimensional), not spatial (3-dimensional) as presently assumed. Voltage represents the spatial intersection of the difference in the potential between two separated spatial points, and always implies at least a minuscule flow of mass current (that is what makes it spatial!). "Voltage" is spatial and depends upon the presence of observable mass flow, while scalar electrostatic potential is spatiotemporal and depends upon the absence of observable mass flow. The two are not even of the same dimensionality. (48)

VOLTAGE: Voltage from the hands is 25-150 millivolts

VOLTAGE: Electrical potential. (69)

VOLTAGE CONTROL: A process whereby one electrical circuit is used to control the function of some other electrical circuit. (69)

VOLTAGE-CONTROLLED AMPLIFIER: An amplifier whose gain can be controlled by an external voltage. (69)

VOLTAGE-CONTROLLED FILTER: A filter whose cutoff frequency can be controlled by an external voltage. (69)

VOLTAGE-CONTROLLED OSCILLATOR: An oscillator whose operating frequency can be controlled by an external voltage. (69)

VOLUME: A term applied to the power and quality of the tone of a voice or instrument or of a combination of sounds. (125) See **AMPLITUDE; SOUND POWER**

VORTEX ACTION: Certain conditions of sound produce undulatory effects and other conditions quite the opposite. In organ pipes of a certain caliber very sensitive waves occur at intervals according to the character of the sound. However, on combining a number of brass tube resonators, of nine or more in number, the induction of certain chords produces high vortex action in the air in the tubes. This also caused Keely considerable difficulty when he was using his Generator, for the reversions would cause vortex action in his resonator tubes and repeatedly blew the resonator caps off, destroying the adjustments in his machine.

"In open atmosphere tuning forks produce alternate condensation and rarefaction of the air, but when a fork is placed in a tube and adjusted to thirds of the mass chord of the tube, a very different action takes place. Vibrators must be accurately adjusted to get such results; they cannot be set promiscuously in

tubes and produce vortex phenomena."

All corpuscular action in Nature is vortex motion. Progressive molecular and intermolecular disintegration of water invariably results in vortex motion of the highest order, but only peripheral. This results whether induced sympathetically or otherwise. (11) See **CAVITATION, CHORD OF MASS**

VORTEX MOTION: "On a combination of more than 9 resonators composed of brass tubes, a wave of sound, induced by certain chords passing over them, produces high vortex action of the air enclosed in them." (1) pg 365 See **ATOMIC THEORY-KEELY'S**

"Forks set in resonating tubes, set to thirds of the mass chord they represent, create high vortex action." (1) pg 366. See **ROTATING MAGNETIC FIELD**

VORTEX THEORY: An attempt has recently been made, based on abstruse mathematical calculations, to carry our knowledge of the constitution of matter one step further back, and identify atoms with ether. This is attempted by the vortex theory of Helmholtz, Sir W. Thomson, and Professor Tait. It is singular how some of the ultimate facts discovered by the refinements of science correspond with some of the most trivial amusements. Thus the blowing of soap-bubbles gives the best clue to the movement of waves of light, and through them to the dimensions of molecules and atoms; and the collision of billiard-balls, knocked about at random, to the movements of those minute bodies, and the kinetic theory of gases. In the case of the vortex theory the idea is given by the rings of smoke which certain adroit smokers amuse themselves by puffing into the air. These rings float for a considerable time, retaining their circular form, and showing their elasticity by oscillating about it and returning to it if their form is altered, and by rebounding and vibrating energetically, just as two solid bodies would do, if two rings come into collision. If we try to cut them in two, they recede before the knife, or bend around it, returning, when the external force is removed, to their original form without the loss of a single particle, and preserving their own individuality through every change of form and of velocity. This persistence of form they owe to the fact that their particles are revolving in small circles at right angles to the axis or circumference of the larger circle which forms the ring; motion thus giving them stability, very much as in the familiar instance of the bicycle. They burst at last because they are formed and rotate in the air, which is a resisting medium; but mathematical calculation shows that in a perfect fluid free from all friction these vortex rings would be indivisible and indestructible: in other words, they would be atoms.

The vortex theory assumes, therefore, that the universe consists of one uniform primary substance, a fluid which fills all space, and that what we call matter consists of portions of this fluid which have become animated with vortex motion. The innumerable atoms which form molecules, and through molecules

all the diversified forms of matter of the material universe, are therefore simply so many vortex rings, each perfectly limited, distinct, and indestructible, both as to its form, mass, and mode of motion. They cannot change or disappear, nor can they be formed spontaneously. Those of the same kind are constituted after the same fashion, and therefore are endowed with the same properties.

The theory is a plausible one, and the reputation of its authors must command for it respectful consideration; but it is as yet a long way from being an established theory which can be accepted as a true representation of facts. In the first place it is based solely on mathematical theory, and not, as in the case of atoms and light-waves, upon actual facts of weight and measurement tested by experiment, and to which mathematical reasoning affords only an aid and supplement. No one has proved the existence of such a medium or of such vortex rings, much less weighed or measured them.

Moreover the theory is open to some very obvious objections. How can aggregations of imponderable matter acquire weight, and become subject to the law of gravity, which, as we have seen, is one of the essential and permanent qualities of atoms? If a cubic millionth of a millimeter of ether formed into a big vortex ring of, say, an atom of mercury, has a weight equal to 200 times that of an atom of hydrogen, which itself has a definite weight, why has it no weight in its original form? And if it had weight, however small, how could the enormous mass of ether filling all space produce no perceptible effect on bodies, even of attenuated cometic vapor, revolving through it with immense velocities? Again, how could these innumerable vortex rings be formed out of the ether without disturbing the uniformity and continuity of the medium, which are essential for the propagation of the light-waves through it? And how could the motions requisite to form the vortex rings be impressed on the ether *de novo* consistently with the principle of the conservation of energy? Energy can no more be created out of nothing than matter, by any process known in nature or conceivable by the human intellect; and to assume it is simply a more refined manner of falling back on the supernatural, which is itself only a more refined manner of saying that we know nothing.

For the present, therefore, we must be content with atoms and ether as the ultimate terms or our knowledge of the material or quasi-material components of the universe. (123) See **ONE SUBSTANCE, UNIVERSAL FLUID, VORTEX**

VOWEL SOUNDS:

Ah contains higher notes than E
E contains higher notes than O
O contains higher notes than U

Vowel sounds in the Cayce Readings:

i-e-o-u-e-i-o-umh...eeiu-u-u-ummm (275-46) (2)

Ar-ar-r-r---e-e-e---ooo---mmm... (1158-10) (2)

"In the spoken word finer vibrations act. The vibrations of the air are nothing; but because every word has a breath behind it, and breath has a spiritual vibration, the action of breath works physically while at the same time breath itself is an electric current. The breath is not only the air, but an electric current; therefore it is an inner vibration." pg 108 of (43) See **VIBRATION-CHORDS, MUSIC**

"...for the voice nerve center is the highest vibration in the whole nerve system..." (341-4) (2)

Q-11: Any specific compositions that can be used for healing?

A-11: R and O and M are those combinations which vibrate to the center forces of the body itself. In any compositions of which these are a part there will be found that necessary for the individual..." (1891-12) (2)

"Then, as ye begin with the incantation of the Ar-ar-r-r-r, the e, the o-o-o, the m-m-m, RAISE these in thyself; and ye become close in the presence of thy Maker - as is shown in thyself! They that do such for selfish motives do so to their own undoing." (281-28) (2)

"Then, either with the aid of a low music, or the incanting of that which carries self deeper - deeper - to the seeing, feeling, experiencing of that image in the creative forces of love, enter into the Holy of Holies. As self feels or experiences the raising of this, see it disseminated through the inner eye ... Then listen to the music that is made as each center of thine body responds to that new creative force..." (281-13) (2)

VOX: (1) A voice. (2) A part. (3) A sound. (4) A key. (5) A theme. (125)



W BOSON: The hypothetical particle that is supposed to be exchanged in beta decay and other weak interactions. (116)

WALDEN'S RULE: (L0/0) Walden's rule states that the product of the limiting equivalent conductance of an electrolytic solution, L_0 , and the viscosity of the solvent, η_0 , in which the solute (or electrolyte) is dissolved is a constant at a particular temperature. Walden's rule is an approximation which would be valid only for ions which behave hydrodynamically like Stokes spheres in a continuum.

WATER, DISINTEGRATION: "The experiments on the 12th closed with the disintegration of water, twelve drops of which we saw dropped, drop by drop, into the small sphere attached to the disintegrator after exhausting the air by suction. A pressure of over 20,000 pounds to the square inch was shown to the satisfaction of all present. Mr. Keely showed control of the ether, inter-atomic subdivision, by graduating the escape of the residue, as he allowed it to discharge itself with a noise like a rushing of steam to an expulsion as gentle as the breathings of an infant. The three subdivisions acted simultaneously, showing instantaneous association and dissociation. The sympathetic globe was operated upon, 120 revolutions per second, ceasing the instant that the wire was detached." Chapter 9 of (1) See **ETHER, INTER-ATOMIC, DISSOCIATION, DISPERSION, MOLECULAR DISSOCIATION, WATER RADIOLYSIS**

WATER, DISSOCIATION: "The breaking up of a liquid vein into drops has been traced by Savart (the pulsations) to the orifice of the draining container.

"Plateau has found in his researches on the figures of equilibrium of bodies withdrawn from the action of gravity, that a liquid cylinder is stable as long as its length does not exceed three times its diameter; or, more accurately, as long as the ratio between them does not exceed that of the diameter of a circle to its circumference, or 3.1416. If this be a little exceeded the cylinder begins to narrow at some point or other of its length; nips itself together, breaks, and forms immediately two spheres." (6) pg 276

"Five drops of water, when acted upon by the triple order of vibration, will create 10 tons pressure per square inch." (1) pg 299 See **DISSOCIATION**

"Comparing it with steam it is as different as it is opposite in origin. Steam is derived from heat or combustion, and so may be said to have a chemical origin; the vapor is a production of mechanical action, a spontaneous energy. Vibration, whether considered as an energy or a motion, is an inherent property or concomitant of matter, and therefore spontaneous. Keely's inventions for producing this power are so entirely original, and so unlike any other devices that have been constructed, that there is nothing in the annals of research to afford a starting point for the understanding. The mechanical means by which this occult energy under consideration is educed and economized, are as unique as those which belong to electricity. Keely's instruments are no more like electrical apparatus than they are like the machinery used with steam, the product of the crude molecular dissociation of water by heat.

"Neither heat nor electricity nor chemicals are employed. Air is water-locked in some part of the apparatus; disturbance of equilibrium is then effected by the movement of an outside lever operating a four way valve within. The air under a tendency to descend, and from its high activity at light and opposing tensions, expels the water in minute globules through delicately adjusted but fixed and strong devices; which successively separate it into multiplied tenuityes, until it reaches a form of greater rarity than can be produced by any practicable degree of heat. It is then dispersed into an adjacent chamber where conditions are suitably arranged for still higher rarefaction (by vibratory action) and consequent augmentation of energy, producing molecular separation, and yielding a vapor finer and lighter than hydrogen. This product has been held at a pressure of fifty thousand pounds per square inch. Pressure, however, is not its highest attribute. It is eminently the medium of vibratory energy, and as such only can be used as a motor."

"Keely believed it to be possible to use and control the vaporous product of the dissociation of the elements of water in his disintegrator, but Keely found it impossible to test its nature in any way. As long as it was kept in rotation energy was manifested. All his devices to hold it, in this rotating condition, failed to operate beyond a limited time; and to "stop the leak" was equally impossible. Nothing was left but atmospheric air, after its escape from the engine. There

was also something so mysterious, so occult, in its operation as to lead Keely, in 1882, to try to construct an automatic device, by the use of which each man could effect its control, according to the degree of his energy of will." (1)

"Keely proved to his own satisfaction that by the dissociation of hydrogen he had imprisoned the ether."

"Keely pursued for and found the subtle etheric vapor to be the medium of nature's most powerful agent, the TRIUNE POLAR FLOW, which he has harnessed for aerial navigation."

"Keely's speculations, in the field of acoustics, led him into that great unknown tract which lies beyond the horizon of ordinary matter. It was in subjecting water to the action of multiplied vibrations in a machine which he called a hydro-pneumatic-pulsating-vacuo engine that his lever suddenly registered a pressure of two thousand pounds.

"It was six years later that experimental research, on the line of vibration, enabled Keely to produce this manipulation of energy at will; for he had no idea at what number of vibrations the water had been disintegrated. Commencing with one hundred per second he proceeded until his instrument registered forty-two thousand eight hundred, when the same pressure was again shown, and the problem was solved." (44)

GENERAL DESCRIPTION OF APPARATUS AND DEMONSTRATIONS

"The multiplier, which may be described in general terms as a series of iron chambers, nearly all of which are of cylindrical form, connected by pipes, and furnished with various cocks and valves, was suspended freely from one of the rafters of the apartment, its bottom being at a distance of about three feet from the floor. The multiplier complete is about thirty-six inches high, twenty-four inches long, and thirteen inches wide, and of a capacity of seven gallons.

"At a distance of about eight feet from the multiplier, a cylindrical wrought-iron reservoir, six inches in diameter and forty inches long (which I will term reservoir A), was suspended from another rafter, and was connected with the multiplier by one-inch pipe.

"It is to be remarked that the dimensions herein given are merely approximate, and are stated only for purposes of general explanation.

"A "stand-pipe" of brass, about two and a half inches in diameter and three feet high, having a spherical chamber at bottom, made in two parts united by flanges, was connected to the pipe uniting the multiplier and reservoir A, a short distance from the multiplier.

"The multiplier was connected with a register of force, placed at a distance of, say, twelve feet from it, by a pipe of one tenth of an inch inside diameter, said register of force consisting of a piston of one square inch area, pressed down in a cylinder by a lever of the third order.

"A small beam engine, of peculiar construction, and not susceptible of brief description, stood upon trestles, about six feet from the multiplier, and adjacent to said engine was a cylindrical brass reservoir, about five inches in diameter and twenty-seven inches long, which will be termed reservoir B.

"A hydrant-cock, communicating with the street main, stood over a sink in one corner of the apartment, at a distance of about three feet from the multiplier.

"The above generally specifies the apparatus with which the experiments were conducted.

"Mr. Keely announced his desire that the apparatus be subjected to such tests as the persons assembled, or either of them, might suggest, in order to vindicate the correctness of his statement of the absence of agents for the production of power, other than his apparatus and air and water.

"The preliminary test applied for this purpose (after determining the pressure of the water on the hydrant, which was shown by a gauge to be 26 $\frac{1}{4}$ lbs. to the square inch) was to blow air through the several passages and parts of the multiplier, and then flood it (the multiplier) with water taken directly from the hydrant, and afterwards withdraw the water, which was done in the following manner,—to wit:

"Mr. Keely blew his breath into the upper cylinder of the multiplier, and air escaped from the upper and the second cylinder, blowing out a candle when applied to cocks on the respective cylinders.

"The hydrant-cock was then connected with a cock on the top of the spherical drum of the multiplier by a rubber tube about five-eighths of an inch in diameter, and water being admitted to the multiplier through the same, escaped through three openings in the bottom of the multiplier, showing a clear circulation of water through the apparatus. These openings were afterwards closed by screw plugs.

"The two halves of the spherical vessel at the base of the stand-pipe being separated, a small rubber spheroid was screwed upon the end of an upward projecting pipe in the lower half, and the upper half and stand-pipe were replaced at 7:50 P.M.

"The cap of stand-pipe was then removed, and water let into the same, until it showed on an overflow pipe at top.

"Water was next let into the multiplicator through the rubber pipe from the hydrant-cock, until it showed at a cock on the second drum of the multiplicator, and was then let off copiously through a discharge cock, the object of this operation being to prove that the apparatus was not charged with any chemicals.

"This charging and discharging operation was repeated, and the discharged water tasted and drank by myself and others; no taste or smell was perceptible.

"A number of weights, aggregating two hundred pounds, were hung upon the long arm of the lever of the force register, to raise which a pressure of 1430 36/100 pounds+ upon its piston, (one square inch area) is required, according to the calculations of Mr. Rutherford, who measured the lever, the length of its arms being, respectively, five, and one-eighth and thirty-five and one-half inches, and the weight on the piston induced by the lever, forty-five pounds ($35.5 \times 200/5 \frac{1}{8} + 45 = 1430.36$).

"An attachment was made of a tube, for the conduction of the evolved vapor or gas, between the multiplicator and the register of force, the connecting tube being one-tenth of an inch inside diameter.

"Mr. Keely then proceeded to make an "expulsion"; that is to say, to develop a force or pressure from the multiplicator, sufficient to raise the weight on the force register lever, or, in other words, to exert a pressure of 1430.36+ pounds to the square inch upon the valve register piston, which, as before stated, was connected by a tube of one-tenth of an inch bore with the multiplicator.

"This he did by disconnecting the gutta percha tube which led from the hydrant-cock to the multiplicator, and blowing from his lungs for a very brief time, say thirty seconds, into the nozzle upon the multiplicator to which this gutta percha tube had been connected. He then shut a cock upon the nozzle, which closed its communication with the atmosphere and, re-connecting the gutta percha tube, turned on the water from the hydrant to the multiplicator.

"The operation was completed in about two minutes after the attachment to the hydrant had been made, by simultaneously opening two cocks upon tubes which connected the first and second drums, and the second and lower drums respectively, of the multiplicator, when the lever and weight of the force register were raised by the piston, this operation being coincident with the turning of the two cocks just mentioned, there being, in other words, no measurable interval of time between the turning of the cocks and the raising of the weight. The weight was raised about two and a half inches.

"At 8:25 P.M. five such expulsions had been made, when an additional weight of eighty pounds was hung upon the lever, and at 8:29 P.M. a sixth expulsion was made, the pressure exerted in this in-

stance being 1974.6+ pounds to the square inch ($35.5 \times 280/5 \frac{1}{8} + 45 = 1974.6$).

"At 8:31 P.M., part second of the program prepared by Mr. Keely was commenced, the experiment in this instance being made with reservoir A, which had theretofore been shut off from the multiplicator by a cock.

"The reservoir was first shown to contain no water, by blowing into a pipe connected to its lower end, when the air escaped with corresponding force from an opening at its top. It was then flooded with water directly from the hydrant through the same pipe into which air had been blown, until the water escaped from the upper opening, and being discharged again at bottom, was tasted by several of the observers, who found in it no perceptible taste or smell.

"The additional weight of eighty pounds having been removed, the multiplicator was again charged, and communication having been opened between the reservoir A and the register of force, two more expulsions were made.

"The third part of the program referred to the operation of the small beam engine before mentioned. The engine was lifted off its trestles, and shown to have no connection or communication with them or with any other extraneous object, and the reservoir B, adjacent to the engine, was connected by a tube of one-tenth of an inch bore with the reservoir A.

"A short tube, carrying upon its end a reaction wheel or "Barker's Mill," having two arms of about two and a half inches long each, with their open ends turned in reverse directions, so as to be revolved by the reaction of an escaping fluid; was then screwed upon the end of the reservoir B, and at 9:03 P.M. was put into rotation at a very high velocity, by the manipulation of the two cocks upon the multiplicator, as before explained. The transition from a state of rest to this high rate of speed was practically instantaneous, and while there was no means of calculating the velocity of the reaction wheel, the noise and tremor caused by its motion was so great as to indicate that, from prudential reasons, the supply of operating fluid should be restricted, which was done by a cock on the pipe leading from the reservoir.

"At 9:05 P.M. the reaction wheel was removed, and a connection being made between the reservoir B and the engine, the latter was driven for some minutes at a rate of about four hundred revolutions.

"At 9:08 P.M. the reaction wheel was again rotated, and the engine run at 9:09 P.M.

"A gaseous fluid was then allowed to escape from time to time from the cock upon the reservoir to which the reaction wheel had been connected, and

was found to be destitute of taste or smell, and not inflammable or explosive; neither did it extinguish combustion, unless when emitted with sufficient force to blow out the candle which was held at the orifice of the nozzle.

"At 9:15 P.M. the engine was run, slackened, and run again at high speed without being stopped, by the manipulation of cocks upon the multiplier.

"In the operation of the reaction wheel and engine, a gaseous fluid was exhausted, but no moisture or trace of water was perceptible.

"A 9:17 P.M. the reaction wheel was run again, and at 9:20, the experiments being concluded, the multiplier was taken apart and inspected by those present.

"There was no heat perceptible in any part of the apparatus or connecting pipes, during the experiments, nor any noise or shock in any part thereof, saving that a slight noise, similar to that of running water, could be heard upon placing the ear close to the multiplier.

SUMMARY

"The following points, as matter of fact, were conclusively established to my mind by the experiments above described.

1st. That the inventor did produce a series of evolutions or "expulsions", of a gaseous or vaporic substance, having an expansive energy of, say, two thousand pounds to the square inch.

2nd. The production of this power, from the time of establishing the water columns in the mechanical structure termed by the inventor his "multiplier," occupied an inappreciable period of time.

3rd. The passage of this gas or vapor from its point of generation to its point of utilization (in the experiments above referred to, say twelve feet) was also inappreciable.

4th. The development or production of the force was unattended by any appreciable noise.

5th. Before the commencement of the operations, the tests applied to the apparatus, -- to wit, blowing through its several connections, flooding it with water, and discharging the water, -- evidenced that it contained no chemical compounds in unstable equilibrium of which, in the one case, could be disturbed so as to evolve gaseous products, or the explosion of which, in the other case, could be produced by the introduced water.

6th. After the tests referred to in the above paragraph had been applied, it would have been impossible for the inventor or any one, to have introduced chemicals or other substance than water, without detection.

7th. No heat was employed, no electricity, no galvanic action, nor was heat, electricity, or galvanic action, discernible as resultant of the operation, except that electric sparks were observed in the spur gearing of the engine, which was propelled by the vaporic force, such evolution of electricity, which was but slight, being obviously caused by frictional contact of the metallic surfaces of said gearing.

8th. The water which as introduced into the multiplier, came direct from the hydrant, under a pressure, as indicated by a gauge applied to the hydrant, of twenty-six and a quarter pounds to the square inch.

9th. The water, before its admission to the multiplier, and after each operation upon its withdrawal from the multiplier, was drank off by myself and by others of those present, and exhibited no taste nor smell, and manifestly came out of the multiplier as it went in, free from all substances other than those contained in the water of the Schuylkill River, from which it came.

10th. The vaporic or gaseous production, I, as did others present, smelt of and freely inhaled, and it had neither perceptible smell nor taste. I applied a burning candle to it, and it did not burn, nor did it extinguish the flame of the candle.

11th. After the conclusion of the experiments, the multiplier was dismantled, and the interior of it examined, and there was no residuum within it indicative of the presence of chemical or explosive compounds, or other substances than air and water.

12th. The operations were conducted in a gas-lighted room, and a lighted candle was held by myself, in close proximity to the multiplier, during the entire period of the operations.

13th. The inventor, from the first to last, afforded every facility for the closest investigation, and proposed from time to time, to repeat or duplicate, as often as might be desired by any one present, either of the several operations, and afforded also every facility for the determination, to the satisfaction of those present, of the truth of his statement, as contained in his communication addressed to the writer hereof, which accompanies this report, and from which communication I now quote,- to wit; "the non-presence of heat, electricity, galvanism, chemicals, or preparations of any kind," other than his mechanical structure, termed a multiplier, and air and water."

signed - Charles B. Collier, a report Nov. 13th, 1874

The witnesses present at this experiment were:

Wm. Boekel, Mechanician
Wm. Rutherford, Chief Engineer, USN
J. Snowden Bell, Mechanical Engineer
B. Howard Rand, MD, Professor of Chemistry in Jefferson Medical College

All of their letters showing agreement to the findings

as stated by Charles Collier were appended to the report.

WATER RADIOLYSIS: Of all the radiation-chemical reactions that have been studied in aqueous solution, the most complex and bewildering is the decomposition (dissociation) of pure water itself. Early workers had shown that water decomposed to hydrogen and oxygen, with some hydrogen peroxide, under bombardment from α -rays. A detailed study of the reaction was made in 1913 by Duane and Scheuer¹⁰⁹ and their results were confirmed twenty-five years later by Lanning and Lind.¹¹⁰ Meanwhile Risse¹¹¹ and then Fricke¹¹² had shown that water under X-rays in a closed vessel appeared to decompose practically not at all. Fricke indeed found traces of gas resulting from irradiation, but on analysis this turned out to be composed of hydrogen and carbon dioxide, obviously arising from organic impurities in the water. When the water was more carefully purified the carbon dioxide disappeared, but a trace of hydrogen gas was always found even from irradiation of the most highly purified water. On the other hand, Guenther and Holzapfel¹¹³ irradiated water with X-rays in contact with a large free volume in a vacuum system and found large continuing yields of hydrogen gas. The experimental situation on water radiolysis in 1940 was indeed confusing. This confusion is reflected in the ideas about water radiolysis expressed in D. E. Lea's otherwise excellent book¹¹⁴ "Actions of Radiations on Living Cells" published in 1946. A better understanding of the subject had already been obtained within the U.S. atomic energy project, but this material could not be published at that time. (115) See also **RADIATION CHEMISTRY, DISSOCIATION**

WATER RESONANCE: See **RESONANCE, RESONANT FREQUENCY**

WATERFALL PLOT: See **CASCADE PLOT**. (100)

WATT: The unit of power; equal to one joule per second. (75)

WATTS: Watts are the basic units by which electric power is measured. For instance, when you ask for a 100-watt light bulb, you are using the term to describe the power consumption of the bulb - the amount of electricity it uses. In audio, however, the term is most often used to specify not the amount of electricity needed to keep an amplifier running, but the amount of audio power the amplifier is capable of feeding to the loudspeakers. This wattage is known as an amplifier's power output. (103)

WAVE ACTIVITY: Limits of wave influence in the sea. For each step downward of $Wl/8$ divide by 2.2

WAVE FUNCTION: In quantum mechanics, the mathematical function that gives the probability of finding the particle at a given point. (116)

WAVELENGTH: [Acoustics] The length in space of one complete cycle of sound wave.

$$A = \text{speed of sound} / \text{frequency} = c/f$$

where A = wavelength in ft or m. (85)

WAVELENGTH: Distance measured along line of propagation, between two points that are in phase on adjacent waves. m and nm. (5)

WAVELENGTH: To ascertain the wave length of any given sound - divide the velocity of sound by its vibration number.

The wave length of any given sound, increases with the temperature.

The temperature remaining constant, the length of the sound wave determines the pitch of the sound produced.

The range of musical pitch is from about 40 to 4,000 vibrations per second (68)

WAVE MECHANICS: "The modern theory of matter holding that elementary particles (such as electrons, protons, and neutrons) have wavelike properties. In 1924 Louis de Broglie postulated that the same wave-corpuscle duality which was then known to exist in the case of light might also occur in matter; this hypothesis was subsequently verified experimentally. With contributions by the mathematical physicists Erwin Schrodinger, Max Born, Werner Heisenberg, P.A.M. Dirac and others, this theory of matter has become the highly successful quantum mechanics of the present day." (3)

WAVE MECHANICS: In 1925, a French physicist, Louis de Broglie, published a paper in which he gave a quite unexpected interpretation of Bohr quantum orbits. According to de Broglie, the motion of each electron is governed by some mysterious pilot waves, whose propagation velocity and length depend on the velocity of the electron in question. Assuming that the length of these pilot waves is inversely proportional to the electron's velocity, de Broglie could show that various quantum orbits in Bohr's model of the hydrogen atom were those that could accommodate an integral number of pilot waves. Thus, the model of an atom began to look like some kind of musical instrument with a basic tone (the innermost orbit with the lowest energy) and various overtones (outlying orbits with higher energy). One year after their publication, de Broglie's ideas were extended and brought into more exact mathematical form by the Austrian physicist Erwin Schrodinger, whose theory became known as Wave Mechanics. While explaining all the atomic phenomena for which Bohr's theory already worked, wave mechanics also explained those phenomena for which Bohr's theory failed. (such as the intensities of spectral lines, etc.), and in addition predicted some new phenomena (such as diffraction of an electron beam) which had not even been dreamed of, either in classical physics or

in Planck-Bohr quantum theory. In fact, wave mechanics provided a complete and perfectly self-consistent theory of all atomic phenomena, and, as was shown in the late twenties, could explain also the phenomena of radioactive decay and artificial nuclear transformations. (25)

WAVE MOTION: "Wave motion can occur in a vacuum (electromagnetic waves), in gases (sound waves), in liquids (hydrodynamic waves), and in solids (vibration waves). Electromagnetic waves can also travel in gases, liquids, and solids provided that the electrical conductivity of the medium is not perfect or that the imaginary part of the dielectric constant is not infinitely great. By current usage, elastic waves propagated in gases, liquids, and solids, regardless of whether one can hear them or not, are called acoustic waves." (3) *Wave motion described in the earth.* (45) *Wave motion described in crystal.* (46)

The transmission of sound is a particular case of wave motion, of which, water waves and rope waves are other examples. The peculiar characteristics of a wave motion is, that the material particles through which the wave is passing, do not move onwards with the wave, but simply oscillate about their position of rest. In the rope wave, for example, the particles of the rope oscillate at right angles to the direction in which the wave is advancing; while, on the other hand, in the sound wave, the air particles oscillate in the same direction as the wave is moving. Just as a water or rope wave consists of two parts, a crest and a trough, so a sound wave is made up of two portions, *viz.*, a condensation and a rarefaction. A sound wave, like a water or rope wave, is determined by three elements, *viz.*, its length, amplitude, and form. The length of a wave is the distance from any point in one wave to the corresponding point in the succeeding one; the amplitude is measured by the extent of vibration of its air particles; while the form is determined by the varying velocities of these particles as they perform their excursions. The greater the amplitude (that is, the extent of particle vibration), the greater will be the degree of condensation and rarefaction. (68)

WAVEFORM: A presentation or display of the instantaneous amplitude of a signal as a function of time. A vibration waveform can be observed on an oscilloscope in the time base mode. (100)

WAVEFORM: Characteristic shape of a wave; helps determine timbre. (69)

WAVENUMBER: Number of waves per unit length = $1/\lambda$. Usually cm^{-1} . (5)

WAVES OF SOUND: See **ACOUSTICS** §3

WEAK INTERACTIONS: Processes, like beta decay, that proceed slowly on the nuclear time scale. (116)

WEIGHT: See **LAW OF OCTAVE, CHORD OF**

MASS, MOLECULAR DISSOCIATION

WEIGHT OF WIND: See **WIND GAUGE**.

WEIGHT, MOLECULAR: "Molecular terrestrial masses, composed of the "ultimate ether" bound latent in substance, are sympathetically drawn to the earth's neutral center according to the density of their molecular aggregation, from which must be deducted their celestial sympathetic outreach. In other words, molecular weight consists in the difference between these forces." (11)

WELD QUALITY MONITOR: An electronic unit connected to an ultrasonic assembly system for sensing, based on energy measurement, whether an acceptable assembly is achieved. (102)

WHEEL: The refrain or burden of a ballad. (125)

WHIFFLER: A wand-bearer to head a procession. A fifer. (125)

WHISTLE: (1) To make a musical sound with the lips and breath without using the vocal cords; the hollow of the mouth forming a resonance box. The pitch of whistling is an octave higher than is generally supposed. (2) Tin whistle, penny whistle, the common wood whistle having holes. (125) See **RESONANCE BOX**

WHITE: The perfect color, of course, is white, and this is what we all are striving for. If our souls were in perfect balance then all our color vibrations would blend and we would have an aura of pure white. Christ had this aura, and it is shown in many paintings of Him, particularly those which depict Him after the resurrection. You recall that He said at the tomb, "Touch me not for I am newly arisen." He meant that as a warning, I think, for the vibration of His being must at that time have been so powerful that anyone putting a hand on Him would have been killed - shocked as if by (a) live wire. (73)

WHITE NOISE: [Acoustics] A noise whose spectral density (level) is substantially independent of frequency over a specified range and has equal power for any range of frequencies of constant band-width. (85)

WHOLE NOTE: A semibreve. (125)

WIEN EFFECT: The increase in the conductance of an electrolytic solution produced by high electrical fields (potential gradients).

WILSON CLOUD CHAMBER: A device used in early work that records the passage of charged particles by the presences of droplets formed on ions left in their passage. (116)

WIND BAND: (1) A military band. (2) The wind instruments of an orchestra. (125)

WIND CHEST: See **ORGAN**

WIND GAUGE: See **ORGAN**

WIND INSTRUMENT: A musical instrument whose sounds are produced by the breath of the player or by means of a pair of bellows. (125)

WIND TRUNK: See **ORGAN**

WOBULATOR: A mechanical device which generates dynamic motion of an observed surface at a known amplitude and frequency. The surface may be observed by a proximity probe for the purpose of calibration of a vibration monitor. Bentley Nevada's TK3-2 incorporates a wobulator. (100)

WOLF: The bad effect produced when playing in certain keys on an open organ tuned to "unequal temperament". It is well known that tempered thirds are more distressing to the ear when heard from instruments of continuous-tone like the organ and harmonium than from pianos, etc. To obviate this difficulty, tuners of organs formerly made certain of their thirds untempered, that is, true to nature, in the ratio 4:5. (125)

WOOFER: Woofers are loudspeakers specifically designed to reproduce the low-frequency notes of the audio range. These bass speakers are bigger and heavier than tweeters because size and weight help them to operate more efficiently at low frequencies. A high-quality woofer should be able to reproduce the lowest notes of the orchestra (about 35 Hz) without difficulty. A loudspeaker system's ability to handle even the deepest notes without faltering adds a special feeling of depth and warmth to reproduced music. A woofer should be free of frequency doubling - the adding of gratuitous harmonics to the fundamental notes, thereby giving the bass a false coloration. A good woofer should also have good transient response - *i.e.*, reproduce heavy bass notes sharply and clearly without booming or blurring. In order to do this, a woofer must be mounted in a properly matched enclosure, for without an effective enclosure even the best woofer will not sound good. (103)

WORD: "For, of the dust of the earth was the body-physical created. But the WORD, the MIND, is the controlling factor of its shape, its activity, from the source, the spiritual the spiritual entity." (263-13) (2)

"Then MIND, as He, was the WORD - and dwelt among men; and we beheld HIM as the face of the Father." (1567-2) (2) See **MIND**

WORK: The net force on an object times the distance through which the object moves. (75)

WOW: Wow is a slow waver in pitch caused by an unsteady turntable or tape speed. Wow can occasionally be cured by replacing the worn rubber drive parts in a defective turntable or tape deck. However,

in poorly made components, the ailment is endemic, and the only cure is to replace the entire unit. (103)

XYZ

1X: Notation for the signal component in a complex vibration signal that occurs at the rotative speed frequency. Also called synchronous. (100)

1/2X, 1/3X, 2/5X, 4/9X, etc.: Notation for the component(s) in a complex vibration signal having a frequency equal to a fraction of rotative speed. Also called subharmonic and subsynchronous. (100)

2X, 3X, etc.: Notation for the component(s) in a complex vibration signal having a frequency equal to an exact multiple of the shaft rotative speed. Also called harmonic, superharmonic, and super-synchronous. (100)

XANORPHICA: A key-violon. An instrument somewhat like the tetrachordon, invented by Rollig (1761-1804), the sounds of which were produced by bows set in motion by a pedal and acted upon by strings. (125)

XENI NEPHIDEI: Elemental spirits that give men occult powers over visible matter, and then feed on their brains, often causing thereby insanity. A great number of physical mediums have become insane. They assist "physical mediums" to lift material objects without any visible means. (131)

XY: Perpendicular axes in a Cartesian coordinate system. Usually used as a reference for orthogonal (mutually perpendicular) radial vibration transducers. (100)

XYLOHARMONICA: An harmonicon consisting of graduated blocks of wood, struck with hammers acted upon by keys. (125)

Y*: An old expression for higher mass resonances associated with strange baryons. (116)

YANG KIN: A Chinese instrument furnished with brass strings which are struck with two small hammers like a dulcimer. (125)

YELLOW: See E

YELLOW: Yellow is the second primary color. When it is golden yellow it indicates health and well-being. Such people take good care of themselves, don't worry, and learn easily; good mentality

is natural in them. They are happy, friendly, and helpful. If the yellow is ruddy, they are timid. If they are red-heads they are apt to have an inferiority complex. They are thus apt often to be indecisive and weak in will, inclined to let others lead them.

In the musical scale the note mi corresponds to yellow, and Mercury is the planet of this color. (73)

YELLOW: [Color Therapy] Use yellow to alleviate: Stomach troubles, indigestion, constipation, liver troubles, diabetes, blind piles, eczema and skin troubles, leprosy, nervous exhaustion, *etc.* (87)

YLIASTER: Primordial matter out of which the universe has been formed in the beginning of time. (131)
See **ETHER; MATTER; COMPOUND INTERESTHERIC**

YO: An Indian flute. (125)

YU: An interval of the Chinese scale. The ancient Chinese divided the octave into twelve equal parts, like the semitones of our chromatic scale, which were called *lu*. Their scale, as commonly used, consisted, however, of only five notes, which were called kounng, chang, kio, tché, and yu, and which corresponded to our F, G, A, C, D; kounng of F being considered to be the normal key. (125)

ZA: Formerly a solfeggio name for B flat. (125)

ZAYIN: The 7th Hebrew letter, Zayin (Z), means radically a sword or any sort of weapon, but hieroglyphically it stands for an arrow. Being the 7th letter, many have been the sacred ideas associated with it, and frequently is it referred to as the sign of spiritualized or regenerated humanity. Persons familiar with the "Tarot" will find close connection between Zayin and the Chariot in which rides the Conqueror crowned with a diadem on which are placed 3 golden pentagrams, while above his head is an azure star-decked canopy. The equivalent Greek letter, Zeta, means something sought and obtained, showing a close relation in this, as in many other instances, between the Greek and Hebrew alphabets. (72)

ZERO: Contrary to its present usage, zero is dimensional and relative in its context. A three-

dimensional spatial hole, for example, exists in time. If we model time as a dimension, then the spatial hole has one dimension in 4-space. So a spatial absence is a spatiotemporal presence. In the vacuum 4-space, a spatial nothing is still a something. The "virtual" concept and the mathematical concept of a derivative are simply two present ways of unconsciously addressing this fundamental problem of the dimensional relativity of zero. (48)

ZERO: A root of the numerator of the filter transfer function. The location, number and grouping of zeroes determines the transfer function.

ZERO-TO-PEAK VALUE: One-half of the peak-to-peak value. See **AMPLIFICATION**. (100)

ZITHER: Cither. A flat stringed instrument, placed upon a table or on the knees, having brass strings played with the thumb of the right hand, while the melody is brought prominently out by the use of a plectrum. (125)

ZODIAC SIGNS: "For, as has been indicated, the characteristics, or that attained by an individual, are indicated by the sign under which the entity enters an appearance. (This as a side note: Remember, those indicated in the charts that are accepted by most astrologers are some ten days behind. Thus we find some variations in the information indicated for individuals through these channels.)" (5746-1) (2)

"About same is symbolized, in the signs of the zodiac, as to that portion of body which was stressed through that particular period of activity." (5746-1) (2) See **AURA CHART**

"The sun indicates strength and life, while the moon indicates change - and in one direction indicating the singleness of that activity through an individual experience, - the variations being indicated by the variations in color." (5746-1) (2)

"The study of the meaning of Aries, Saggitarius, Pisces, Libra, or any or all of such phases, would indicate the activity of the individual. For, remember, it is body manifestation, - some the feet, some the head, some the thigh, some the groin, some the bowels, some the breast, - some one and some another, see? these indicating the ACTIVITY of the individual." (5746-1) (2)

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