THE SEA OF ENERGY IN WHICH THE EARTH FLOATS

JOHN E. MORAY

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For Beyond the Light Rays Lies the
Secret of the Universe

The Evolution of Energy and Matter
Originally compiled for the Layman in 1926 from
excerpts of the Writings first presented in 1914

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In the study of these pages one should consider that both matter and radiations have particle properties as well as wave properties. The particle properties are evident when recognized as highly localized events of very short duration with specific values of electric charge, energy and mass. The wave properties can be proven in different ways which have been proven and taught for so many years.

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SCIENTIFIC DISCOVERY OUR CORNERSTONE

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INTRODUCTION

RADIANT ENERGY — the term Moray has used to describe that source of energy coming from the Cosmos to the earth and radiating from the earth back from whence it came. This is the energy the Moray device captures and could be described as those particles of energy pervading all space. In the evolution of energy and the evolution of matter these particles of matter and energy (one and the same thing) manifest under certain conditions as pure energy and under others as pure matter. Radiant Energy from the Cosmos, like radiant particles of matter, being composed of an infinitesimal quantity whose behaviors are described by mathematical equations similar to those used for describing electrical waves, keeping in mind to differentiate between wave length and frequence. Radiant- Energy being particles of energy, just as light is wave lengths and particles is comparable to the electron and magnetron; a ring of negative electricity traveling in a vortex with the speed of light. Streams of energy quanta, each quantum having energy and momentum where the electron revolves around the proton at a distance equal to the electron radius.

To Summarize — Radiant Energy as herein used is that energy existing in the lumineferous medium of the Universe, kinetic and exercised in wave transmission and rendered sensible by conversion of its energy into a detectable frequency. The phenomenon of the transducer combined with fission. IN THE FINAL ANALYSIS RADIANT ENERGY IS A MEANS OF USING THE ENERGY RELEASED BY THE FISSIONABLE REACTIONS TAKING PLACE IN THE STELLAR CRUCIBLES OF THE UNIVERSE.

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WHAT IS NEEDED TO BE DONE TO COMMERCIALIZE THIS DISCOVERY

By following the procedure of "Syntheses" by first recognizing the Natural Law, to study the principle and then to allow the true apprehension of the principle to determine the Mechanism through and by which this power may be brought into practical use has been the method of Dr. Moray. Ninety percent of the project is completed. The remaining ten percent does not present any more difficulties than the standardization of a few highly specialized and intricate tubes and measuring devices, coupled with further routine research engineering in mechanical construction or prototypes of the unites for economy, efficiency and lasting qualities when produced commercially.

CHAPTER ONE

A NEW ERA IN ENERGY

Power from the Cosmos and the Earth

Dr. Nickola Tesla said over sixty years ago, "Ere many generations pass our machinery will be driven by power obtainable at any point in the universe. Is this energy static or kinetic? If static, our hopes are in vain; if kinetic, and this we know it is for certain, then it is a mere question of time when men will succeed in attaching their machinery to the very wheelwork of nature. "Nickola Tesla was not referring to so-called "atomic energy" or nuclear energy but to the energy which is continually bombarding the earth from outer space. Call it cosmic or what one will.

Enough energy is coming to the Earth to light one million, one hundred ninety-three thousand, six hundred, one hundred-watt lamps for every human being on the earth today. No fuel of any kind will be taken as a dead load for the energy can be "picked-up" direct by great ocean liners, railroads, airplanes, automobiles or any form of transportation, to say nothing of the heat, light and power available for use in all kinds of buildings; to pump water on the desert lands with equipment of only a fraction of the weight of any steam plant or any kind of engine in use today and at a fraction of the cost. A wild dream? A proven, practical reality as hundreds of people know who have witnessed the MORAY Radiant Energy equipment. Powered from the cosmos!

The total energies involved in "cosmic" radiations are individually and collectively very large. The methods or processes of their generation involve a basic relation to the total structure of the action of the universe. Physicists today believe that cosmic radiation consist primarily of protons and, some heavier nuclei. At times they pack a maximum allop of around 100 quadrillion electron volts. Coming continuously, with slight variations in time, their radiation have a uniform directional isotropy. The earth is therefore surrounded in an atmosphere of radiations with the cosmic rays coming continually to the earth from all directions. There may be a slight deflection of the weaker rays by the earth's magnetic field. There is every indication that our sun is not the source of any appreciable amount of these radiations. The origin, therefore, is from the universe as a whole. The total energy of cosmic radiation is more than the entire luminous output of all the stars and nebulae of the universe combined. Unlimited power is being delivered to everyone's doorstep.

The Moray radiant energy discoveries give the greatest amount of energy per pound of equipment of any system known to man. Electric power through an electric motor or an electric jet far exceed any form of engine in the delivery of power as there is no dead center, or lost motion, in an electric motor nor loss of push in an electric jet. A much higher starting torque is had than in any type of combustion engine.

Cosmic power is the most practical form of "energy harnessing" yet put to use by man whereby it is possible to utilize the vast source of energy of the universe without a prime mover at any point on the land, in the air, on the water or under the water, using the energy which exists in the universe and transforming it into useful purposes. An electrical generator is, in the true sense, not a generator, as it does not create electrical energy. Electricity is not made by the generator, it is merely pumped. From that standpoint, an electric generator might be referred to as an electric pump and the Moray radiant energy device as a high-speed electron oscillating device.

To account for the propagation of heat and light — that is, of radiant energy — man has postulated the existence of a medium filling all space. But the transference of the energy of radiant heat and light is not the only evidence in favor of the existence of such a medium. Electric, magnetic, and electro-magnetic phenomena (and gravitation itself) point in the same direction.

It is a matter of common observation that attractions and repulsions take place between electrified bodies, magnets, and circuits conveying electric currents. Large masses may be set in motion in this manner and acquire kinetic energy. If an electric current be started in any circuit, corresponding *induced* currents spring up in all very close neighboring conductors; yet, there is no visible connection between the circuit and the conductors. To originate a current in any conductor requires the expenditure of energy. How then is the energy propagated from the circuit to the conductors? If we believe in the continuity of the propagation of energy — that is, if we believe that when it disappears at one place and reappears at another, it must have passed through the intervening space, and therefore have existed there somehow in the meantime — we are forced to postulate a vehicle for its conveyance from place to place.

When a body is electrified, what we must first observe is that a certain amount of energy has been spent; work has been done, and the result is the electrified state of the body. The process of electrifying a conductor is therefore the storing of energy in some way in, or around the conductor, in some medium. The work is spent in altering the state of the medium, and when the body is discharged the medium returns to its original state, and the store of energy is evolved. Similarly a supply of energy is required to maintain an electric current, and the

phenomena arising from the current are manifestations of the presence of this energy in the medium around the circuit. Formerly an electrified body was supposed to have something called electricity residing upon. it which caused the electrical phenomena, and an electric current was regarded as a flow of electricity traveling along the wire, while the energy which appeared at any part of the circuit (if considered at all) was supposed to have been conveyed along the wire by the current. The existence of induction, however, and electromagnetic actions between bodies situated at a distance from each other, lead us to look upon the medium around the conductors as playing a very important part in the development of the phenomena. It is, in fact, the storehouse of the energy.

Upon this basis Maxwell founded his theory of electricity and magnetism, and determined the distribution of the energy in the various parts of the field in terms of the electric and magnetic forces. The medium around an electrified body is charged with energy, and the electrical phenomena are manifestations of this energy, and not of an imaginary electric fluid distributed over the conductor. When we speak of the charge of an electrified conductor we refer to the charge of energy in the medium around it, and when we talk of the electric flow or current in the circuit we refer to the only flow we know of, viz. the flow of energy through the electric field into the wire.

The work spent in producing the electrification of a conductor is spent on the medium and stored there, probably as energy of motion. To denote this we shall say that the medium around the conductor is polarized, this word being employed to denote that its state or some of its properties have been altered in some manner by the work done on it — that is, by the energy stored in it. In the case of a conductor possessing what is termed a positive charge, the medium around it is polarized in a certain manner and to a certain extent depending on the intensity of the charge. If the charge be negative the polarization is in the opposite sense, the two being related, perhaps, like right-handed and left-handed twists or rotations.

Now consider the case of a a body charged alternately, positively and negatively, in rapid succession. The positive charge means a positive polarization of the medium, which begins at the conductor and travels out through space. When the body is discharged the medium is once more set free and resumes its former conditions. The negative charge now entails a modification of the medium or polarization in the opposite sense. The result of alternate charges of opposite sign is that the medium at any point becomes polarized alternately in opposite directions, while waves of opposite polarizations are propagated through space, each carrying energy derived from the source or agent supplying the electrification. Here, then, we have a periodic disturbance of some kind occuring at each point, accompanied by waves of energy traveling outwards from the conductor.

The phenomena of interference lead to the conclusion that light is the result of a periodic disturbance, or vibration, of the medium, but as to the nature of the vibration — that is, as to the exact nature of the periodic change — or what it is that changes we possess no knowledge. We know that alternating electric charges are accompanied by corresponding changes of state, or vibrations, of the medium, and if the charge be varied periodically and with sufficient rapidity, we have a vibration at each point analogous to, and perhaps identical with, that which occurs in the propagation of light; a combination of wave and particle properties.

This, then, is the electromagnetic theory of the luminous vibration. In the older or elastic-solid theory, the light vibrations were supposed to be actual oscillations of the elements or molecules of the medium, about their positions of rest, such as takes place when waves of transverse disturbance are propagated through an elastic solid. Such a limitation is, however, unwarranted to some extent although we cannot afford to entirely disregard the particle theory of light. A combination of the theories have merit. We know that the change, disturbance, vibration, polarization, or whatever we wish to term it, is periodic and transverse to the direction of propagation. The electromagnetic theory teaches us nothing further as to its nature, but rather asserts that whatever the change may be, it is the same in kind as that which occurs in the medium when the charge of an electrified body is altered or reversed. It reduces light and heat waves to the same category as waves of electric polarization; the only quality of the latter required to constitute the former is sufficient rapidity of alternation. These speculations were given the strongest confirmation by important experiments of Professor Hertz many years ago.

When a resilient substance is subjected to strain and then set free, one of two things may happen. The substance may slowly recover from the strain and gradually attain its natural state, or the elastic recoil may carry it past its position of equilibrium, and cause it to execute a series of oscillations. Something of the same sort may also occur when an electrified capacitor is discharged. In ordinary language there may be a continuous flow of electricity in one direction till the discharge is completed, or an oscillating discharge may occur — that is, the first flow may be succeeded by a back-rush, as if the first discharge had overrun itself and something like recoil had set in. The capacitor thus becomes more or less charged again in the opposite sense, and a second discharge occurs, accompanied by a second back-rush, the oscillation going on till all the energy is either radiated or used up in heating the conductors or performing other work.

As stated above, when capacitors are charged with this radiant energy and then discharged through a' circuit of proper impedence, reactance and inductance syncronizing the oscillations of the device with those of the Universe, we set up electrical inertia. That is, in the reversal of the current, the condensers are charged and

discharged and recharged slowly until the energy originally stored in them is radiated in kinetic energy through the device, which is kept alive indefinitely by the oscillations of the Universe through establishing resonance.

Considering oscillations, mechanical and electrical and or mathematical, we find that electrical resistance is the same as mechanical friction and current comparable to mechanical velocity. Inertia and inductance then may be considered analagous terms. In mechanics the greater the inertia of a body, the longer it will keep in motion. In the RE circuit, the greater the electrical inductance the longer the current continues to flow once it is established by a syncronized cosmic surge.

Expressed mathematically, the equations are the same for electrical or mechanical phenomena. That is $R < \sqrt{\frac{4L}{C}}$ where R is the resistance in ohms L is the inductance in henries and C the capacity in farads an oscillatory discharge will occur and with a very powerful inductance inertia will assert itself. For low values of R the frequency of the oscillations can be shown by $f = \frac{1}{2\pi\sqrt{LC}}$. The rapidity of the oscillations i.e. frequencies are governed by the quantity of the capacity and the inductance.

In the vibrations of the forces of the Universe we find the key to the sources of all energy. The real key in securing the energy needed in modern industry is the utilization of the energy resources of the Universe without being limited to mechanical prime movers. The answer may lie in the balancing of an energy generator that will oscillate because of the oscillations of the Universe. Some claim it will be found by a collapsing of the earth's magnetic field. Others seek it in the creation of an electron drag. Dr. Gunn, who was a civilian scientist for the U.S. Navy, stated years ago that the earth is a huge generator, generating over 200 millions amperes of electric current continuously.

The aurora borealis is considered to be very definitely an electrical phenomenon produced by the passage of electric charges through the rarified gases of the higher atmosphere.

The conversion of matter to energy in the stars is now generally accepted as demonstrated, and reasoning from what occurs in radioactive disintegration, during which energy waves are radiated, we may conclude that energy waves of very high frequency are sent out from the stars, one of which is our sun. Now the conversion of energy into matter will equally have to be accepted.

It is well known that air conducts electricity away from charged objects. This being true how does the earth, a charged object exposed as it is to the surrounding atmosphere, maintain its charge? Dr. Gunn and others have proven the earth has this charge. Physicists have shown that the earth has a negative charge which amounts to 400,000 columbs, yet six feet above the ground the air is charged with more than 200 volts positive in respect to the ground. Therefore, if the air conducts electricity the earth's charge must be constantly passing into the atmosphere. It has been calculated that the earth has a continuous discharge into the atmosphere of 1800 amperes. At this rate the earth would lose 90% of its charge into the air in an hour, yet the earth's charge does not diminish but persists and has done so since the earliest of geological time. Where does the earth's source of energy come from? It has been found that the higher the altitude from the earth, ionization, which could be the media for the flow of energy, increases instead of decreasing. Many names have been given to the sources of energy which we may feel are different sources of energy. We carry on a great deal of research on cosmic ray — the universal electromagnetic field, earth's magnetic field and the energy being received on the earth from the sun's rays. Could it be all energy is from one source — vibrations? Since the source of energy is the universe, the generation of energy by rotary action and by all prime movers is an effect and not a cause. Would it be going too far to suggest that there is no such thing as heat, light, sound or even electricity; but all things are merely effects manifesting themselves in various forms because of the effect of vibrations on various media? Oscillatory energy action, be it in a leyden jar or another capacitor, man-made or in what we may call natural capacitors, all act the same. The oscillations will continue until they have reached their cycle of height and then there will be a back-rush returning to where the oscillations originated. Every oscillation, whether large or small, is completed during the same interval of time. The beat note of time, the heart beats of life, the oscillations of the universe all prove the same great fact that oscillations are governed by the same cycle of time, completed during the same interval of time. Waves of energy have a regular beat note, coming and going as the waves of the sea, but in a very definite mathematical order, coming to the earth from every direction with a definite rhythm that might be referred to as the Father of Time, the Sire of Gravitation.

We repeat, "Energy has a definite elastic or resilient rigidity and density, which is subject to displacement and strain." When a strain is removed, the medium will spring back to its old position and beyond, surging back and forth as the waves of the sea, and will continue to oscillate until the original pressure is used up. If the internal impedance is too great, there will be no oscillations, but it will merely slide back in a dead beat to its unrestrained state. Cutting down the resistance to the minimum and by synchronous or resilient ionic actions of the device with the ionic actions of the universe, recovery will be quicker and quicker until inertia will assert itself and lengthen out the time of final recovery by carrying the recoil beyond the natural oscillation and thus

prolonging the vibrations by oscillations. When the recovery is distinctly oscillatory and harmonics set in, the oscillations will continue because of the oscillations of the universe. These oscillations will be surgings with a definite beat note of the evolution of matter and the evolution of energy.

"In the far-off stellar crucibles of the universc we see the same laws being obeyed as in our laboratories. As we trace down to the almost infinitesimal constituents of the extremely minute atom, we find apparently matter does not exist at all, as the realistic substance which we have supposed it to be. There at its very foundation it seems to consist of energy charges which probably stimulate the motions of celestial bodies. It is becoming more and more certain that the apparent complexity of nature is due to our lack of knowledge, as the picture unfolds it promises a marvelous simplicity. Energy is emitted at various wave lengths, or frequencies which must be taken into account in laws of radiation… Now the physicist uses quanta as commonly as he does electron and atoms and molecules. Bodies are built of molecules, the molecules of atoms, and the atoms of electrons, ions, protons and high energy photons. Here we see the atomistic principle applied to "material" (matter) and then to electricity (What shall we call it?) Finally, a physical process — the radiation emitted by the electrons — is divided into quanta. With such pictures of the universe being constructed we may cease to be surprised at anything, and our interest and admiration will grow. Will we ever get to the final foundation?

"One of the most marvelous relationships that has ever been revealed in the entire science of physics is that between light and electricity. Knowing what we do at the present time in regard to the structure of atoms, this relationship is not quite so surprising. However, considering the total absence of this knowledge about a half century ago, pertaining to the existence of electronics in atoms of matter, the sudden revelation that light (and radiation in general) are vibratory phenomena was very startling and revolutionary." Even today persons unfamiliar with fundamental physics find it difficult to believe that energy traveling from yonder star to the earth is electromagnetic of many wave lengths of frequencies, with different effects depending on the media, being acted upon.

"Radiant here means proceeding from a center in straight lines in every direction. Energy is internal and inherent. "Energy" is defined as a condition of matter in virtue of which any definite portions may effect changes in any other definite portion. This was written in 1892, and discoveries since confirm it. Energy then, is a state of matter, or, rather, the result of a particular state or condition in which matter may be when any observed phase of energy appears."

It is recognized that in addition to possessing kinetic energy, the atom is capable of absorbing energy internally. This internal energy would seem to be associated with the configuration of the particles of which the atom is composed. While under ordinary conditions an atom is in what is known as the normal state, or the state in which we find matter apparently neither giving off, nor absorbing energy. However, the internal energy of the atom can be altered. When the internal energy of the atom exceeds that of its normal state it is said to be excited. Excitations may be caused in several ways, among which is the collision of the atom with rapidly moving positive or negative particles, or as in the breaking of lines of force in the modern electromagnetic generator, which is nothing more than an electric pump, for the electric generator does not create the electrical energy any more than the water pump creates water. Kinetic energy is given up when excitation causes rapidly moving particles to give up some or all of their kinetic energy to the atom during collisions. This is taking place in the Universe all the time. The electric motor and generator would never have been discovered except a dielectric (insulation) had been discovered. Discover a dielectric (a valve) for the energy of the Universe and a means of making a device oscillate with the oscillating energy of the Universe and one has the answer to harnessing the energy of the Universe. A limiting case of excitation is ionization, in which energy is absorbed by the atom sufficiently to allow a loosely bound electron to leave the atom against the electrostatic forces which tends to hold it within the atom. An atom which has given up one or more electrons is said to be ionized. It is possible that ionization, or in other words excitation, may take place in successive steps through absorption of quanta energy, or that is, through the evolution of matter and evolution of forces. The return of an ionized atom to a state of lower energy is associated with electromagnetic radiation. So also from the process of ionization which may result from a number of causes, and the one we are interested in is through cosmic radiation, electric energy becoming associated with the oscillation or vibration of the universe. The higher the frequency, the greater the ionization or excitation. All energy appertains either to matter or excitation of energy and continually passes from one to the other, or in other words, continually possessing kinetic energy. There, at its very foundation, matter consists of an energy charge which governs the very motion of the planets and suns.

Matter is susceptible to motion, and stress. All atoms appertain either to matter or energy and continually pass from one to the other, thus producing kinetic energy. There at its very foundation matter consists of energy charges which govern the very motion of celestial bodies…

To introduce a new way of using an old source of energy, be it called the collapsing of earth's magnetism or any hypothesis of a source of energy can only be justified by the necessity of explaining the insistent fact that a battery of vibratory units can be made to produce 50 KW of energy per unit of 60 pounds. Therefore, some hypothesis of theory must be found to attempt an explanation of the discovery of a device whereby energy can

be obtained by oscillatory means in harmony with the vibrations (oscillations) of the Universe. On the other hand the hypothesis may be taken that the oscillations are out of harmony with the harmonies of the Universe cutting lines of force of energy oscillations by oscillations. The viewpoint on the harmonics of the Universe depending on what yardstick is used in the valuation of the hypothesis used to explain the results. It all sums down to the fundamentals of electromagnetism or whatever name one has chosen to apply to the original source of energy which in the final analysis must be accepted as vibration or oscillation. The focus of our attention in any field of energy has the same dimensions as has the foci of attention in all the higher fields of vibratory energy. It also must be conceded that all energy is vibratory in its final analysis and therefore exists throughout all the Universe. It might be well not to throw this theory out of the window as some former theories have gone and later had to be brought back through the door because they refused to die but were kept alive by the fact that they may have best explained the reason why a modality which existed did perform as claimed.

No one can say that in all space, including that of the Earth's atmosphere, all matter is not being bombarded by high speed particles. Therefore is it too far wrong to say that throughout space there is energy and this energy is kinetic in nature and can be harnessed and used by man by oscillatory means without a mechanical prime mover? Not alone on the earth but in all the Universe.

It has been proven that this oscillatory energy will drive special constructed electric motors at a speed heretofore never dreamed possihle. Tesla had a glimpse of the idea in his one wire motor. Also by this means of oscilliatory action the clockwise vortex of the pull of gravity in the Northern Hemisphere can be made to rotate counter-clockwise and the counterclockwise pull of gravity in the Southern Hemisphere can be made to rotate clockwise.This is a complete reversal of the vortex of the earth's magnetic pull, or call it what you will.

Watson Davis, director of Science Service, Washington, D.C. in his book "The Advance of Science," 1934 writes "Cosmic Rays bombard the earth from outer space every second of the day and night. They penetrate everything including our own bodies. They carry the mightiest packet of energy yet known to science. They give rise to burst of material particles. —"

"Of all radiant energy rushing about the universe, the Cosmic Rays are thought to be by far the most important. Science deduces with astronomical accuracy that the universe's total radiant energy in the form of cosmic rays is from 30 to 300 times greater than that existing in heat, light, and all other forms combined. Of the imports of energy received by the earth, the cosmic rays equal approximately one-half of the total energy coming in from the stars, excepting the sun."

The important purpose for the quotations which have been given is to arouse attention to the fact that there are tremendous energies coming to the earth from outer space. These energies are only different manifestations of the energies we see in operation all around us. In many cases we are not even consciously aware of their existence. As Mr. Davis states, "They penetrate everything including our own bodies. "Everyone of us is actually alive by virtue of these energies. Every part and particle of the Universe is alive with them. The generators that now furnish our electric power do not create or originate any power or electricity; they merely direct "pump" the existing energy or electricity. In other words, so far as this is now concerned, electricity has always existed.

Vibrational waves of frequencies above the normal range of human ear perceptions are catalogued as ultrasonics. These are waves of frequencies of over 20 k.c. up to 500 m.c. Vibrations above and below these ranges act essentially the same.

Motion is manifest in everything in the universe. In other words, as in a musical note of a high or low C the vibrational rate, the frequency, is different but all "C" notes are essentially the same, differing only in harmonic and range frequency. This is the foundation upon which much of Moray's investigation of vibration is based. All matter possesses a natural rate of vibration. Moray's research in ultrasonics did not end at 500 m. c. but he took the harmonic of certain frequencies and utilized them for various results from breaking objects by vibrations to bringing down birds out of the air, from throwing the natural vibratory rate of living cells out of balance to the shearing off of animal, mineral and vegetable matter. Sometime it has required several frequencies to be transmitted over a media at the same time. Any material that has elasticity can propagate this type of ultrasonics research. The propagation takes the form of a displacement of oscillations.

The universe is singing and this symphony or frequency is what keeps every part of the universe and every atom in its proper orbit. We can see this in studies beyond the microscope or beyond the telescope, either instrument telling us the same story. Science agrees that all form of matter is vibrating at its particular rate of frequency and so it is with the various forms of energy, heat, light, magnetism and electricity, these are but forms of vibratory motion connected with and emanating from the same source, the great generator of the universe; or, in other words, all matter, energy or force in the evolution of matter and the evolution of forces manifests a rate and degree of vibration entirely of its own. Matter, vibrating at a certain rate of its individual character, may be transmitted into other substances by lowering or raising its rate of frequency. If the frequency is raised high enough its molecules will separate and the atoms are freed. Raise the vibration of the atoms still higher and higher and they will resolve themselves into the original elements of which all matter is constituted.

Matter then becomes a form of energy. Frequencies may be developed which will balance the pull of gravity to a certain degree of neutralization of the forces of gravity. One then goes beyond those of gravitation. The understanding then of the principle of vibration or frequency is to grasp the secret of energy, i. e. vibrations, in which lies the secret of all things.

The Salt of the earth is energy and the evolution of matter and the evolution of forces in the processes of the creation of all things. By the proper uses of these natural laws of energy and matter, matter is turned into energy and energy into matter.

In the Gamma Rays we find potentials which are equivalent to as much as 2,000,000 volts, yet their wave lengths are not the shortest known to the physicists. In octaves still higher lie rays which are known as Cosmic Rays. Who can draw a definite line and say how much higher other octaves exist than those known as the Cosmic Rays- Our starting point from the discovery of these different rays — vibrations — was electrical conductivity of the air. It has been discovered that conductivity is just as strong by night as by day, so that radiations emitted by the sun can scarcely be the cause of this energy. May we not, then, accept the theory that the sun, in and of itself, has no energy, but is merely a rebroadcaster of the greater generator — the sonic of the universe itself; that these two, then — matter and energy — are possibly one? Is the sum total of all that has been found out during the centuries of constant research to be judged by the small portion of the universe which is visible to man, who is only armed with his telescopes, or with the most powerful miscroscopes and spectroscopes ever made by man?

All space is saturated with vibrations, energies which are doubtless what we may call electrical in their ultimate character or very closely allied to electrical action. The relation of matter to energy and energy to matter then becomes the potential of the universe, one continuous series of oscillations, oscillating to and fro like a great pendulum across the universe. One might ask, "How can one get a steady source of energy from such surges?" Could not a steady flow of water be obtained from the waves of the sea?

In reference to electrons, neutrons, protons, photons, and ions, etc., it is our theory in using these terms that they are the energy of the universe, which have become disassociated here and there, and these innumerable infinitesimal particles constitute (by forces they exert and the disturbances they originate) the substratum of what our senses terms as matter, and by nature splitting matter the energy of the universe is born and matter "reborn."

Matter is susceptible to motion. The media is susceptible to stress. All atoms appertain either to matter or energy, and continually pass from one to the other, thus introducing kinetic energy. There at its very foundation matter consists of electrical charges which govern the very motion of celestial bodies — including radioactive radiations of energy and matter. The evolution of matter and the evolution of energy.

There are ample writings and scientific books written by experts which acknowledge that there is unlimited energy in the universe, but to say one is able to tap this supply is another matter. If I tell you there is water, good cold water, in a glass on your table, but you cannot drink it for a million years, what would you think? You know how to get the water out of a glass. Well, it is as easy to tap this energy now out in space as it will be in a million years from now. If it can be done then, it can be done now.

We speak of generating electricity: To be exact, we only transfer it from one place to another (pump it, if you please). We cannot generate it because we can neither destroy or create it. After we have used it to light our homes or do other work, it is like water over the wheel — no less water, only the lowering of potential. The electricity has "sunk back" from whence it came, ready and waiting for nature or man to raise its potential, when it again is ready to do man's bidding, or in other words in the evolution of energy it "sinks back" to its source. It is naturally very slowly but steadily being liberated from the universe only to return again.

Elements maintain an equilibrium by oscillations, rotations, attractions and repulsions, but this does not interfere with a transformation of equilibrium, which when the transformations of equilibrium are rapid enough become heat, light and electricity, i.e., matter is turning into energy and energy into matter.

There can be no "production" of current electricity, there will be no kinetic energy if there is no disturbance of equilibrium, that is to say change of potential of energy level. When one thinks of the oxygen and nitrogen molecules of the air all about us moving with the speed of bullets and striking us and everything with this speed, one can form some idea of the agitation taking place in the universe. The oscillations of the universe are part of this agitation.

The oscillations of these electrons, ions, photons, protons, etc. out in space are emitting electromagnetic waves of many wavelengths and frequency. In the Moray device it is so constructed that the frequency is very much lower on the secondary side than on the primary side and almost complete resonance established.

All radiant energy is now believed to possess mass or something equivalent to it. Mass and radiant energy are even considered to be interchangeable.

We are convinced the energies from the Universe are active radiations produced in "nature's cyclotrons" (nature's reactors) by the evolution of matter into energy and energy into matter.

"Scientific American" (1930) — "The earth itself is a huge electric dynamo generating enough current to supply light, heat, and other electrical needs to the 10 largest cities in the U.S. for at least a million years."

Researches on thermal reactions inside the earth, conducted by Dr. Ross Gunn, indicate that the earth is a great generator.

"Nature of the World and of Man" (Printed by the Univ. of Chicago Press, 1925) "The amount of light and heat (radiant energy) received by the earth from the sun is enormous. On the square yard exposed perpendicularly to the sun's rays radiant energy is received at the rate of one and one-half horsepower. The average rate for the earth through the periods of darkness as well as of light is three-eights of a horsepower per square yard. This means that 300 horsepower are received on a building 50x150 feet in dimensions. Our planet is receiving energy at the rate of 160,000 horsepower per inhabitant of the earth at the present time.

"The earth receives but an insignificant fraction of the energy the sun radiates: only about one-two-billionth." "The Advance of Science," by Watson Davis, Director, Science Service, Washington, 1934.

Cosmic Rays bombard the earth from outer space every second of the day and night. They penetrate everything including our own bodies. They carry the mightiest packet of energy yet known to science. They give rise to bursts of material particles.

Hundred Billion Volt Wallops.

Preliminary analysis of Explorer VI data just published shows the belts shrunken in size and in intensity — at least this was the state of affairs during August and September of last year.

Another surprise come in the discovery of a third belt lying between the outer and inner belts found by Van Allen. Perhaps this new belt should be called the Arnoldy, Hoffman, and Winckler belt in honor of the three University of Minnesota cosmic ray scientists responsible for its discovery.

The three physicists from the Land of Lakes masterminded the construction of the radiation detection equipment which formed part of the payload of Explorer VI and analyzed the data it accumulated.

The new shape in radiation belts found by the Minnesotans confirmed a growing suspicion that the belts are not the stable pair of doughnuts once visualized, but a shimmering set of tenuous rings which may change markedly from day to day.

Radiation levels measured by Pioneer III, Pioneer IV, the Russian Mechta, and Explorer VI have shown significant variations.

Fortuitously, Explorer VI was in orbit and busily taking radiation measurements during a strong magnetic storm created by unusual activity on the face of the sun.

As a result, the step-by-step reaction of the belts to such a storm and a rather complete history of their return to normaley was obtained for the first time.

The orbit of Explorer VI was ideal in several respects for the probing of the intensity and extent of the Van Allen belts.

Its orbit was highly elliptical, extending from about 4,100 miles from the earth's center at its near point to some 30,000 miles at its far point.

Moreover, the inclination of the orbit was such that the rocket passed from rather high northern magnetic latitudes to high southern magnetic latitudes.

Because of these two orbital characteristics, a large portion of the region of the belts was scanned in several days time.

That portion of the new data which has been processed to date indicates that the maximum normal radiation dosages in the belts during the period of Aug. 7 to Oct. 6 of last year was down significantly compared to that found earlier with payloads aboard Pioneers III and IV, and the Soviet Mechta.

On the night of Aug. 16-17, a strong geomagnetic storm occurred which- brought a new surprise. During the first 24 hours of the storm, about two-thirds of the radiation in the outer zone was "dumped" on the earth.

Available evidence suggests that the lost radiation consisted largely of low energy electrons.

The outer belt soon recovered, in fact over-recovered, and near the end of the storm, on Aug. 18, the outer belt was found to contain about five times the total radiation found there before the storm.

This abnormally high radiation "fever" persisted for 10 days and was followed by a slow return to normal.

As yet, a satisfactory explanation of the "dumping" process in the radiation of the outer belt has not been found.

Tracing the probable dumping paths of this radiation to earth, the Minnesota scientists found that it should show up near the surface of the earth between magnetic latitudes of 52 and 62 degrees, with a peak appearance at 57 or 58 degrees.

On the very night of the magnetic storm, the counters aboard Explorer VI revealed the disappearance of radiation from the outer belt, Dr. Winckler observed an aurora over Minneapolis, at a magnetic latitude of 57 degrees.

The tie-in was inescapable. The observed aurora must have been caused by the jumped electrons from the outer belt.

Such electrons would produce more than the visible evidence of an aurora. 1-hey would produce X-rays. Previous observations by balloon had already indicated that such X-rays were often present at relatively low latitudes during times that visible auroras lay far to the north.

The Minnesota data thus gives support to the idea that under certain conditions at least, an aurora may consist of two parts, a visible aurora most likely appearing near the usual auroral zone, and an X-ray aurora, invisible perhaps to the naked eye, lying to the south.

The National Aeronautics and Space Administration picked up the tab for this work, and most likely will do so in the future as the Van Aliens, Arnoldys, Hoffmans, Wincklers and others bring new light to bear on the remaining mysteries of the earth-circling radiation belts. Salt Lake Tribune, June 19, 1960.

SPACE FILMS DISCLOSE FAR GREATER RADIATION

BEDFORD, MASS. (UPI) — Film packs exposed at altitudes up to 700 miles in an Atlas nose cone showed far greater radiation than previously discovered, according to the air research and development command.

"Particle tracks indicate that radiation in the (Van Allen) belts discovered by the Explorer satellites far outshadow the flux of primary cosmic radiation as measured by means of skyhook balloons at 20-mile altitudes," the report said.

"Counts in the Atlas-flown emulsions show that for every comic ray that penetrated the block, some 44,000 protons of the Van Allen belt were recorded.

"The accompanying photomicrograph of a section of the emulsion smaller than the head of a common pin shows a track produced by a heavy cosmic ray primary immersed in a sea of protons carrying kinetic energies in excess of four billion electron volts and thus capable of penetrating the Atlas nose cone.

"The more energetic of the trapped particles produced `stars' or nuclear explosions inside the emulsion (film) 500 times more frequently than observed on earlier Aerobee rockets which reached only 100 miles, below the intense trapped radiation of the Van Allen belt." March 17, 1960, Deseret News

No other radiations "pack such a wallop" as Cosmic Rays. Compared with other energies here on earth, they rate thousands and millions of times as powerful. Cosmic Rays energies seem to lie between 100 million and more than 100 billion volts. It is not possible to be any too definite and positive, because estimates necessarily change with additional experiments and knowledge. Comprehension becomes difficult when energies reach billions of volts. The highest electrical presssure on high-tension power lines is 250,000 volts. The peak of artificial electricity production for experimental purposes is 20 million volts. Lightning is rated at about 1 billion volts.

Dr. Anderson's cloud chamber at California Institute of Technology in which the positron was discovered has furnished much information about cosmic ray energies. He found that some positrons are born of cosmic rays smashing into matter. The cosmic-ray energies deduced from the tracks left in the Anderson cloud chamber range from 100 volts to 3 billion volts. The Lemaitre-Vallarts theory together with Dr. Johnson's asymmetry measurements, give definite values for the energy of half of the cosmic radiation, and shows it continuously disturbed between 5 billion and 50 billion volts.

The figure of 100 billion volts is a result of Dr. W. Kolhorster's measurement of penetrating radiated in the depths of the Strassfurt salt mines. He found that the minimum energy of these rays had a penetration which was greater than ever before demonstrated. Dr. Axel Corlin of Sweden's Lund Observatory found radiation that still had energy after passing through somewhat greater depths and, therefore, the voltage figures can be made even higher. And energies of 100 billion volts or more are indicated by the great bursts set off by cosmic ray collisions, called the stosse, which have been observed particularly in Germany. The Moray RE devices have worked equally well in deep mines under water or high in the mountains and in an airplane.

It is about 100 years since science began to consider light, heat, magnetism, galvanism and electricity as natural forces. In the early part of the 19th Century school books termed these things imponderable substances. The corpuscle theory of light was taught and the sun was supposed to contain a never failing supply of these corpuscles. After the corpuscular theory had about faded man turned to the wave theory, but even the wave theory was based on a crude concept of a movement of the ultimate principles or atoms of matter. The electronic theory superceded the old theory and while the electron theory surpasses all former theories, could it be, as greater light leads us on, the electron theory will be found to lack "absolute" knowledge, and the Einstein Theory stand some revision, amendments, or even undoing?

CHAPTER TWO

REACTIONS BY MEANS OF ELECTRONIC EXCITATION

As I stated in 1914 in connection with the action of Moray RE tube values.

If two molecules were beyond each other's Molecular range and if the neighboring surfaces could, by any means as by the supply of electricity from without, be oppositely electrified, the forces of cohesion would be intensified momentarily by something akin to chemical affinity and cohesion would set in over Ultra-molecular distances. The opposite charges cannot be maintained electrostatically between two neighboring metallic surfaces, but they can be momentarily imparted by a sudden jerk of disruptive discharge or receive electric impulses, these are the things which are effective in promoting chemical cohesion. It is not to be supposed that the electrons in a polarized atom need to be disturbed in any great amount in order to produce chemical cohesion, polarization converts ordinary molecular force in cohesion into incipient but real chemical affinity.

It has long been known that electrical forces between charges are of the inverse square law type. The interactions of two moving charged particles free in space can be easily computed by our analogy to our well-known astronomical problems with due regard to the signs. Coulomb's Law states, "The forces exerted upon each other by two small charged bodies varies directly as the product of the charges and inversely as the square of the distance between their centers." The force also depends on the kind of medium in which the charged bodies are placed $f = \frac{Q^1\, Q^2}{4\pi\, p\, r^2}$ Where p is the permeability of the medium. As an illustration of the force given by the Coulombs Law, if we have two small bodies each charged with one coulomb of electricity and these are placed in a vacuum with a distance of one meter between centers the force of repulsion will be 8.9 x 10^9 neutons or 2.25 x 10^9 lbs.

It is obvious that chemical molecules can be made to obey Coulomb's Law and may be subjected to the interactions of the electrical forces, the impact, or inter-molecular pressure, between the reacting molecules must be very large.

We know from proven experimental facts that at 10^{-2} cm. and even down to 10^{-5} cm. apart, gaseous ions at atmospheric pressure exert very feeble forces on each other. As the ions are being knocked around randomly by molecular impacts, Brownian movement whose impact forces are larger than the attractive forces. Only until they are within molecular distances to each other is the coulombic potential energy equal to or exceeding the average of translation.

$$\frac{ge^2}{4\pi\, p\, r_o} \text{ equal to or greater than } \tfrac{3}{2} Kt$$

r_o is the molecular distance

Inside this molecular distance the ions are actively drawn together; outside this sphere of radius r_o has an electric field given by the equation:

$$X = \frac{e}{r^2}$$

at 10^{-8} cm. X is 10^8 volts/cm., even at 10^{-6} cm. it is 10^4 volts cm. It is apparent that the coulombic force within such molecular distances between oppositely charged ions must be very great. The effect is analogous to the entrapping of comets when they pass near a planet, thereby rendering them permanent members of the solar system. Since the stoppage of comet like ions in an encounter with oppositely charged ions occurs well within the limits of atomic magnitude, 10^{-8} cm., so that the acceleration will be of the order of $U^2/2t=10^{26}$ egs., and the force needed to drop even a single electron will be 1/10 dyne. The power to stop and neutralize such electrons flying with 1/30 of the speed of light inside a molecular thickness can be estimated.

$$\frac{\text{energy}}{\text{time}} = \tfrac{1}{2}\,\text{mu}^2 \qquad \frac{\text{u}}{2\text{t}} = 10^{27}(10^9)^3 10^8 = 10^8 \,\text{erg/sec}$$

Reaction of excited atoms or molecules is of importance only under conditions of high electric densities, in view of the short time intervals involved,' that is 10^{-8} sec. Some atoms can, however have electrons in metastic state of excitation lasting some 10^{-4} sec. However, at lower electron densities second impacts can change the phenomena, and such atoms in impact with neutral atoms or molecules of an appropriate sort can lose energy by inelastic impacts causing excitation, ionization or dissociation of the molecules.

In any collison between a charged particle and a neutral molecule ionization takes place because of the electric force exerted on the planetary electrons in the molecules.

The Bohr Theory of spectral lines indicates that an electron should be able to lose energy to an electron in an atom or molecule as soon as it possesses an energy equal to $hv=1/2\ mv^2$; v is the frequency of the energy radiated, h is the Planck constant therefore we have $h=6.62 \times 10^{-72}$ erg/sec, V=frequency, m=mass. When the disturbed electron returns from its orbit or state, it was suspected that the first inelastic impact at increasing energies should correspond to these excitations losses, leading to light emission, and not to ionization, the ionization potential being higher. It was found in complete conformity with Bohr's theory, the first inelastic impacts of electrons with atoms or molecules at lower energies, in general gives rise to the emission of light of the first line of a series of these atoms and that as the electrons' energies increase, the separate higher lines of appropriate frequency appear as the energy reaches a proper value.

At an appropriate energy of the impacting electron, the atomic or molecular electrons are completely removed from the atoms or molecules leaving behind the positively ionized atomic ions or molecular ions.

When an electron possesses more than an ionizing amount of energy, any superfluous energy which it has after causing ionization is distributed between itself and some electrons removed from the atoms or molecules.

A single electron of appropriately high energy can liberate as many as 4 to 5 electrons at once from an atom as in the outer electrons of mercury. The work on dissociation and the mechanism of ionization in certain gases such as the rare gases, nitrogen and hydrogen, has shown the possibility of the simultaneous excitation and ionization of the same atom by a single electron impact of appropriate energy.

It is found with few exceptions that the larger the diameter of the atoms and the larger the number of external electrons the smaller the excitation and ionization potential will be.

The probability of resonance and ionization is greatest at the precise ionization or resonance potential and falls off exponentially from that value on only to rise again as the next potential is reached. In any case it can be definitely stated that the probability of ionization and excitation calculated on the basis of the electron free path in a given gas the number ions formed are a maximum at the ionization or excitation potential; thereafter, they drop rapidly to lower values as the electron velocity increases.

We experimentally found the number of ionizing collisions per meter made by an electron, is approximately proportional to the excess of energy of the electron above the ionizing energy

$$n=C\ (E-E_1)$$

E is the actual energy of the electrons

E_1 is the ionization potential of the gas

C is a constant

The energy an electron must have before it can produce an appreciable amount of ionization is always considerably larger than the ionization potential. The ionization potential determines only the energy at which ionization by collision starts. The greatest amount of ionization occurs when the electron has an energy 5 to 10 times that given by the ionizing potential.

The minimum value of the potential at which definitely inelastic impacts of electrons with atoms or molecules set in and where the electrons lose all, or a large fraction of their energy at a single impact, is called the critical potential. It was first observed that the conductivity of gas was increased at the critical potential, or first ionization potential, that is, when an electron acquired an energy of equivalent volt V_o, characteristic of a given gas, it was able on impact, to remove an electron from an atom which has an ionization potential of V_o. This is expressed in electron volts.

The second ionization potential corresponds to the work required to remove a second electron from the atom or molecule, when the atom or molecule has already been ionized.

Unless ionization occurs, atoms and molecules can absorb only discreet amounts of energy, this energy has the effect of moving the most loosely held orbital electron or electrons in an atom to some larger orbit. Thus at normal temperature 80.°F, the average kinetic energy of the gas molecules corresponds to less that 0.04e.v., that is, the fraction of the total number of molecules which has energies greater than that necessary for ionization of the gas is extremely small.

Because the mass of the electron is so very small the energy it loses in an elastic collision is only a small fraction of its total kinetic energy. The fraction f is given by the following equations:

$$f = 2.66\frac{mM}{(m-M)^2}\frac{(1\quad WM)}{Wm}$$

WM average mass of the molecules

Wm average mass of the electrons

f is approximately equal to m/M even when the average energy of the electrons is only 20% or 30% larger than the average energy of the molecules. Thus with a comparatively small electric field, if the electrons can make a sufficient number of collisions the average energy of the electron can become many times that of the molecules.

If the electric intensity were only 100 volts/ampere the average energy of the electrons in oxygen would be about 4.5 e. v. at 1 mm. Hg. This corresponds to a temperature of 35,000°k. Under conditions such as these the

actual kinetic energy of a fairly large fraction of the electrons would thus be larger than the ionization energy of the molecules and ionization could occur owing to the collisions of the electrons with neutral molecules.

The forces acting between an electron and a molecule vary much more than the inverse square law coulomb. This is represented by the following equation:

$$f = \frac{(D-1) \quad O^2}{2 * 3{,}1416\ N\pi 5}$$

this assumes spherical elastic molecules and ions, these attract each other at a distance r with a force f. Thus an electron can approach very closely to a neutral molecule before experiencing any force due to the neuclei and the orbital electrons. If then, the electron has made a series of collisons and its energy or velocity is sufficiently low it can attach itself easily to the neutral molecule to form a negative ion. However, at too low pressures, the electron mean free path is increased and collisions are few thus insufficient to bring about the formation of negative molecular ions.

Electrons of low velocity approaching an ionized atom or atomic ion or molecular ion, must be able to interchange velocities so that while one electron neutralizes the ionized atom, the other electron escapes with the total energy resulting from the process. Another example would be a free slow-moving electron approaching an excited atom, the energy of excitation is given to the slow electron while the excited electron returns to its normal orbit without radiation or to some intermediate orbit with radiation of lower frequency. A classical example for illustration is the irradiation of mercury vapor by the line 2537 Au; the mercury vapor becomes activated, is then in a metastable state; if these atoms collide with Thallium atoms while in this state, a thallium-electron would be raised to a higher level so that it emits the green thallium line. The difference bewteen the energy of the 2537 Au line and the low-energy thallium line is converted into kinetic energy of the separating mercury and thallium atoms after impact. If the activated mercury atom strikes hydrogen molecules in the excited state the energy is converted into the work a dissociation of these molecules into atoms or molecular hydrogen fragments. If the excited mercury atom collides with an atom of lower ionizing energy, this may remove an electron from the neutral atom ionizing it, and itself returns to the normal state.

Methods of electronic excitation

A. Processes in the gas itself;
1. Rapidly moving electrons and beta particles from radioactive changes.
2. Rapidly moving positive charges, protons and alpha particles.
3. Rapidly moving positive ions in high electrostatic fields
4. Photo electric ionization by ultraviolet light, X-Ray and other rays beyond the light rays as coming from the Cosmos.
5. Through chemical reactions in the gas, e. g. e. oxidation of NO — NO_2 P — P_2O_3, P_2O_5, etc.
6. Possibly ionization and excitation of the gas may be caused by temperature alone without action of the walls, or by impact of rapidly moving neutral atoms or molecules from other sources, for example neutralized alpha rays,

B. Processes due to solid or liquid surfaces in contact with the gas.
1. Bombardment of metal by fast electrons, alpha particles, positive ions or recoil atoms giving secondary atoms.
2. Action of metasable atoms on solid surfaces giving secondary atoms.
3. Action of gamma rays, X-rays and light on solid or liquid surfaces giving electrons photoelectric effect.
4. Incandescent metals in general emitting large numbers of electrons called thermo-ionic emissions.
5. Incandescent surfaces having salts, phosphates, oxides, chlorides, or complex metal salts of mixed composition, at lower temperatures give positive ions such as sodium ions, postassium ions, barium ions, etc.
6. Chemical reactions at surfaces, oxidation of moist phosphorus, potassium, sodium, give ions of both signs, but more negative ions.
7. The atomizing of liquids into minute droplets by high velocity air currents tangential to the surface causes the smallest droplets to become negatively charged. If water is used which contains ions the larger droplets have ions in them and are predominately positive. The source of conductivity of the gas is the source of the charges on rain clouds and thunderstorms.
8. Frictional effects between solid particles suspended in gases, as typified by electron in sand storms.

9. Ionization of a gas can occur when the average energy of the molecules becomes so great that the energy transferred in a collision bebetween two neutral molecules is sufficient to ionize one of them.
10. The collision of free electrons with neutral atoms or molecules. Ionization by collision between molecules and electrons in thermal ionization may involve several processes:
    a. The electrons may ionize directly in colliding with a neutral molecule.
    b. The electron may excite a molecule acid subsequent electron may ionize it.
    c. An electron might excite a neutral atom which subsequently in returning to its normal state would give off radiation and cause photo-ionization either in the gas or at the walls of the discharge.
11. The electric field is then one of the most important ionization agents.

An ion moving under the influences of the forces of the electric field is given by the following equations:

F — XAned

legend F — force; X — field strength; A — base area volums; n — ions/cc; e — charge; d — length parallel to field

This force acts on each ion between its 10^9 collisions/sec. with molecules to give it momentum in the field direction. At each of the 10^9 impacts some of this momentum is yielded to the neutral molecules with which the ion collides. As a result the molecules are set into a motion along X.

When a molecule captures a charge to become a molecular ion it moves in the electric field according to the following equation:

K — e/6 x 3.1416 - a (1-AL/a)

legend e — charge; coefficient of viscosity; a — radius of particles; A — constant, (.874); L — Mean free path.

The distance a molecule moves between impacts is called a free path, the mean free path is dependent on the velocities of the ions.

Now an ion that has fallen through a potential difference of one volt will have a kinetic energy of 1.6×10^{19} joule. That is,

q E —1x1.6 x 10^{19} — 1..6 x 10^{19} joule

According to the equation: q E — $^1/_2mv^2$ we find that the velocity of the particle after falling through a difference of potential of E volts is entirely independent of the length of the path the particle has traversed and also entirely independent of the form or shape of the electric field. The electric field intensity may be distorted in any way we please. That is, it may be at a high at one point, low at another, but still if the total difference in potential is E volts, the velocity of the particle will be:

$$V = \sqrt{2q / m(E)}$$

E. g. an electron with the kinetic energy of one electron has a velocity of: V — 5.93 x 10^5 meters/sec.

A hydrogen ion having a kinetic energy of one electron volt would have a velocity of 9.85 x 10^3 meters/sec. Or nearly 6.1 miles per second. Hence the mobility of charged particles, positively charged molecular ions and negatively charged molecular ions or atomic ions in the electric field may be controlled by simply controlling the difference of potential through which the particles are falling. Further, since the molecules are to react with one another the rate of reaction and the intensity of said reaction may be controlled at will.

A specific case in which the electric field performs the double function of molecular excitation and the creation of inter-molecular and atomic ions is being given by the system used by the inventor.

It is a system utilizing the principles of the wire corona with concentric cylinder at different pressures. The system is modified in conformity to the concept that chemical reactions must take place when the oppositely charged molecular ions from an appropriate activated catalyst are accelerated against one another in the wire corona, it consists of a cylinder made of a suitable catalyst from which positive atomic ions are emitted. The reactants (gases) streaming through the chamber parallel to the length of the wire attain the polarity of the negative molecular ions by the high electric field close to the wire. As these negative molecular ions are accelerated at the right angles to the wire in the direction of the electric field toward the positively charged catalyst cyclinder, they are met by an avalanche of on rushing atomic ions from the catalyst. A certain amount of reaction takes place in that instant. (10^{-8} sec.) However, some of the negative molecular ions outside the mean free path of the positive atomic ions are free to rush headlong toward the positive cylindrical field where they are neutralized, and instantly given a positive charge by the avalanche of outrushing positive ions. These

positive molecular ions are accelerated back into the field and collide against the negative molecular ions coming from the direction of the negative electrode corona. This melee continues until the reaction has come to a point when the individual participants are either all gone or the mixture is outside of the electric field; backrush oscillations.

The Moray apparatus combined with other equipment, consists of a combination of specially constructed tubes which we will refer to as valves, "pressure transmitters," interceptors and oscillators. The valves are not rectifiers in the sense that they operate as radio valves in changing A.C. or H.F. to D.C. They have an actual valve action in stopping the "flow" of energy which may be thought of as oscillatory action similar to the waves of the sea, without rectification, from returning to the outer circuit, much as a retaining wall could stop the waves of the sea from returning. The other modalities and "tubes" of the device are equally unique in their performance. Although no new laws of energy are being advanced or claimed as having been discovered, the application in the method of utilization of the energy throughout space is unique in that "Generation" is accomplished by oscillatory utilization rather than by the conventional prime owner. These detector tubes have a synchronized pull with the specially developed oscillators of high faradic capacity and provide a means through which oscillating energy may pass to specially constructed valve oscillators whose relation to the first stage valve is such as to permit oscillations to come in from but not to return to the outer circuit with an automatic variable relation to the oscillations from the universe, and capable of setting up within their circuits initial oscillations which coincide with the oscillations of the universe.

Special provision is provided to stop R. E. tubes from becoming blocked in their disipation of the charges created by the oscillations that continually accumulate based on the oscillatory capacity back rush effect common to capacitors and herein applied in vacuum tubes. This action of these devices has the effect of enlarging and prolonging the time of charge and discharge of the capacitors and the capacity energy in the circuit to an appreciable interval in perfect harmony with the natural energy wave through the intercepter's valves and oscillators in the circuit which set up in the circuit electrical pulsations corresponding to the energy waves captured by the interpreter and again kept from returning to the second outer circuit by "multi-walled" valves. The final tubes act as energy pressure transmitters with a means to prevent "shunting" condensation by a special form of "getter." This stops condensation accumulating at the base of the tubes which would block their ionic action.

One must "split" the energy discharge band into lines of variation, call this what you will, lines of energy or line of light beyond the "light rays." The oscillations, therefore, do not become simple oscillations but through the action of the Universe set up an energy flow — which might be referred to as the assertion of inertia. When inertia sets in the action will continue because of the oscillations of the Cosmos, otherwise one would have a complete dissipation of energy and no oscillations. The oscillations will vibrate during the same period of time regardless of the potential, but the rate of vibration of the device depends on the "capacity" of its modalities, i.e., condensers, etc.

Let us go from the known to the unknown. We have referred to a form of ionic action in place of the common electronic liberation accomplished in radio tubes. It is an accepted fact when various substances are bombarded with alpha particles they are found to give off electrons. This is the principle involved in various vacuum tubes. Thomson gave a similar action of liberation the name of Delta Rays. These Delta Rays or electrons are thought by some to originate in a type of ionization which might be referred to as "thermions," give off when the alpha particles strike the bombarded substance. Is it, therefore, possible some "particle" from the Cosmos, with greater penetrating power than Alpha particles, would penetrate quartz or various substances and set up a decided ionic action? One maybe could learn much from a glorified "monochromator."

Just as sodium, postassium, caesium, rubidium, barium, strontium, react to visible light, or let us say wavelengths, within a certain range, might not certain other substances or substance react to oscillations from the Cosmos or artificially produced radiations?

The universe is analogous to a radio transmitting station. It is continually emitting energy, only of a greater range of wavelength. Wavelengths and frequencies are truly the answer to all vibrant worlds of living things. The stellar laboratories providing environments as yet unproducible by man or perhaps only unrecognized. The terms cosmic energy, radiant energy (as used by Dr. Moray) can be thought of as synonymous terms of frequencies of unknown and undefined limits. In fact, limits of arbitrarily named ranges of the spectrum, which the spectrum has not defined so that the terms should be recognized as meaning a locality in the wavelength scale without being definitely "fenced." Energy must be absorbed to be utilized. Absorption converts energy into heat, chemical energy, mechanical energy, electrical energy and perhaps into forms unknown at the present time. "Vibrant with life" is more than a poetical phrase.

In its simplest form an ion consists of a molecule of air that has either one or more or one less than the quota of electrons for the electrically neutral molecule. The former is a negatively charged, the latter a positively charged ion. Positive ions are attracted toward negatively charged bodies while negative ions drift away from them. This process goes on and the medium loses its electrical charge at a rate that is porportional to the

abundance of ions, to the velocity at which the ions move towards the attracting medium. The velocity is less or greater if the ion is not the simple type but consists of a variable aggregate of molecules. Much could be written on this. but the above should suffice for the present purpose. Let us go on from, not stop at, the Ultra violet Light Theory of Aurorea.

In some electronic tubes the electrons are not emitted directly from the filament but from an indirect Cathode which does not enter into the direct electrical function of the tube. Does this teach us anything toward an indirect generation of ions and ionic action? Could the opposite deflection of alpha and beta rays and the . undeflected course of the gamma rays teach us anything about cosmic energy or radiant energy valves and oscillators?

The more perfect the ionic action the greater the velocity. The greater the mean free path and the greater the collecting voltage the greater the ionic gain of energy will be between collisions and the greater the amount of kinetic energy will be conserved. The collision will be "perfectly resilient."

The little we know about "space" and what it contains or may contain is so limited that we are forced to acknowledge anything is possible beyond our experiences. The actual material of space consisting of the matter of celestial bodies is a very small part of the whole. There may be many all pervading energies or matter that are more important than those we have detected. The very fact of our inability heretofore to detect them may make them all the more important in the cycles of our life and the things we know.

There is a multiplicity of phenomena which occurs at the same time in gas conduction, the known laws are largely empirical and approximate. Ohm's law is valid in only a few limited cases, conductivity changes markedly with the variety of gas and the gas pressure. In the detector and intercepter circuits it becomes more important to maintain oscillatory action than frequency stability.

The relationship and combination of natural vibration and forced vibration is particularly important. It must be remembered that a point of resonance will be reached at some frequency and the charge will reach a magnitude depending on the impressed force which, in the case of the universe, is immense — the effect of resonance, pure resonance.

Science claims complete resonance is not producible. Science also, at one time, said it was impossible to transmit the human voice over a copper wire. That is and will always be a fact, but the same results are obtained. Science also said it was impossible for a heavier than air device to "fly."

Resonance has been obtained where a return wire in an electric circuit is not necessary. Pure resonance offers many dangers to the inexperienced investigator. The walls of Jericho are an example of pure mechanical resonance. Marching feet, running dogs and some harmonics come within the danger zone for bridges and the other mechanical structures, as also the breaking of a water glass. Every substance has a natural mechanical vibratory resonance and a point of dissociation. This is also true in electrical or energy resonance.

The theory is that in perfect resonance the oscillations will become more and more vigorous until the vibration or oscillation will go on forever if properly "fed" or to the dissociation of the matter. However, while this will be true in theory, it is only partly true. In fact, if one can obtain resonance with the "great generator" of the universe with its multiplicity of vibrations corresponding to the natural vibration and pure resonance of the different substances — each substance has a different pure sonic, pure vibration, pure resonance, buildings may be made to fall, glass to break, matter to explode, but only such things as come within the exact vibratory ranges of that resonance will be affected. The vibratory rate and the resonance of water is not exactly the same as that of oil. Find the proper mechanical or energy resonance of certain "kinds" of matter and the constructive results will far outweigh the destructive. Gasoline and fire each have their place which must be honored and feared as also appreciated. Man can destroy himself now, so where will a pure controlled resonance make too great a difference? There are enough things which, in the hands of babes, ignorance or knaves can snuff out nearly everything now; so, where need pure resonance be feared? The writer has, as Tesla did, come very close to pure resonance with certain substances. Being in resonance to one substance as compared to another is not being in resonance to all substances.

Put together in pure energy resonance certain electrical responding modalities which synchronize with the resonance of certain vibrations of the universe and what have you? Usable energy from the universe. This energy may come to the planets as oscillations similar to the oscillations and the tides of the sea. The R. E. tubes received this energy in surges, which may last only. a few micro-seconds but the pressure and the current in those surges are so large that sufficient energy is delivered to the equipment in resonance as to be un???ed and usable in multiples of flashes and a magnitude which will compete with the light of day. Remember resonance and pressure can do a lot of amplifying of energy. Also remember the vibrations going out from the sources in the universe must also return to their sources. Nothing is lost only a lowering of potential like water over the wheel.

The R. E. tubes present no new laws of physics. It may be a case of advancing further in the law and thereby obtaining results not at first deemed possible. This is the history of science. R. E. tubes possess greater ability to obtain "saturation" and thus charge the accompanying capacitors or condensers at a more steady rate which, when a certain voltage is reached, ionization occurs in the gases of the discharged tube and causes the

condensers of the valve circuit to discharge into other condensers of the oscillators and the other modalities of the circuit.

When ionization in the preceding tubes is no longer possible because of the reduced voltage, the process starts all over again. The first valve passes vibration of energy into an oscillatory circuit, ionization sets in, a discharge occurs and energy passes through another valve into other oscillators. The process is repeated from the first stage on to the second on to the third and so on, much like a bucket bridge. That is why I asked years ago, "cannot a steady flow of water be obtained from the waves of the sea or energy from the vibrations of the Cosmos?"

Many phenomena, especially those occurring in certain frequencies, are still unexplained and there are numerous places where the classic theory and observed facts do not agree.

When a vibration of any kind strikes a boundary between two media of different vibratory impedances at an angle of less than 90 degrees, a transformation of the vibratory rate may be changed into another vibratory rate. The R. E. Device, therefore will continue to capture energy by resonance, or call it what you will, as long as the "keep alive" vibration of the Cosmos continues to oscillate the various stages of valves and oscillators in the circuit. Simple is it not? Just a case of the trapping of energy which is everywhere present in the primary circuit and causing it to oscillate through the secondary circuits t rough a blocked circuit of no return.

Our experiments have proved that there is an energy which exists in the universe which, by proper development of equipment can be made available for commercial use.

One may say all "energy" comes from the sun. Can one prove the sun is the foundation of all "energy?" Or is the sun a retransmitter of energy? That light is an electrical phenomena has been amply proved. The atoms in those distant stellar crucibles have moving electrons which are emitting electromagnetic waves of many lengths and and many frequencies, which can be tuned to certain ranges of wavelengths. Our eyes and other senses respond to some of these frequencies but there are many beyond those which we loosely term light. The photographic plate records some of these and also invisible radiations of shorter wavelengths or higher frequencies known as ultra violet radiations. There are radiations measured by their heating effect of longer wavelengths or lower frequencies which we call infrared radiations. There are electromagnetic radiations of shorter wavelengths. These are generally known as "Roentgen Rays." There are rays of still shorter wavelengths; these are of unlimited power. These are born and put into locomotion from the very "Source or Foundation of Energy." What is a man to do with such a picture of the universe other than let our interest and admiration grow? But will we ever get to the final foundation? Anything is possible beyond our experiences. And as Tennyson said

"One God, one law, one element
And one far-off divine event
To which the whole creation moves"

Electricity is vibrations. Substance is a vibrating medium. All substances are really combinations of one primordial substance i.e. vibrations. Electrons in motion go to constitute an electric current. What electricity is to matter, so is electric force to common mechanical force, and electrical inertia to mechanical inertia. By inertia, we mean the ratio of force to acceleration.

Here on earth we have many "receiving stations" which are tuned to certain ranges of wavelengths.

Energy was defined in 1892 as a condition of matter, in virtue of which, any definite portion may effect changes in any other of definite portion. Later discoveries have since confirmed this. Energy then, is a state of matter, or rather, the result of a particular state or condition in which matter may be, when any observed phase of energy appears.

Cosmic rays, cosmic vibrations and matter may appear to consist of two entirely different things, but the fact is, these two subjects are actually joined together. Those highly penetrating rays which we call cosmic rays, originate somewhere in the remote spaces of the universe and continually bombard our earth with continuous vigor day and night, year after year.

We must not think of cosmic rays, infra ray and ultra-violet, X-ray, gamma or any ray, or particle as simple in character. None of them in any sense of the word consist of a simple frequency of ray. Ultraviolet rays, X-ray, gamma rays, cosmic rays and so on all consist of various wavelengths or frequencies. That is all ultraviolet rays are not of the same frequency, all X-rays are not of the same frequency any more than all radio waves (hertzian waves) are the same frequency. All are exceedingly complex in their make-up. This complexity is what has given them such an important place in the study of the physical sciences.

The great study of matter and cosmic rays so closely tied together, will open up greater and greater fields of science for the practical good of the human race.

Experiments have also satisfied us that gravity is akin to, if not an "electrical" oscillation, so well balanced that we might, for the lack of a better name, almost call it a "Wattless energy" until some force is exerted to oppose its potential and then gravity opposes such force. This means gravity can be controlled and unlimited advancement made in air navigation.

Facts prove that matter is capable of dissociation fitted to lead it into forms in which it loses all its material qualities. Among the most important Dr. Le Bon noted the emission by all bodies of particles endowed with immense speed, capable of making the air a conductor of electricity, of passing through obstacles, and of being thrown out of their course by a magnetic field. None of the forces then known were able to produce such effects, particularly the emission of particles with a speed almost or equaling that of light; it was evident that science then found itself in the presence of absolutely unknown facts. Several theories were put forth in explanation of them. One only — that the dissociation of atoms, which Dr. Le Bon advanced at the commencement of these researches — has resisted all criticism and on this account is now almost universally adopted.

It is now nearly seventy years since Dr. Le Bon proved by experiment that the phenomena observed in substances termed radioactive — such as uranium — could be observed in all substances in nature, and could only be explained by the dissociation of their atoms.

The action of light on any substance, a lighted lamp, chemical reactions of very different kinds, an electric discharge, etc., cause these effluxes to appear. Substances termed radio-active such as uranium or radium, simply present in a high degree a phenomena which all matter possesses to some extent. When Dr. Le Bon formulated for the first time this generalization, though it was supported by very precise experiments, it attracted hardly any attention. In the whole world one physicist, the learned Prof. De Heen, alone grasped its import and adopted it after having verified its perfect correctness. But the experiments being too convincing to permit of long challenge, the doctrine of the universal dissociation of matter at last triumphed. The atmosphere was then cleared, and physicists no longer denied that this dissocation of matter — this radioactivity as it is now called — is a universal phenomenon widely spread thoughout the universe; and, as Prof. J. J. Thomson demonstrated, exists in most substances — water, sand, granite, clay, bricks, etc.

What becomes of matter when it dissociates? Can it be supposed that when atoms dissaggregate they only divide into smaller parts and thus form a simple "dust of atoms"? We shall see that nothing of the sort takes place, and that matter which dissociates dematerializes itself by passing through successive phases which gradually deprive it of its material qualities until it finally returns to the rate of vibrations whence it seems to have issued as energy.

When the fact is once recognized that atoms can dissociate and reappear as energy and then from energy back to matter then the question arises as to whence they obtain the immense quantity of energy necessary to launch into space, particles with a speed of a same order as light or *greater.*

The explanation in reality is simple enough, since it is verified that far from being an inert thing only capable of giving up the energy artificially supplied to it, matter is an enormous reservoir of energy, intra cosmic energy.

Such a doctrine years ago assailed too many then accepted fundamental scientific principles to be at once admitted. Accustomed to regard the rights, the rigid principles of thermodynamics as absolute truths, and persuaded that an isolated material system could possess no other energy than supplied from without, a majority of physicists long persisted in seeking outside of it the sources of the energy manifested during the dissociation, not disintegration of matter. Gradually we are coming to see the facts.

The reality of this form. of energy is proven by experimental facts. Cosmic energy is the most powerful of known forces, and is the origin of most others including intra atomic energy.

Matter, formerly regarded as inert and only able to give back the energy originally supplied to it, is, on the other hand, a colossal reservoir of energy intra-atomic and intra-cosmic energy which can be expended without borrowing anything from without.

It is from the intra-sonic energy manifested during the dissociation of matter that most of the forces in the universe are derived, notably electricity and solar heat.

Force and matter are two different forms of one and the same thing. Matter represents a stable form of intra-atomic energy; heat, light, electricity, etc., represent instable forms of it (cosmic energy).

In the dissociation of atoms, the stable form of energy termed matter is simply changed into those unstable forms known by the names of electricity, light, heat, etc.

For the examination of these several propositions let us, as a basis of presentation, take them as proved and seek at once the changes they bring about in a general conception of the mechanism of the universe.

The problem of the nature of matter and of force is one of those which has most exercised the sagacity of scientists. Its complete solution has escaped us because it really implies the knowledge, still inaccessible, of the first cause of things. Scientific theories heretofore set forth have not allowed us to completely solve this great question. They lead, however, to a conception of matter and energy far different from that in use at the present day, cosmic energy.

We can arrive at the conclusion that matter is an immense reservoir of energy solely constituted by a system of vibrating atoms maintained in equilibrium by the rotations, attractions and repulsions of matter's component parts. From this equilibrium result the material properties of bodies such as weight, form, and apparent permanence. Matter also represents movement, but the movements of its component elements are confined within a very restricted space. This conception leads us to view matter as a variety of energy. To the known

forms of energy — heat, light — there must be added another — energy from the cosmos which embraces but surpasses intra-atomic energy. This energy is characterized by its collossal greatness and its unlimited accumulation with everything in the universe.

It follows from the preceding statements that by dissociation of matter one is simply giving to the variety of energy which fills all space in a different form — such as, for example, what we call electricity or light but in reality are radiations or forms of vibrations, their proper status.

We will endeavour to give an account of the forms under which this energy of the universe may be condensed within the atom, and the cosmos, but the existence of the fact itself has a far greater importance than the theories it gives rise to of simple atomic energy. Without pretending to give the definition so vainly sought for of energy, we will content ourselves with stating that all phenomenality is nothing but a transformation of equilibrium. When the transformations of equilibrium are rapid, we call them electricity, heat, light, all forms of vibration. When the changes of equilibrium are slower, we give them the name of matter. To go beyond this we must wander into the region of hypothesis and admit that the elements of which the aggregate is represented by forces in equilibrium, are constituted by vortices formed in the midst of the universe. These vortices posses an individuality, supposed by some to be ephemeral but which the evolution of matter and of energy prove to be eternal. The individuality disappears, and the vortex dissolves as soon as the forces which maintain their existence cease to act but others form elsewhere, i.e. eternal creation, eternal evolution, eternal energy and matter.

The equilibriums of these elements of which the aggregate constitutes an atom, may be compared to those which keep the planets in their orbits. So soon as they are disturbed considerable energies manifest themselves, as they would were the earth or any other planet stayed in its course.

Such disturbances in planetary systems may be realized, either without apparent reason, as in very radioactive bodies when, for diverse reasons, they reached a certain degree of instability, or artificially — as in ordinary bodies when brought under the influence of various excitants — heat, light, or other forms of vibration.

These excitants act in such cases like the detonator of an explosive — that is to say, by freeing quantities of energy greatly in excess of the very slight cause which has determined their liberation. And as the energy condensed in the universe is immense in quantity, it results from this that to an extremely slight loss in matter there corresponds the creation of an enormous quantity of energy.

From this standpoint we may say of the various forms of energy such as heat, electricity, light (all vibrations), represent the last stages of matter before it returns into the cosmos from whence it came.

IF, extending these ideas, we wish to apply them to the differences presented by the various simple bodies studied, we should say that one simple body only differs from another in rate of vibration. If we could deprive any element of a sufficient quantity of the energy it contains, we should succeed in completely transforming it.

As to the necessarily hypothetical origin of the energies condensed within the atom, we will seek for it in a phenomenon analogous to that invoked by astronomers to explain the formation of the sun, and of the energies it stores up. To their minds this formation is the necessary consequence of the condensation of the primitive nebula. If this theory be valid for the solar system, an analogous explanation is equally so for all matter.

Such a theory clears away the classical duality of matter and energy. These are two identical things under different aspects. There is no separation between matter and energy, since matter is simply a stable form of energy and nothing else and continually changes from one to the other in the cosmos.

We can only understand things by fitting them into the common frame of our thoughts. The essence of energy being unknown, we are compelled to materialize it in order to enable us to reason about it. We thus arrive — but only for the purposes of demonstration — at the following definitions: Energy and matter represent entities of the same order. The various forms of energy — electricity, heat, light — are manifestations of matter in action. They only differ in the nature and the stability of the equilibrium formed in the heart of the cosmos. It is through these manifestations that the universe is known to us.

The illustrious Faraday endeavored to clear away the duality existing between matter and energy. Others made the same attempt, by pointing out that matter was only brought home to us by the intermediary of forces acting on our senses. But all arguments of this order were considered as having a purely metaphysical bearing. It was objected to in Faraday's time that it had not been possible to transform matter into energy, and that this matter was necessary to animate the former. Scientific principles, considered assured, taught that nature as a kind of inert reservoir could create the liquid it holds. Everything seemed then to point out that nature and energy were irreducible things as independent one of the other as weight is of color. It was therefore not without reason that they were taken as belonging to different worlds.

The transformation of matter into energy having been demonstrated, it follows that energy may be transformed into matter.

The facts summed up in the preceding pages show that matter in a set form is not eternal but as a rate of vibration or energy is eternal, that it constitutes an enormous reservoir of vibrations, and that it disappears by

transforming itself into other forms of energy or matter before returning to its source, being in reality just another cycle in the process of creation.

It can therefore be said that if matter cannot be created, it cannot be destroyed but returning to its source begins a cycle again. The elements of a substance which is burned or sought to be annihilated by any other means are transformed and are but a change of vibration. They may lose every quality of matter, including the most fundamental of them all — weight — but that only shows gravity lost its power over such elements because of a change in vibration. The theoretical importance of these principles is considerable but self-evident.

It is easy to deprive matter of all its attributes, save one. Solidity, shape, color, chemical properties may disappear but there remains a rate of vibration. The very hardest body can be transformed into an invisible vapor. But, in spite of every one of these changes, the mass of the body, as measured by its weight, remains invariable, and by changing or restoring rates of vibrations can be made to reappear; this constituted the one fixed point in the mobile ocean of phenomena, vibration. It enables the chemist, as well as the physicist, to follow matter through its perpetual transformations, and this is why matter remains something mobile and eternal.

The importance of permanence and, therefore, the indestructibility of vibration which one recognizes throughout the changes in matter, being the only characteristic by which this great unknown conception can be grasped, necessarily became preponderant.

These fundamental dogmas, the bases of modern science, the researches detailed in this work tend to destroy. If the principle of the conservation of energy — which is simply a bold generalization of experiments made in very simple cases — likewise succumbs to the blows which are already attacking it, the conclusion must be arrived at that nothing in the world is eternal in a set form but subject to changes of rate of vibration. The great divinities of science could also be condemned to submit to that invariable cycle which rules all things.

On the ruins of former doctrines and after centuries of persistent efforts, there sprang up two sovereign powers which seemed eternal — matter as the fundamental woof of things and energy to animate it, the two being one on different rates of -vibration. With the equations connecting them, modern science thought it could explain all phenomena. In its learned formulas all the secrets of the universe were enclosed. The divinities of old time were replaced by ingenious systems of differential equations.

Discovery is rarely spontaneous; it only appears so because the difficulties and the hesitations which most often surround its inception are generally unnoticed.

The public troubles itself very little with the way in which inventions are made, but psychologists should certainly be interested in certain sides of the problems of inventions. In fact, they will find therein valuable documents on the birth of beliefs, on the part played, even in laboratories, by suggestions and illusions, and finally on the preponderant influence of prestige considered as a principal element of demonstration which much of the time surplant facts.

The generality of the phenomenon of the dissociation of matter would have been noticed much sooner if a number of known facts had been closely examined, but this was not done. So also is this true of the law of oscillations by vibrations of the universe. These facts were spread over very different chapters of physics. For example, the loss of an electric charge occasioned by ultraviolet light has long been known, but not one little thought connecting the fact with a cathode ray. More than 75 years ago Niepe de Saint-Victor saw that, in the dark, salts of uranium caused photographic impressions for several months; but as this phenomenon did not seem to be connected with any known fact, it was put to one side as the oscillations of the cosmos are now. For hundreds of years the gases of the oscillations or vibrations of the universe have gone unappreciated. The common link which connects them appeared clearly when we established that the dissociation of matter and the forms of energy which result from it are to be ranked among the most widely spread natural phenomena. Flames had been observed to discharge electrified bodies without any one determining the exact cause of this phenomenon/. The loss of electric charges through the influence of light had been known for many years but it was regarded as a fact peculiar to a few metals with no suspicion of how general and important this law was.

All this phenomena and many others, such as electricity and solar heat — are very dissimilar in appearance, but are the consequences of the same fact — namely, the dissociation of matter.

The discovery of the dissociation of matter by radiation has allowed us to penetrate into an unknown world ruled by new forces, where matter losing its properties as we had known it, becomes a form which passes without difficulty through obstacles, and possesses a whole series of unforseen properties, the farreaching effect of which we have yet a great deal to learn about.

With the discovery of the universal dissociation of matter is linked to that of intra-atomic energy and energy of the cosmos by which science has succeded in explaining some radioactive phenomena.

The origin of intra-atomic energy is not difficult to elucidate, if one supposes, as do the astronomers, that the condensation of our nebula suffices by itself to explain the constitution of our solar system. It is conceivable that an analogous condensation of the cosmos may have begotten the energies contained in the atom. The latter may

be roughly compared to a sphere in which a non-liquefiable gas was compressed to the degree of thousands of atmospheres at the beginning of the world.

The reason this force (the most widespread and the mightiest of all those of nature) has remained unrecognized so long is in the first place because man lacked the reagents necessary for the proof of its existence and then, because the theory and atomic edifice erected by science were so stable, so solidly fixed in our minds that its dissociation and connection with the cosmos remained extremely slight. Had it been otherwise the world would long ago have utilized cosmic energy*

But how is it that a demonstration so simple as that of the existence of cosmic radiant energy has not been made since the discovery of radioactivity, and especially since the demonstration of the generality of this phenomenon? This can only be explained by bearing in mind that it was contrary to all accepted principles to recognize that matter or the energy of the universe could by itself produce energy. Scientif is dogmas inspire the same superstitious fear as did the gods of old, though they have at times permitted all their liability to be broken.

The fact of the existence of a considerable condensation of energy within the atoms of the universe only seemed at first to annoy us because it was outside the range of things formerly taught us by experience; it should however be remarked that, even leaving on one side the facts revealed by radioactivity, analogous concentrations are daily observable. Is it not strikingly evident, in fact that electricity must exist at an enormous degree of accumulation in all substances of the universe since it is found by the electrolysis of water that one gramme of hydrogen possesses an electcric charge of 96,000 coulombs? One gets an idea of the degree of condensation at which electricity existed before its liberation in all the universe. Elementary treatises have long since pointed out that barely a twentieth part of the above quantity would suffice to charge a globe the size of the earth to a potential of many thousands of volts. The best static machines of our laboratories hardly give forth. 1/10,000 of a coulomb per second.

They would have, consequently, to work unceasingly for a little over 30 years to give the quantity of electricity contained within the atoms of one gramme of hydrogen.

As electricity exists in a state of considerable concentration in all matter, it is evident that the atoms of the universe should have been regarded many years ago as a veritable capacitor of energy. One should have recognized the quantity of this energy must be enormous; it was only necessary to appreciate the magnitude of the attractions and repulsions which are produced by electric charges before us. It is curious to note that several physicists years ago have touched the fringe of this question without perceiving its consequences. For example, Cornu pointed out that if it were possible to concentrate a charge of another sphere also having a charge of one couloumb, the force created by this repulsion would equal 918 dynes, or about 9 billions of kilogrammes.

What about the stars and plants of the universe? We know that by the dissociation of water we can obtain from one gramme of hydrogen an electric charge of 96,000 coulombs. This energy would be enough (and this is exactly the hypothesis enunciated by J. J. Thomson) to dispose the electric particles at suitable distances within the universe to obtain through their attractions, repulsions, and rotations, extremely powerful energies in an extremely small space. The difficulty was not, therefore, in conceiving that a great deal of energy could remain within any atom, not just a radioactive one, but that nature was supplying us from the universe usable energy if we but reached out to harness it. It is surprising that a notion so evident was not recognized long ago.

Calculation of radioactive energy has been made within those limits of speed at which experiments show that the inertia of matter does not greatly vary.

Science formerly established a complete separation between matter and energy. The classic ideas on this decision will be shown in the following passage of a work by Prof. Janet:

"The world we live in was thought, in reality, a double world; or, rather it was composed of two distinct worlds — one the world of matter, the other the world of energy. Copper, iron, and coal are forms of matter, mechanical labor and heart are forms of energy. These two worlds are each ruled by one and the same law. Matter can neither be created nor destroyed. Energy can neither be created nor destroyed, therefore we can rightly observe that as energy and matter are one in different stages we have but one world in the evolution of matter and energy.

"Matter and energy can assume various forms without matter transforming itself into energy or energy into matter — We can no more conceive energy without matter than we can conceive matter without energy."

It is utterly impossible," Lord Kelvin wrote, "that the heat produced can proceed from the stored energy of radium. It therefore seems to me absolutely certain that if the emission of heat continues at the same rate, this heat must be supplied from outside."

Lord Kelvin fell back on the commonplace hypothesis formed at the outset on the origin of the energy of radioactive bodies, which were attributable, as it was then believed, to some mysterious forces from the ambient medium. This supposition had no experimental support. It was simply the theoretical consequence of the idea

* Let us here remind the reader this theory was first given to the world by Moray as early as 1914 and 1926 first published in printed book form in 1931.

that matter being entirely unable to create energy, could only give back what had been supplied to it. The fundamental principles of thermodynamics which Lord Kelvin had helped so much to found, tell us, in fact, that a material system isolated from all external action cannot spontaneously generate energy. Experiment is superior to principles, and when once it has spoken, those scientific laws which appeared to be the most stable are condemned to rejoin in oblivion, the used-up,wornout dogmas and doctrines of the past.

It would be desirable, even in this so-called atomic and space age, to have the theory which explain the facts, and to enable science to know whether the energy is borrowed from the atom itself or from external sources from the universe.

Many physicists, like Lord Kelvin, held to the end to the old principles; that is why the phenomena of radioactivity, especially the spontaneous emission of particles animated with great speed and the rise in temperature during radioactivity, seem to them utterly unexplicable, and constitute a scientific engima, as M. Mascart said. The enigma, however, is very simple with the proper explanation. Today there is an enigma on the use of cosmic power for commercial purposes.

One can hope, however, that ideas so opposed to classical dogmas as oscillatory cosmic energy and the transforming of matter into energy and energy into matter will soon be widely acknowledged.

The fact is that the scientific ideas which rule the minds of men at various epochs have all the solidity of religious dogmas. Very slow to be established, they are very slow likewise to disappear. New scientific truths, although they have experience and reason as a basis, are only propagated by prestige, that is, when they are enunciated by those whose official position gives them prestige in the eyes of the scientific world. Truths of such great importance as Ohm's law which governs the whole of electricity, and the law of the conservation of energy which governs all physics, were received, on their first appearance with indifference or contempt and remained without effect until the day when they were enunciated anew by individuals endowed with influence. Now we limit the conservation of energy without fully understanding what truths it embraces.

It is only by studying the history of sciences that one succeeds in understanding the genesis of beliefs and the laws governing their diffusion. We have just mentioned two discoveries which were among the most important of the 19th Century, and which are summarized in the laws, of which one can say that they ought to have appealed to all minds by their marvelous simplicity and their imposing grandeur. Now tradition fences them in where we fail to see their magnitude. Not only did they strike no one, but the most eminent scientists of that time did not concern themselves about them except to try and cover them with ridicule. Are we different today?

That the simple enunciation of such doctrines should have appealed to so few shows with what difficulty a new idea is accepted when it does not fit in with former dogmas. Prestige, we repeat, and to a very slight entent, experience are alone the ordinary foundation of our convictions — scientific and otherwise. Even the most convincing experiments have never consituted an immediately demonstrable foundation when they clashed with long established accepted ideas that we hate to discard even when the old dogmas have been proven wrong. Galileo learned this when, having brought together all the philosphers of the celebrated University of Pisa, he thought to prove to them by experiment that, on the contrary to the then accepted ideas, bodies of different weights fell with the same velocity. Galileo's demonstration was assuredly very conclusive, since by letting a small leaden ball and a cannon shot of the same metal fall at the same moment from the top of a tower, he showed that both bodies reached the ground together. The professors contented themselves with appealing to the authority of Aristotle and would not change or modify their opinions. For years it has been the same with R. E. demonstrations especially by those who never saw the device.

Galileo lived a long time ago, but the degree of receptivity of minds for new things has not sensibly increased.

When Ohm discovered the law which immortalized his name and, on which the whole science o f electrical measurement rests he published it in a book filled with experiments so simple and so conclusive that they might have been understood by any child in an elementary school. Not only did he fail to convince anyone, but the most influential' scholars of his time treated him in such a way that he lost the berth he occupied, as a college professor, and, to avoid dying of starvation, was only too glad to take a situation in a college at 1,200 francs per annum, where he remained for 6 years. Justice was only rendered to hire at the close of his life. Robert Mayer, less fortunate, did not even obtain this belated satisfaction. When he discovered the most important of modern scientific laws, that of all the examples of the conservation o f energy the vibrations of the universe is *the greatest example, he had great difficulty in finding a publisher who would consent to publish his findings; no scholar bestowed the least attention upon it, no more in fact than on his subsequent publications, among which was the one on the mechanical equivalent of heat, published in 1850. After attempting suicide, Mayer went out of his mind, and remained for a long time unknown, to such a degree that when Helmholtz re-made the same discovery, he was not aware o f the work o f Mayer. Helmholt himself did not meet with any greater encouragement to begin with and the most important of the scientific journals of that day, the Annals de Poggendorff , declined to insert his celebrated memoir, "The Conservation of Energy," regarding it as a fanciful speculation unworthy of the attention of serious readers.*

Although matter was formerly considered inert, and only capable of preserving and restoring the energy which had first been given to it, it was necessarily established that there existed within it forces sometimes in considerable amounts, such as cohesion, which forces were independent of all external agents. Other forces, such as radiant heat and electricity, which also issued from matter, might be considered simple restitutions of an energy borrowed from the cosmos.

If the cohesion which makes a rigid block out of the dust of atoms of which bodies are formed, or if that affinity which draws apart or dashes certain elements one upon the other and creates chemical combinations, or if the osmotic attractions are repulsions which hold in dependency the most important phenomena of life, are visibly forces inherent to matter itself, then it was, with the old ideas, impossible to determine the source of this energy. The origin of these forces ceases to be mysterious when it is known that the cosmos is a colossal reservoir of energy that fills all space. Observation has long ago shown that any form of energy lends itself to a large number of transformations, and we can conceive how energy from the cosmos may be the source of all molecular forces — cohesion, affinity, etc. — of matter. We are far from being acquainted with their character, but at least we see the source from which they spring, the universe where matter is "born" from energy.

Outside the forces plainly inherent to matter that we have considered, there are two — electricity and solar heat — the origin of which has always remained unknown, and for which we can find an explanation in the theory of intra-atomic energy and inter-cosmic energy, the cradle of the intra-atomic energy.

When we approach in detail the study of the facts on which their theories are based, we find that electricity is one of the most constant manifestations of the dissociation of matter. Matter being nothing else than cosmic energy itself, it may be said that to dissociate matter is simply to liberate a little intra-atomic energy throughout the universe and to oblige it to take another form. Electricity is precisely one of these forms.

Throughout the years the role of electricity has constantly grown in importance. It is at the base of all chemical reactions; it is a universal force, and one must connect all other forms with it. That a force with the manifestation importance and universality of electricity should have remained unknown for thousands of years constitutes one of the most striking examples of apathy in the history of science, and is one of those facts we must always bear in mind to understand how we may be surrounded with every powerful force without fully realizing their existence. Power from the cosmos radiant energy is another similar example.

For centuries all that was known about electricity could be reduced to this, that, certain resinous substances when rubbed attract light bodies. Could not other bodies enjoy the same property? By extending the friction to larger surfaces might not more intense effects be produced? This was the one question of inquiring. However, ages passed before a mind arose penetrating enough to ask itself, "The where and why-for," — one inquisitive enough to verify by experiment whether a body with a large surface when rubbed would not exercise an action superior in energy to that produced by a small fragment of the same body. From this verification which now seems simple, but which took centuries to accomplish, we saw emerge the frictional electric machine and the phenomena it produces. Why not now let it emerge from the oscillations of the universe arid put into the hands of man a power which he one time thought the gods alone possessed the secret to.

Electricity was then only produced very laboriously and was considered a very exceptional phenomenon. Now we find it everywhere and know that the simple contact of two heterogeneous bodies suffice to generate it. The difficulty now is not how to produce electricity, but how not to give birth to it during the production of any phenomenon whatever. The falling of a drop of water, the heating of a gasous mass by the sun, the raising of the temperature of twisted wires, the burning of a match, and any action capable of modifying the nature of a body, are all generators of electricity.

If all chemical reactions are electrical reactions, as is now proven to be the case, if the sun cannot change the temperature of a body without disengaging electricity, if a drop of water cannot fall without its manifestation, it is evident that electricity's role in all forms of life must be preponderant. This, in fact, is what the world is beginning to admit. Not a single change takes place in the cells of the body, no vital reaction is effected in the tissues without the intervention of electricity. M. Berthelot showed the important roles of the elecric tensions to which plants are constantly subjected. The variations in the electric potential of the atmosphere is enormous, since they may oscillate between 600 and 800 volts in fine weather, and rise to 15,000 volts at the least fall of rain. This potential increases at the rate of from 20 to 30 volts per metre in height in clear to from 400 to 500 volts in rainy weather for the same elevation. "These figures," Berthelot said, "give an idea of the potential which exists either between the upper point of a rod of which the other extremity is earthed, or between the top of a plant or a tree, and the layer of air in which that point or that top is bathed. M. Berthelot also proved that the effluves generated by these differences of tension can provoke numerous chemical reactions-the fixation of nitrogen on hydrates of carbon, the dissociation of carbonic acid into carbonic oxide and oxygen, etc. Why go back to these scientists of yesteryear? Only to show that much we are doing today does not originate with the Atomic Age! There were thinkers before our day. After having established the phenomenon of the general dissociation of matter, let us ask ourselves if the universal electricity, the origin of which remained unexplained, was not precisely the consequence of the universal displacement of matter. Experiments fully verified this

hypothesis, and they proved that electricity is one of the most important forms of intra-atomic energy liberated by the displacement of matter. The various methods employed to obtain electricity, notably friction, only hasten the dissociation of matter. Now let us turn to vibratory oscillations of the universe.

CHAPTER THREE

THE DISSOCIATION OF MATTER

As we study the dissociation of matter, so will the importance of this phenomenum proportionately increase. After recognizing that, electricity may be considered one of the manifestations of the vibration of matter.

To maintain that stars such as the sun can keep up their own temperature by the heat resulting from the dissociation of their component atoms, seems much like saying that a heated body is capable of maintaining its temperature without any contribution from outside.

Atomic reactions cool, simply because the rise in temperature produced during the dissociation of its atoms producing the incandescence is far too slight to compensate for its loss of heat by radiation. The substances which, like radium, most rapidly dissociate, can hardly maintain their temperature at more than 3° to 4° C. above that of the ambient medium. Suppose, however, that the dissociation of any substance whatever were only one thousand times more rapid than that of radium, then the quantity of energy emitted ould more than suffice to keep it in a state of incandescence.

The whole question therefore is whether, at the origin of things, that is to say at the epoch when atoms were formed by condensations, did they not possess such a quantity of energy or rate of vibration that they have been able ever since to maintain the stars in a state of vibration, thanks to their slow dissociation. This supposition is supported by various experiments. J. J. Thomson arrived at the conclusion that the energy now concentrated within the atoms is but an insignificant portion of that which they formerly contained and lost by radiation. Independently and at an earlier date, Prof. Filippo R'e arrived at the same conclusion. If, therefore atoms formerly contained a quantity of energy far exceeding the still formidable amount they now possess, they may, by dissociation, have expended during long accumulations of ages a part of the gigantic reserves of forces piled up within them at their source in the universe. They may have been able, and consequently may still be able, to maintain a very high rate of vibration, i.e., stars, like the sun and the heavenly bodies. In the course of time, however, the store of intra-atomic, energy within the atoms of certain stars may at length be reduced, and their dissociation and rate of vibration become slower and slower. Finally, they have acquired an increasing stability, have dissociated very slowly, and have become such as one observes them today in the shape of cooled stars like the earth and other planets.

If the theories thus formulated are correct, and this the experiments of the Moray Radiant Energy discoveries so indicate, then intra-atomic energy manifested during the dematerialization of matter constitutes the fundamental element from which most other forces are derived. So it is not only electricity which is one of its manifestations, but also solar vibrations, the primary source of life and of the majority of the forces at our disposal. This study, which reveals to us matter in a totally new aspect, permits us to throw unforeseen light on the higher mechanics of the universe.

The interest now being shown in spontaneously radioactive substances consists in their emitting in considerable quantity,, elements which other bodies only produce in much smaller quantity. By thus enlarging on this general phenomenon, we encourage it's study in more detail, as also the rate of vibration in all things.

Rutherford, who studied radioactive substances with great success and, with Curie, discovered facts concerning rays from them, led to the designation of the radiations as Alpha Beta Gamma. The Alpha radiations are composed of positive ions, the Beta radiations of electrons identical with those constituting the cathode rays, while the Gamma radiations are similar to the X-rays. Did these pioneers build better than they realized in showing the way?

Alpha particles are formed of positive ions. They are deviated by an intense magnetic field, but in the opposite direction to the Beta rays or particles. The radius of curvature of their deviation is 1000 times greater than that of the Beta particles. They form 99% of the total radioactivity of radium. They render air a conductor of electricity. Their action on a photographic plate is much less than that of the Beta rays, and their force of penetration very slight, since they are stopped by a sheet of paper. This weak power of penetration enables them to be easily differentiated from the other radiations to which paper is no obstacle. Of all the emission of radioactive bodies, it is the Alpha particles especially which make the air a conductor of electricity, and it is the Beta particles or rays which produce photographic impressions. When a radioactive body is enclosed in a glass tube nearly all the Alpha particles are stopped by the glass walls but inside those glass walls great things take place because of their electrical conducting ability.

It is supposed, from various calculations, that the Alpha particles must have a mass equal or superior to that of the hydrogen atom and a like charge. Their speed, as calculated from the extent of their deviation by a magnetic field of given intensity, is one-tenth that of light. For uranium and thorium, it is for one gramme, 70,000 per second, and for radium a hundred thousand millions. This emission may last without interruption for more than 100 years.

The emission of alpha particles, positive ions, is, together with the production of the emanation, the fundamental phenomenon of radioactivity. The emission of beta particles and that of the gamma rays, which together form hardly 1 % of the total emission, should represent a further stage in the dissociation of radioactive atoms. How puny are these compared to the total energy in the cosmos but how close the relationship.

On striking phosphorescent bodies the alpha particles render them luminous. It is this property which is the basis for the operation of the spinthariscope, an instrument which renders visible the permanent dissociation of matter. It consists of a screen of sulphide of zinc, above which is placed a small metal rod, the end of which has been dipped in a solution of chloride of radium. On examining the screen through a magnifying glass, there can be seen spurting out without cessation. a shower of small sparks produced by the impact of the alpha particles and the emission may last for centuries. This shows the extreme smallness of the particles coming from the disaggregation of atoms. This emission is visible because each particle is made apparent through the enormous degree of lateral perturbation produced by its shock on the sensitive surface, in the same way that raindrops falling into the water produce ripples which exceed their diameter. One may, by using certain varieties of phosphorescent sulphide, succeed in making screens showing the phenomena of dissociation, not only with salts of radium, but also with other substances. Herein is the door to greater discoveries.

The high speed of the alpha particles seems very difficult to explain. This speed is intelligible enough in the case of the beta rays, which, being composed of atoms of pure electricity, and having a very small inertia can acquire a very high speed under the influence of limited forces; but the Alpha particles whose dimensions would appear to be identical with that of the hydrogen atom, a velocity of 30,000 kilometres per second seems to be more difficult to explain. It could prove profitable if these experiments of Rutherford and his co-workers were taken up again.

These velocities may not be produced instantaneously; they are only comprehensible on the hypothesis that the particles of atoms can be compared to small planetary systems animated with enormous velocities. They would preserve their speed on leaving their orbits as does a stone launched from a sling. The invisible speed of rotation of the elements of matter would therefore be simply transformed into a speed of projection perceptible only by proper instruments.

Beta rays are considered to be composed of electrons identical with those of the cathode rays. They are formed of negative electric atoms freed from all matter. Their mass is similar to that of the cathode particles, the thousandth part of that of the hydrogen atom. Their velocity varies between 33% & 96% of that of light.

They immediately render luminous by impact bodies capable of phosphorescence, even when separated from them by aluminum foil. The phosphorescence is very bright in platinocyanide of barium and some kinds of diamonds which are rather rare, but are capable of phosphorescence.

In addition to alpha and beta particles, the first charged with positive, and the second with negative electricity, radioactive bodies emit an extremely slight proportion (less than 1%) of gamma rays which are entirely analogous, as to their properties, to X-rays, but possessing a higher power of penetration, since they can penetrate several centimeters of steel. This property enables them to be easily distinguished from alpha and beta rays, which are stopped by a lead plate a few millimeters thick[*]

One of the singular properties of alpha-beta-gamma emissions is that none of them can touch a gaseous or solid body without immediately causing, no doubt through the disturbance produced by their enormous velocity, a dissociation resulting in the production of secondary rays, which are similar in their properties to the primary rays, but less intense. These secondary radiations also impress photographic plates, render the air a conductor of electricity, and are deviated by a magnetic field. They are able to produce by their impact tertiary rays having the same properties. It is the secondary rays produced by the gamma rays which are the most active. A photographic impression through a metallic plate is sometimes intensified by the interposition of that plate, because the action of the secondary rays then superimposed on the primary rays. Herein may lie a prototype of the action of the universe.

Emanations can be cheaply drawn from any highly radioactive body either by dissolving in liquid placed in a receiver communicating with a closed tube and subjecting the radioactive substance to certain ray bombardment or by bringing them to a red heat in a similar apparatus and bombarding them with rays. The emanation drawn into the tube renders it phosphorescent. It can be condensed in liquid air. This condensation is revealed by the localization of the phosphorescence.

At ordinary temperature radioactive bodies in a solid state emit the emanation, but only a hundredth part of the quantity omitted in a state of solution and under bombardment of certain rays. By introducing sulphide of zinc into a bulb containing a solution of chloride of radium, the disengagement of the emanation renders the sulphide phosphorescent. Radium, when heated, loses the greater part of its activity because of the quantity of emanation it gives off, but it regains it again in about 20 days. The same loss occurs when a solution of this salt is heated to boiling.

[*] Written by Moray in Europe in 1914 when these penetration values were valid.

When solid chloride of radium has been brought to a red heat, or a solution of it has been boiled for some time, or better still, subjected to special ray bombardment, it still preserves a quarter of its primary activity, but this latter is then solely due to the alpha particles as can be noted by the weak penetrating power of the rays emitted, when can no longer pass through a sheet of paper. It is only after a certain lapse of time that the appearance of the beta rays, capable of passing through metals, again takes place. The activity of the emanation is lost rather quickly. The rapidity of this loss varies according to the substance. That of actinium is destroyed in a few seconds, that of thorium in a few minutes, that of radium only at the end of three weeks, but is reduced to one-half in 4 days.

Radium and thorium produce different energy levels of emanations, that is, of dissociations which begin with the emission of the emanations. Five or six have been counted. The first engenders the second, and so on. They, no doubt, represent successive stages in the evolution of matter.

To these emanations are due three-fourths of the heat continually produced by radium, which maintains its temperature of 3° or 4°c. above its surroundings. If radium be deprived of its emanation by heating, it gives out about a quarter of the heat it emitted before heating. Almost all of the rise in temperature is due to the alpha particles. If some emanation of radium is left for several days in a tube, one can observe the spectral lines of helium which were not there before.

Before drawing too many conclusions from this transformation, it must be f irst remarked that helium is a gas which accompanies all radioactive minerals. It was from these bodies that it was first obtained. This gas enters into no chemical combination, it will not liquify and can be kept for indefinite time in the tube in which it is enclosed, a catechist of interesting effect.

This derivative from radium is a special helium since it appears to possess the property of spontaneously vanishing. Its only resemblance to ordinary helium seems to consist of the momentary presence of some spectral rays.

The emanation disintegration products of the radioactive bodies represents one of the intermediate substances. It is partly material, since eit can be condensed and dissolved in certain acids and recovered by evaporation. But it is only incomplete material, since it ends by entirely disappearing and transforming itself into electric particles and secondary particles. This transformation, which takes place even in a sealed glass tube, has been proved by experimentation.

Matter and energy! Where can one draw the line? The part played by various radiating substances in the phenomena of energy and life is a very predominant one. Most often it is the indirect reactions which reveal their existence in the phenomena of life and allow them to be isolated. All we know of them in their physiological reactions is that they lose their properties if deprived of the infinitely small quantities of mineral matter which they contain under a form that we suppose to be in the ionic state.

Why go into these reactions? Because they may to a degree help us to understand natural phenomena of the cosmos and of life because there is a parallel of phenomena.

Among the substances of which one might strictly say act only by their presence is found the vapor of water, which in extremely small amounts play an important part in various reactions. Perfectly dry acetylene is without action on hydride of potassium, but in presence of a trace of humidity the two bodies react one on the other with such violence that the mixture becomes incandescent. Well-dried carbonic acid is also without action on hydride of potassium, but in presence of a slight quantity of steam it produces a formate. It is the same with many other bodies — ammonia gas and hydrochloric gas, for example, which ordinarily combine with the emission of thick white fumes, but do not do so after having been carefully dried. It will be remembered that by adding to dried salts of quinine traces of water vapor they become phosphorescent and radioactive.

Although catalytic actions were known many years ago it was only in later years that they proved to play a preponderant part in the chemistry of living beings. It is admitted that the disastases and various ferments whose role is so important act only by their presence.

On closely examining the role of bodies acting by their mere presence, we note that they behave as if energy were transported from the catalyzing body to that catalyzed. This fact can hardly be explained unless by acknowledging the catalyzing body is undergoing the commencement of atomic dissociation. We know that, by reason of the enormous velocity possessed by particles of matter during its dissociation, considerable quantities of energy can be produced by the dissociation of a quantity of matter so small as to elude all attempts to measure it. The catalyzing substances could therefore be simply liberators of energy in matter on the earth and in all the universe. As in the atomic pile the fission material is worn out so also platinum black and the colloid metals are eventually worn out — that is to say, by use they lose a great part of their catalyzing action. The theory involved indicates all matter and energy simply represent a state of equilibrium between the internal elements of which it is formed and the external elements acting upon it. If this connection is not plainly apparent in some bodies, it is because they are so constituted that their equilibrium maintains themselves without perceptible changes within the limits of fairly large variations of the medium. Water can remain liquid in variations of temperature ranging

from 0° to 100°C., and most metals do not appear to change their state within still wider limits of heat or of rates of vibration. However, these facts do not answer all the questions.

Succession of changes will be accompanied by the liberation of a certain quantity of the intra-atomic energy contained in matter. This is going on all the time in the cosmos to such an extent man with his man-made devices can never hope to compete. So why not use "nature's gift" of cosmic reactions? The actions by mere presence which are of such importance in the phenomena of life, may perhaps find an explanation in this theory. It was such studies on phosphorescence which led men to this hypothesis. It will be recollected that pure substances, various sulphides, phosphates of lime, etc., are never phosphorescent normally, and only become so when brought to a red heat for a length of time with traces of other various bodies — such as bismuth, maganese, etc. On the other hand, this elevation of temperature always provokes a dissociation of matter. It is therefore reasonable to suppose that the elements proceeding from this dissociation have an active part in the compounds then formed, which gives to such bodies the capacity of phosphorescence and sometimes other properties.

The combinations so obtained have precisely the characteristics pointed out above as belonging to extreme mobility, that is to say, of disintegrating and then regenerating themselves very rapidly. A ray of blue light falling on a screen of sulphide of zinc, illuminates it in the tenth of a second, and a ray of red light falling on the same screen, disintegrates the phosphorescence in the same space of time, that is it brings the screen back to its original state. These two contrary operations, necessarily implying two converse reactions which may be indefinitely repeated.

These facts prove that by reason of the enormous quantity of intra-atomic energy contained in matter, a loss substance too small to be detected by an analytical balance may be accompanied by a very greater liberation of energy. We have no need to do this artificially because it is being done for us in the cosmos.

It is possible even without the action of heat to verify in ordinary bodies the existence of a constant emanation from the dissociated matter, though this emanation normally is extremely small in quantity. This all proves that the evolution of creation is going on continually.

To cause it to be apparent, it is necessary to compel it to accumulate in a restricted space. In order to demonstrate this, fold a sheet of metal so as to transform it into a small cylinder similar to the one which encloses the ball of a condensing electroscope. The lower opening is then closed and it is left for 8 days in darkness, and then, still keeping it in darkness so as to avoid any possible influence from light place the cylinder on the insulating disc of the electroscope or special ray counter instruments to examine its radioactivity. It will be found, after having charged the whole system, that a definite discharge per minute is obtained. As the metal rapidly loses that which it has accumulated, the discharge soon ceases. Many bodies other than metals such as box-wood cylinder will produce the same effect, also certain gas-filled tubes.

The metal, after ceasing to act on the electroscope or counter still has not exhausted its provision of radioactivity. It has simply parted with the quantity it can emit at the particular temperature at which the operation was effected. As with phosphorescent bodies or radioactive matter, it only has to be slightly heated to cause it to again yield a more considerable emission of active effluves. The only difference between all matter is in the rate of vibration or wavelength, the difference resulting in transmutation; changing and restoring. A matter of changing from one rate of vibration to another, evolution in its true sense, evolution from one rate of vibration to another or transmutation, energy changing into matter and matter into energy as we wrote back in 1925.

Cosmic rays are constantly creating radioactive carbon and the fusion of small atoms together to make larger ones gives off more energy than so-called "splitting" of the larger uranium or plutonium atoms, the uranium energy release ratio being only 1 to 1000-that is only 1/1000 of the heavy atoms changed in the uranium "atom splitting" process.

"Nuclear fission" action is not confined to highly radioactive substances. "Atom splitting" is taking place naturally on this earth, in the universe, and on other planets and suns, and there is absolutely no need of the unnecessary hysteria that has swept the world over "atom splitting" as it has been going on naturally from the very beginning of time. Energy and matter cannot be considered strangers nor as a science just being introduced to the world. When the evolution of matter acid the evolution of forces is considered nothing new is being advanced: When we consider radium giving off 3 distinct forms of energy — alpha, beta, gamma — we cannot help but see a relationship between electricity & matter. Alpha ray? Alpha particle (matter) Beta Ray (the electron, but still matter).

Radium also emits an emanation which has the characteristic properties of matter (radon gas nuclei of helium, ionized helium, another gas generated by alpha rays) from radium which can be condensed into a liquid. Its volume varies inversely with its pressure (Boyles law) . Thorium gives off 3 solid substances — mesothorium, radio thorium, and thorium X.

Now, if we turn to vegetable matter, we find energy is also being given off similar as in the case of radium, thorium and other radioactive matter. This time, however, we find direct electrical energy being given off.

Various vegetables and fruits will do for the experiment. A "volta pile" can be made of potatoes, grain, apples, onions, etc. Let us consider the apple. In a "volta pile" made of 25 apples (50 halves) one can obtain enough e.m.f. to light a flashlight globe. It will also be found that the living animal cell like the vegetable cell is giving off energy and consuming oxygen and giving off carbon dioxoide and an electrical potential.

We-find in vegetable, mineral and animal matter the same relationship 'and dependence on oxidation and electrical energy — oxidation in stellar space, evolving energy into matter and matter into energy. Here we see energy and matter and matter and energy vibrating together.

Regarding the force of energy from the cosmos, noted experts in photography have found the light produced from this source of energy is much whiter than that obtained from ordinary electrical energy. Also, this light burns into the film when photographed due to the great intensity and pure white light produced, yet the light is easy on even weak eyes.

It was also noted that detail from these films could only be obtained by holding back dense areas to about 10 times that of normal exposure even when non-halation film and super flash bulbs were used., but the pictures are sharper. Let us again state, "An electrical generator is in the true sense not a generator. It creates nothing. Electricity is not made by the generator, it is merely captured or pumped. From that standpoint an electric generator is an electric pump, and a radiant energy or cosmic energy device, a high-speed oscillating energy resonator.

Let me be permitted to say again, if we reverse our imagination on what the telescope has taught us of the stellar universe, we will find that beyond the microscope we have the particles of which everything about us consists, obeying every law that is found everywhere from stellar space to atomic space. We find bodies in motion and *when we think o f how small the proton and electron are, and yet obeying the same laws o f the universe, we may see the economical wastefulness of science tryin to crack the atom, when nature, or call it what you will,* is *accomplishing the sane thing for us in stellar and inter-stellar spaces. Why do something nature is already doing for us?…* Let's use what nature offers as I first suggested many years ago. From this conception, we might see that Democritus came close to a great scientific truth in his bold statement, when he declared that all physical phenomena reduced itself to one single item-motion — or as we might repeat, "vibration," "the sonic of the universe." Let me repeat, "Do not forget the atom is but a counterpart of the universe itself, and that light and other radiations exert a mechanical pressure upon every object they strike, and that all these radiations are essentially electrical in their character. There is a breaking down and a building up of the atom continuously, and it is this evolution which is producing, eternally, unlimited power."

May it not yet be shown that the dissipated energy which results from so much transformation of matter which has heretofore been unavailable — or should we say, unused by us where it has only appeared to be unavailable should now become available to us, an unlimited source of power through the Moray discoveries of application of these forces? And that matter and energy are possibly one is the sum total of all that has been found during the centuries of constant research. Are matter and energy to be judged by that small portion of the universe which is visible to man, who is only armed with his limited yet most powerful telescope, or with his most powerful microscopes?

As I have said before, I repeat again, "All space is saturated with energies which are vibratory in their ultimated analysis and very closely allied to electrical action. The relation of matter to energy and energy to matter then becomes the potential of the universe, one continuous series of oscillations, oscillating to and fro like a great pendulum across the universe. A steady flow of energy can be had from the surges of the universe just as a steady flow of water may be obtained from the surgings of the sea."

Electrons are spontaneously being emitted from the nuclei found in nature and every new discovery on the subject bears out the claim that all "space" is filled with energy millions of amperes at very high voltages. Let "A" equal the atomic mass and "N" the nuclear mass. Let "Ze" represent atomic nuclear charge, "Ma" mass and a mass number "A". We then have the energy found in nature from a given substance to be:

$$\text{Energy}=Mn\,(Z^{a}) — Mn\,(Z+1)^{a} — me(e)$$

$$\text{Energy} — Ma(Z^{a}) — Zm\,(e) — Ma\,(Z_{1})\,A\,(Z_{-1})\,m(e) — M(e)$$

$$\text{Energy} — Mz\,(Z^{a}) — Ma\,(Z_{+1})A$$

This is based on the disintegration of radioactive material, natural or artificial; but, the same action is taking place in the "sonic" (vibrations) of the universe with all matter and energy.

As long as the universe has existed charged particles now called cosmic rays" have been bombarding every planet or object in the universe, including all living bodies, at tie rate of twenty tunes per second and with a force great enough to penetrate deep into the rocks of the earth.

Cosmic rays have been called "the death cry of the universe" or "by-products of the destruction of matter in the cosmos." In the process of the evolution of matter and evolution of forces there is no "death cry," only the "song of creation." There is no destruction of matter or energy, only the cycle of matter and energy. The creation is going on continually. You subtract in one place only to add in another.

CAPTURE OF ENERGY BY RESONANCE

With the Radiations of the Universe

Oscillating Discharge — When any elastic substance is subjected to strain and then set free, one of two things may happen. The substance may slowly recover from the strain and gradually attain its natural state, or the elastic recoil may carry it past its position of equilibrium, and cause it to execute a series of oscillations; something of the same sort may also occur when an electrified condenser is discharged. In ordinary language there may be a continuous flow of electricity in one direction till the discharge is completed, or an oscillating discharge may occur-that is, the first flow may be succeeded by a back-rush, as if the first discharge had overrun itself and something like recoil had set in. The condenser thus becomes more or less charged again in the opposite sense, and a second discharge occurs, accompanied by a second back-rush, the oscillation going on till all the energy is either radiated or used up in heating the conductors. However in the case of RE the oscillations go on forever because of the actions of the universe. It is known that high frequency currents may be classified as to their oscillating characteristics, i.e. damped or undamped. The energy from the Universe being of both types, depending on conditions beyond the scope of this writing, we have a back rush effect as explained before in the RE device.

The purpose of the capacitors in the RE circuit is to act in their capacity of stored energy discharged. If the resistance is low, an oscillatory discharge takes place: The discharge and recharge on the opposite plates continues in the ordinary sense until the energy which was originally stored is dissipated. In the case of the RE device a different effect is established because the oscillations from the Universe, trapped by the RE valve, continue to enter the circuit as waves of the sea beat upon the shore. Wit negligible resistance in the device, no energy is lost in heat and the oscillations continue.

With the explanations given, is the obtaining of energy from the energy oscillations of the Universe any less understandable than the obtaining of energy from a mechanical prime mover? To use mathematical language: exact conditions exist in both cases be they mechanical or electrical systems. The electrical prime mover, the so-called electric generator or the Moray energy oscillator all have the same scientific facts. In a mechanical system, the greater the inertia the greater the tendency of the body to keep in motion once it is set in motion. In an electrical circuit, the greater the inductance with resistance cut to a minimum, the greater the tendency of the electrical energy (current) to continue to flow once it is started.

From the above it then becomes clear that if $R < \sqrt{\frac{4L}{C}}$ where R is the resistance in ohms L is the inductance in henries, and C the capacity in farads, oscillating discharges take place. For low resistance value i.e. R, the frequency of the oscillations may be expressed $f = \frac{1}{2\pi\sqrt{LC}}$

Let Q be the charge of the capacitor at any instant, C its capacity, R the resistance of the circuit, and L its coefficient of self-induction. Then if I be the intensity of the current and E the electromotive force, we have the equation

$$E - IR = \frac{d}{dt}(LI) = L\frac{dI}{dt}.$$

In this case $E = \frac{Q}{C}$, and $I = -\frac{dQ}{dt}$. Therefore

$$L\frac{d^2Q}{dt^2} + R\frac{dQ}{dt} + \frac{Q}{C} = 0.$$

The solution of this equation is

$$Q = Ae^{\mu t} + Be^{\mu' t}$$

where μ and μ' are the roots of the equation

$$\mu^2 + \frac{R}{L}\mu + \frac{I}{CL} = 0,$$

or

$$\mu = -\frac{R}{2L} \pm \sqrt{\frac{R^2}{4L^2} - \frac{1}{CL}}.$$

Writing

$$\alpha = \sqrt{\frac{R^2}{4L^2} - \frac{1}{CL}},$$

we have

$$\mu = -\frac{R}{2L} + \alpha, \qquad \mu' = -\frac{R}{2L} - \alpha,$$

and

$$Q = e^{-\frac{Rt}{2L}}(Ae^{\mu t} + Be^{-\mu t})$$

where A and B are constants determined by the initial conditions, viz. that initially we have $Q=Q_0$, and I=0, which give

$$+B = Q_0, \text{ and } A\mu + B\mu' = 0,$$

or

$$A = Q_0\left(\tfrac{1}{2} + \frac{R}{4L\alpha}\right), \text{ and } B = Q_0\left(\tfrac{1}{2} - \frac{R}{4L\alpha}\right).$$

Hence at any time we have

$$Q = Q_0 e^{-\frac{Rt}{2L}}\left\{\left(\tfrac{1}{2} + \frac{R}{4L\alpha}\right)e^{\mu t} + \left(\tfrac{1}{2} - \frac{R}{4L\alpha}\right)e^{-\mu t}\right\}.$$

Consequently the current at any instant is

$$I = -\frac{dQ}{dt} = \frac{Q_0}{2CL\alpha} e^{-\frac{Rt}{2L}}\left(e^{\mu t} - e^{-\mu t}\right).$$

Hence if a be real — that is, if we have $R^2 > 4L/C$ -the quantity Q will gradually diminish to zero as the time increases.

If, however, we have $R^2<4L/C$, then α will be imaginary, and writing

$$\alpha' = \alpha\sqrt{-1} = \sqrt{\frac{1}{CL} - \frac{R^2}{4L^2}}.$$

the above formulae become at once

$$Q = Q_0 e^{-\frac{Rt}{2L}}\left(\cos\alpha' t + \frac{R}{2L\alpha'}\sin\alpha' t\right),$$

and

$$I = \frac{Q_0}{CL\alpha'} e^{-\frac{Rt}{2L}} \sin\alpha' t.$$

In this case the current starts from zero and rises to a maximum; it then falls to zero and becomes reversed, after which it passes through a series of oscillations. The discharge therefore does not take place in a single flow from one capacitor to the other, *but a back-rush sets in, and a* series of currents, or oscillations, occur alternately in opposite directions.

The current attains its maximum intensity when

$$\tan\alpha' t = 2L\alpha'/R \qquad \text{(maximum current).}$$

The zero value of the current is reached when

$$\alpha' t = n\pi \qquad \text{(zero current),}$$

and consequently the charge at the same time is at its maximum, for we have *I=-dQ/dt.* Thus the charge oscillates backwards and forwards, attaining positive and negative maxima after the lapse of equal intervals π/α',the time of a complete oscillation being

$$T = \frac{2\pi}{\sqrt{\frac{1}{CL} - \frac{R^2}{4L^2}}}.$$

If the resistance be small compared with the reciprocal of the capacity we may use the approximate formula

$$T = 2\pi\sqrt{LC}$$

The successive maximum charges occur when I=0, or $\alpha' t = n\pi$; they are therefore

$$Q_0, \quad Q_1 = -Q_0 e^{-\frac{\pi R}{2L\alpha'}} \quad Q_2 = -Q_0 e^{-\frac{2\pi R}{2L\alpha'}} \quad Q_3 = -Q_0 e^{-\frac{3\pi R}{2L\alpha'}}$$

The quantities therefore diminish in geometrical progression, and the energy of the charge diminishes correspondingly on each oscillation, being lost in heating the circuit.

Whether the discharge is continuous or oscillatory therefore depends on whether 4L is less or greater than CR^2, and an oscillatory discharge may be obtained either by increasing L or sufficiently diminishing C and R.

These predictions on analysis have been confirmed, as Thomson suggested, by examining the spark, during discharge, by means of a revolving mirror. In Feddersen's experiments the image of the spark in a revolving mirror was viewed through. a telescope. When the resistance of the circuit was high the spark was merely drawn out in width — that is, at right angles to its length; but when the resistance was sufficiently reduced, so that the oscillating discharge might occur, the band was reduced to a broken image consisting of a series of strips, each strip corresponding to a discharge. As stated we have discovered the oscillation of the Universe corresponds to oscillation of electric capacitors depending on the frequency of the energy involved going on into infinity. The arithmetic progression becoming geometrical.

The drawings, circuits and theory have been pronounced by leading men of science as scientifically mathematically, electrically, sound and correct.

It is generally accepted now by science, and Moray's device proves, there is energy coming from the Cosmos and that the earth is surrounded by such a field of energy; That the earth floats in a sea of energy.*

EARTH FLOATS IN ELECTRICAL SEA

By Alton L. Blakeslee-Associated Press Science Writer*

BOULDER, COLO., Oct. 12 (AP) — High overhead floats a fantastic *electrical sea.*

It girdles the earth, reaches at least 150 miles deep. It writhes with storms and savage winds. Powerful electro-jet currents course through it.

It is. pulled by tides, pocked by peculiar clouds, bombarded by cosmic rays.

Created by the sun's cruelest rays, this sea is the ionosphere a *vast belt of electrons* and electrified atoms or ions. It begins 60 miles up, goes at *least* 200 *miles high.*

In sparsest form it apparently *reaches* thousands *of miles* into *desolate space.*

It's a shield between you and a deadly sun.

Were it not there, absorbing the sun X-rays and most power ultraviolet light, life on earth would perish.

Were it not there, you might never hear a radio. Short wave radio communication depends upon bouncing or reflecting radio waves back to earth from this electrical sea.

Strange quirks in the ionospheres sometimes perform magic. Miami police calls are heard in California.

Or a picture from a TV station hundreds of miles away suddenly appears on the screen.

Exploring this sea is a major activity of the International Geophysical Year, a co-operative 64-nation effort to learn more about our earth, sun and space.

Fingers of radio itself are a prime method of ionosphere exploring. Literally thousands of times a day over the world special radio beams are darting up and bouncing back to measure heights, intensities and other changing peculiarities of the ionosphere.

When the full story is pieced together, scientists hope to answer some puzzles of the high atmosphere and *find new or improved ways of putting the ionosphere to human service.*

THE RADIO fingers and other techniques already have disclosed much of the story, explains Robert W. Knecht, a project leader in sun-earth relationships at the National Bureau of Standards Boulder laboratories.

In reality the ionosphere is our outer atmosphere of ultra-thin air. X-rays and ultraviolet light from the sun rip into molecules of oxygen and nitrogen, tearing out their electrons, electrifying billions-times — billions of atoms.

Usually the ionosphere has distinct layers.

About 60 miles high is the E layer, then the denser, F-1 region at about 120 miles, the F-2 layer at 200 miles.

The E LAYER reflects low-frequency or long radio waves. Higher frequencies or shorter waves penetrate through it, bounce back from higher layers. Sufficiently *high frequencies barrel right on through into space.* Usually this is what happens with TV signals.

During IGY, nearly 200 special radio-sounding stations from pole to pole are intently exploring the ionosphere. Each shoots up pulses of radio waves, sweeping through a quick range from long to short waves in 15 seconds, then timing and recording the echoes from different layers.

A few will make continuous recordings of the seething electrical sea.

For the ionosphere, far from being a static shell, changes, minute by minute, hour by hour, season by season. It is a sensitive link between events on the sun and earth, Knecht points out.

Great flares or explosions on the sun sometimes create a much enhanced D layer about 40 to 50 miles up. This absorbs rather than reflects radio waves, producing radio blackouts and interference. Other sun flares have no effect, for reasons not yet understood.

NOTED PHYSICIST ANNOUNCES NEW ENERGY SOURCE

Nickola Tesla, the renowned physicist and inventor who developed the great AC motor, the fundamental principle of radio, and the practical transmission of alternating power foretold the discovery, many years ago of a hitherto unknown source of unlimited energy, "so practical that the machinery to harness it will last 500 years, and so basic that it will undo existing theories.

"They called me crazy, in 1896 said Dr. Tesla, when I announced the discovery of cosmic rays,: Dr. Telsa said, "Again and again they jeered when I discovered something new and then years later saw that I was right. Now I suppose it will be the same old story when I say I have discovered a hitherto unknown source of energy, unlimited energy, that can be harnessed.

"The initial cost will be relatively big. After that hardly anything and unlimited power for the asking."

Dr. Tesla has given the world the arc lighting system, the Tesla coil and rotating field principle for alternate current and innumerable other electrical devices.

Dr. Tesla did not live to reduce to practical application the discovery he referred to above.

This energy, or as Moray explains it— these oscillations of Energy are picked up by the Moray device and the oscillator tubes of the device itself. As stated, these surgings or oscillations of Energy coming and returning to the Universe are picked up by the Moray Device because the Moray Device is tuned to oscillate in harmony with the oscillations of the universe just as musical instruments can be made to oscillate together. Every oscillation, whether large or small, is completed during the same interval of time. The beat note of time, the heart beats of life, the oscillations of the Universe all prove the same great fact that oscillations are all governed by the same cycle of time, or, as stated above, completed during the same interval of time, and as Moray stated years ago, these waves of energy have a regular beat note of time, coming and going as the waves of the sea, but in a very definite mathematical order of time, coming to the earth from every direction, stronger in the day time than at night, but always coming with regular beat note that might be referred to as the Father of time, the Sire of Gravitation.

Below will be found excerpts from some Scientific books.

"ASTRONOMY," by Robert H. Barker, Ph.D. Professor of Astronomy, University of Illinois, page 303:

"Another problem relates to the apparent lavish expenditure of this radiation. Of all the energy that pours forth from the sun, less than one part in 200 million is intercepted by the planets and their satellites. The remainder spreads through interstellar space with little chance, so far as we know, of being recovered. The suggestion that the sun shines only in the directions of material that can intercept it makes an appeal from the point of view of economy, but appears to have little else to recommend it. It would seem that nature is squandering its resources of energy so prodigally that it must end in bankruptcy; but doubtless we have at present an imperfect account of the situation."

Quoting from "Foundations of the Universe" by Luckiesh of General Electric, pages 41-43:

"The great success of the atomistic principles as it is involved in the kinetic theory of matter was one of the wonders of the modern scientific age. It is to be expected that there will be found other applications equally fascinating and promising. It is now being pressed further into the service of explaining the structure of matter…"

"When Maxwell (1873) propounded the electromagnetic theory of light (radiation), his achievement was epochal. The exact manner in which the radiant energy traversed space was not known, and the next epochal event was the founding by Planck (1900) of the quantum theory. Here we have the atomistic principle applied to energy instead of being confined to the material of the universe as it had been. In other words, in the quantum theory we have the atomistic idea applied to physical processes. We now have the atom of matter, the atom (electron) of electricity, and the atom (quantum) of action (a product of energy and time). Planck assumed the emission of radiation (from the sun, a lamp filament, etc.) to occur discontinuously. He conceived elements of energy of equal magnitude analogous to the equality of electrons, or atoms of a given element. Radiation or radiant energy is emitted of various wave lengths or frequencies which must be taken into account in laws of radiation *** now the physicist uses quanta as commonly as he does electrons and atoms and molecules. Bodies are built of molecules, the molecules of atoms, and the atoms of electrons (and protons) etc. Here we see the atomistic principle applied to "material" (matter) and then to electricity. Finally, a physical process — the radiation omitted by the electrons — is divided into quanta. With such pictures of the Universe being considered we may cease to be surprised at anything, but our interest and admiration will grow. Will we ever get to the final foundation?"

Matter and energy, are possibly one, is the sum total of all that has been found during three centuries of incessant research in all that portion of the Universe visible in a forty-inch telescope armed with the most powerful spectroscope ever made.

It is the experience of the writer that all space is saturated with inconceivably minute corpuscles of energy. Reference is made to the discoveries of Professor J. J. Thomson. These are doubtless either electricity in its ultimate refinement, or very closely allied to it, or its immediate carries… The earth and sun, all suns and dark bodies in space, all granular matter move through the primodial cosmical mass of electrical energy as would a

wire screen through water. The wide spaces in diamond, glass, steel, flint or any thing else allow these 'Bodies smaller than atoms,' as Thomson calls them, to pass through."

From the definition of energy it is the potential of the Universe. When matter is in a phase allowing it to be active, it effects other quantities of matter at a disance. The method of transfer is known to be by means of wave and corpuscular motion. Each impulse moves from the omitting to the receiving mass on a rigorously straight line. One continuous set of oscillations in this right line is called a ray. Each negative or "Thomsonian corpuscle" makes a double vibration to and from like a pendulum straight across the direction of the ray — i.e., at right angles to it, the corpuscles move over and return to the original position had before the excursion. Since the corpuscles are negative and can be drawn out of their original straight path by the action of magnetism, the entire wave motion of the Universe is electro-magnetic. This is what Maxwell theorized many years ago. Thomson proved the theory a fact.

"After one corpuscle makes an oscillation across the direction of the ray and return the next does likewise, and the next, and so on. After the first corpuscle makes the swing, another distant from it 186,000 miles in the same straight line will also make a vibration at the end of the first second of time."

"ATOMS AND RAYS," by Sir Oliver Lodge, Fellow of the Royal Society of Science and holder of five or six Doctors degrees from colleges, with honors from a score or more and who held offices of President in a dozen or more Scientific Societies, printed in 1924:

The term 'light,' strictly speaking, means that kind of etherial radiation which is able to affect the eye. But it is common knowledge that there are many other varieties of radiation besides these to which the eye is sensitive. It is not clearly known why the eye is sentitive to some kinds of etherial radiation, and not to other kinds. That, no doubt, can be ascertained; it is a question for physicists and physiologists in collaboration. But the eyes of animals and insects as well as of man, all appear to be sensitive to a limited range of etherial radiation, which is therefore called light. Other kinds of radiation can affect a photographic plate; other kinds, again, can stimulate the chemical actions going on in the leaves of plants, and thereby supply the energy needed for vegetable growth. Another kind — a rather deeper harmonic as it were — supplies everything on earth with warmth, and by evaporating water contributes to most of the phenomena of weather. Other kinds, again, are omitted when individual electrons traveling at a high speed in a vacuum, encounter the obstruction of a target; this kind of invisible radiations being called X-rays. And, at the opposite end of tile scale, another kind of radiation is emitted and is known as the Hertzian waves employed in radio.

In speaking of these kinds of radiation as different, we are not speaking quite accurately. They differ only as treble notes differ from bass notes; they differ in rapidity or rate, of vibration, wave-length or frequency. They do not differ in any other essential particular. Through the whole range — from the telegraphic waves, which may be- a mile long, to X-rays, of which the wave-length is actually smaller than atoms, and only expressible in billionths of an inch — they all travel we assume at precisely the same speed. They are all of the same electromagnetic character; they are all subject to the same laws of interference, of reflection, refraction, and polarization, which have long been studied in the department of physics known as optics.

T. Henry Moray would qualify the above statement by saying there are speeds greater than 186,000 miles per second.

"Whatever an electric charge is, or is not, it is certainly a focus of energy. And if we could imagine an vortex, containing the known mass of the electron and circulating with the velocity of light, its energy would be equal to that of the electric field in the space surrounding the electron. This coincidence, if it be a coincidence, can hardly fail to have some meaning. And there are those who are beginning to think that the whole material universe is built up of energy in various states of self contained or intrinsic motion; by which adjectives it is intended to discriminate between rotatory motion, like that of a top or a whirlpool, and ordinary locomotion, are shifting from place to place.

"Those who hold this view of the universe are strengthened in their position by the statements of Einstein on energy in general. It is well known that all the ordinary energy we are acquainted with, such as tile motion of railway trains, cricket halls, and such like, is merely relative — relative to the earth, or to some other piece of matter. There is nothing absolute about it. But Einstein gives an expression for what one might be inclined to call absolute energy, in which the only relevant velocity is the velocity of the Cosmos. And all the phenomena we observe in nature, at any rate in inorganic nature — omitting the phenomena of Life and Mind for the present, as lying outside our physical ken — may be regarded as due to, and as demonstrating, slight modifications of the portion affected by this great velocity, in form which enables it to appeal to our animal-derived senses. For the spinning motion itself is impalpable and beyond the ken of our instruments, until it partially exhibits itself as transmitted waves in the form of radiation."

"All the energy that we experience can be resolved into vibrations or tremors. But all electric and magnetic phenomena, and therefore, all chemical activity, are likewise known to be modes of manifestation of vibrating space, the complete manner and meaning of which have still to be worked out."

"So the question arises, What i's Matter? Is that too a manifestation of some peculiar properties in the medium? We know now that matter is built up of protons, neutrons, electrons, etc. But when we come to analyse these into their fundamentals, we find far more than a hint that they are but special modifications in the all-pervading energy, and are essentially resolvable into kinetic energy of a specific kind. Hence we are beginning to think that all matter itself is a form of energy."

"Energy is tile chief thing in the physical universe that directly appeals to us. We apprehend it under a great variety of forms. And it is becoming probable that what we call matter is one of these forms. Most of the forms of energy that we know are convertible one into another. The energy of motion turns into heat; so does the energy of electric currents, unless it is converted into the energy of chemical separation or electric charge. Conversion from one form to another, without loss, is the sign-manual of energy. And the proof that matter is a form of energy will not be clinched until it can be demonstrated that matter tot) is convertible into other forms of energy."

Many attempts have been made to harness the forces of nature directly to produce usable power. Other types of energy besides sunlight are constantly bombarding the earth with waves arid particles, or surrounding it ill much the same manner as its atmosphere or the very space in which it exists. Among these are the gravitational and magnetic fields and the cosmic rays.

The features of cosmic radiation would enable R E transformers using cosmic radiations as a primary source to operate with relative independence as to position or season. It is also evident that such a device would show possibilities of efficient operation in moving vehicles within the earths atmosphere and ill space at continuous high power levels.

Such an energy transformer or converter leas been built. It has been operated at full load continuously with no expenditure of fuels of any type without a mechanical prime mover, kept alive by the oscillations of the energies from the cosmos; An energy converter, or transformer, which would be capable of converting the high frequency, high level energy of the cosmic radiations into current of usable frequency and voltage.

Basically the theory of operation is as follows. Oscillations are started in the first stage or circuit of the device by exciting it with an external energy source. The circuit is "tuned" until the oscillations are sustained by harmonic coupling to the cosmic wave frequencies. The reinforcing action of the harmonic coupling increases the amplitude of the oscillations until the peak pulses "spill" over into the next stage through a special detector or valve which prevents the return or feed-back of energy from succeeding circuits. These "pulses" drive this stage which oscillates at a lower frequency and is again reinforced by harmonic coupling with the ever present cosmic waves. The second stage drives a third stage and additional stages are coupled until a suitable power level at a usable frequency and voltage is obtained by means of special transformers. (See* schemetic drawing of R E device).

Once the machine is in operation and delivering power it does not require any continuance of the excitation forces. necessary to start it. The oscillations are sustained as long as it remains properly tuned and the external circuit is completed through a suitable load.

The special tubes which appear to be the key to the success of this device are Ionic cold cathode tubes which require no external power sources.

Practically speaking, the present method of securing energy with primemovers has been used too long. We have used it so long, that we have let ourselves believe that there is no other way to secure it. Present methods are expensive and cumbersome. Think of the power sites, and steam plants, the transmission lines, the transformers, and many other kinds of equipment that are now required to supply our electricity. The present system is unreasonably expensive. When we begin to realize the tremendous energies, electrical energies, that surround us, we should actually he ashamed that we have been so dilatory in our efforts to improve upon this crude, cumbersome, and expensive method of furnishing heat, light and power.

Books could be filled with accounts of the struggles for existence of a new idea or a new way of doing things. You need only read the story of the development of the telephone, and the railroad, the airplane, automobile, and so on, and you will begin to appreciate the cost in sacrifice, money and unselfishness to promote a new and revolutionary movement, irrespective of the vast good it accomplishes when established for the use of humanity. (See Ralph Parleys "Pockets of Paradise").

CHAPTER FIVE

HISTORY OF RADIANT ENERGY

Experimentation and Development

The thought has occured that the reader would find a brief history of Dr. Moray and his work a valuable background. With this in mind, the editors of this chapter leave gone through a great deal of correspondence and many of the papers of Dr. Moray. The material would fill many volumes but of necessity had to be condenced to what was felt to most clearly demonstrate the purpose in mind and give the reader the most comprehensive approach to the work.

The story of Henry Moray is the story of a man working alone, whose discoveries and theories have been years ahead of his time. His many pamphlets and writings have advanced ideas with which science is coming more and more into agreement. Isis active mind has delved into many fields of science and always come up with many new and startling discoveries.

Henry Moray was born August 28, 1899 in Salt Lake City, a son of James C. and Petronella (Larson) Moray. His father was a well known mining enigneer and an active pioneer in the early mining activities in Western America. He was educated in the public schools in Salt Lake City. As a young boy, he could hardly wait for school to close afternoons so he could run to the public library to read books about electricity. Such men as Michael Faraday and Nickola Tesla were his heroes. As early as 1905 he was experimenting with then so-called wireless and other electrical devices.

In 1907 lie started experimenting with alternating currents of High Potential and High Frequency and with rays beyond the light rays. His main interest leas always been with high frequency phenomena. lie attended the L.D.S. Business College, the L.D.S. University, and a course in electrical engineering from Pennsylvania. In 1912 lie went to Europe and while there over a period of years did advance study in electrical engineering.

Through the years lie has kept abreast of the latest developments in science through diversified and extensive reading and has built up a personal scientific library of very extensive proportions.

On November 28, 1917, he married Ella Ryser. They had five children: Henry Junior, Ella Evelyn, Sylvia, John Eugene, and Richard Ryser.

Prior to 1921 when he decided to devote all of his time to private research, he was an electrical engineer and designer for the Utah Power and Light Co., Phoenix Construction Co., assistant chief electrical engineer Aarastad Construction Co., and assistant division electrical engineer for the Mountain States Telephone and Telegraph Co. He also worked as a civil engineer for the Denver and Rio Grande Railroad. During this time lie designed the electrical layouts for important power plants and for some of the largest buildings of that time in the west. He was a certified member of the A.A.E. (American Association of Engineers), and a past secretary of the Independent Electric Co.

Time and space do not allow a full discussion of the various Moray devices as the primary purpose of this paper is a presentation on RE. A very complete and detailed record of letters, articles, pamphlets, etc., are on file in the records of The House of Moray in Salt Lake City, Utah.

Dr. Moray and radiant energy are so closely related that one cannot be separated from the other. It is not the purpose of this history to give a complete picture of Radiant Energy but a discussion is necessary as it seems that all of the other work which Moray has done is received on the basis of how the party or parties involved feel about Radiant Energy. During the past years, Dr. Moray has turned to many other fields of endeavor, continuing to build on Radiant Energy as finances from other works would allow. Since 1926 this work on Radiant Energy has been paralleled among other things by an intensive study of radiations and radio active substances.

Through the years Dr. Moray's chief wish has been to be free of bothering business details so that lie could concentrate on research. Yet every time lie has turned business details over to someone else, chaos has resulted. One of the chief needs has been to find someone who combined the unusual talents of a good business manager with a knowledge of science, who was dedicated, trustworthy, unselfish, and tough enough to withstand the rough road which had to be traveled. The qualities of trustworthiness and toughness seem to have been lacking the most often. It has been lard to find administrators with the special skills needed.

Progress through all of history has been slowed and sometimes thwarted by selfish interests. But inspite of all obstacles, the world slowly crawls forward.

James DuPont in a speech before a group of Kiwanis and Chamber of Commerce representatives asked how many businesses would be in existence today if it were not for inventing acid scientific research. This work requires something which no money call buy and which no educational training call supply acid without which no research or inventing business can thrive — the power of creative imagination. Tile pioneering today is oil the frontier of scientific research. It is no place for the faint of heart.

Independent research in the United States today travels a rough road. The problems lie in two directions. 1. Financial: It is very difficult for all individual or small group of individuals to collect sufficient funds for equipment which is very specialized and very expensive and to be able to pay competent help. 2. Business management: Few research workers have the time for involved business acid financial details oil top of the full schedule necessary for scientific advancement.

People, like objects, seem to lie governed by the laws of inertia. Anything which tends to change the existing status quo is viewed with alarm; particularly if they cannot understand or explain the new in view of present knowledge. Through the years continual experimentation and refinement leas gone forward, but always in tile long run tile work leas fallen back onto one man and his resources.

At the onset Radiant Energy received much attention, but it got off to a bad start because of the desire for personal advancement acid power by groups of promoters.

Many leave asked what is this thing Moray has called Radiant Energy which has caused so much discussion over so many years? In lay terms it is the harnessing of the power of the universe to man's need for electrical energy here oil carth. Many attempts have been made to harness the forces of nature directly to produce usable power.

As early as 1904 Nickola Tesla on experimenting with A.C. currents of High Potential and High Frequency said "There is a vast quantity of available energy in space and it will not be long until men will attach their machines to the wheelwork of nature.

Radiant Energy was first presented years before the world was ready to accept it in principal or to understand its magnitude. History has again shown the unwillingness of men to accept and adapt to drastic change or new ideas. Dr. Moray realized the magnitude of his discovery and has felt the burden of responsibility for what could well be the future of mankind. lie has had a sincere desire to place his knowledge where it would do the most good for all and not into the hands of a few who were selfish for power and wealth. In this undertaking he has been thwarted on all sides, even from quarters where there was no knowledge of or connection with the work.

Because of conflicting interests, some people would like to sit back or deliberately interfere with the development of Radiant Energy until Dr. Moray makes a slip and the invention becomes public use. The many offers for Radiant Energy have to be carefully considered for intent and chances for successful presentation. Some interests have even tried to tie the invention up and prevent future development. As has been said before, time and space do not allow a lengthy review of the happenings through the years, but a few high lights may be of interest.

On July 24, 1925, while conferring with Senator Reed Smoot at the senators invitation in his offices in the Hotel Utah in Salt Lake City, Dr. Moray offered his Radiant Energy discovery to the United States Government gratis. The senator thanked Dr. Moray for his offer but stated that the U. S. government would decline such an offer on the grounds that the government was not running in competition with public utilities.

In the early years of its development during many, many tests the Radiant Energy device was minutely examined. Many people saw this device with no other purpose in mind than to prove it a fraud. None was ever able to find any evidence of fraud and admitted that it was beyond their comprehension.

During this time there seem to have been four main points of dispute, all of which were thoroughly dealt with. These objections were: 1. The power was obtained from a hidden wire connected with the electric light circuit. 2. The power came from batteries. 3. The power came from induction. 4. There existed no such energy in the universe so that it couldn't be as represented.

Let us look at each of these objections in view of the records of people who saw these demonstrations. Only a few of the more comprehensive descriptions can be examined here.

The question of batteries is most conveniently dealt with at the same time as the idea of a hidden wire connected to the electric light circuit.

On March 16,1929 Mr. T. J. Yates, E.E., and M.E., a graduate of Cornell University with a great deal of experience in the electrical field, wrote a complete and detailed description of the apparatus and experiments which he saw of the Moray Radiant Energy device. He made and related several basic electrical tests which proved that the source of power present was not from an ordinary light circuit or from batteries. He made tests which would have produced a short circuit if the circuit had been connected to the electric power source. None was produced. He checked the main switch, and examined the table which held the device for hidden wires. He opened the main control switch on the lights in the building with no visible effect upon the Radiant Energy circuit. He tested the terminals for a battery type discharge and found that the tests indicated a condensor type discharge. He tested and made sure that energy was passing through the apparatus. He emptied the boxes which contained the apparatus -and found no batteries nor any place big enough to hold them. He also made the observation that the lights even though standard globes burned a different color, brighter and whiter, than those on the regular light circuit. In conclusion he said, "One is therefore forced to conclude that the electrical energy was received from some other source and difficult as it is to understand, with our present knowledge of electrical

generation, no other conclusion can be drawn from the demonstration as above described than that the energy was received by and through the apparatus as claimed by Dr. Moray." (See Footnote)

TO WHOM IT MAY CONCERN:

This is to certify that on the evening of March 16, 1929, in connection with Dr. H. H. —— of —— City, I witnessed a demononstration at the home of T. H. Moray, 2184 South 5th East Street, Salt Lake, City, Utah.

Dr. Moray claims to have devised and invented an apparatus that will produce electrical energy without the use of prime mover, and this is the apparatus demonstrated on the occasion above referred to.

The subjects of this article will be treated in the following order:

1. Description of Apparatus
2. Demonstration
3. Objections that I have heard
4. Tests
5. Conclusions

1. Tile apparatus consists of an antenna, a lead-in and a ground wire. These are connected to the terminals of a switch. Two wooden boxes were placed on a table. In one of these boxes was a high-frequency transformer and in the other box were two sets of condensers, 10 large condensers in one set and 10 small condensers in the other set; two composition cylinders, each about 1 1/2 inches diameter and four inches long; each of these weighed about three or four ounces; and another box approximately hemispherical in shape about 2 inches in diameter and weighing about 2 ounces; and a coil of wire. These piece. of apparatus were connected by a number of wires by which lite hook-up was connected.

Two of these wires were led out to the switch. One was attached to the blade of the switch and the other to the jaws of the switch so that when the switch was open the antenna, lead-in apparatus in the boxes, and ground wire, were all in series.

Two other wires Ieading out of the box were connected to six 100 watt lamps connected in multiple during part of the demonstration, and to a flat iron during part of the demonstration.

2. Demonstration.

During the demonstration the apparatus was connected in series as above described, except that a small switch connected in series with tile coil was left open.

Dr. Moray stroked the coil with a small magnet for three or four minutes: he then closed the small switch and the lamps were lighted and remained bright as long as the circuit was left closed, which was about 60 minutes. He then connected an electric flat iron. In a short time tile iron was hot. When the ground wire was disconnected and when the lead-in was disconnected the light went out.

3. Objections that I have heard.

1. That the power is obtained by a hidden wire from the electric lighting circuit.
2. That tile power is obtained from batteries.

4. Tests.

Before and after the demonstration I closed the big switch which connects the antenna and ground. If the antenna or lead-in were connected to the lighting circuit this would have produced a short circuit. I further tested by closing and opening the switch several times to see if any sparks appeared, but there were no sparks. I placed my wet finger between the blade and the jaws of the switch and could not feel any electricity. I touched my hand to both sides of the switch and the wall to check for ground but could not feel anything. We turned the table over and examined it carefully for hidden wires but found none. With the apparatus all connected the same as when operating the lights, the contacts with the switch were moved but produced no arcing. This indicates that the circuit was dead.

While the demonstration was being conducted and the lamps were receiving their energy through the apparatus the main switch that control the lights in the house was opened. All lights on the house circuit went out but the lights on the aerial circuit was not altered — were neither brighter nor dimmer at that time. *Thus the lights could NOT have received their power from that source.*

The condensers were THOROUGHLY tested. The terminals were shorted, the positive to the negative. If they had been batteries they would have showed a spark, but no sign of spark appeared. They were then tested by connecting them to the electric terminals. After thus being charged the large condenser gave a vigorous discharge, showing a brilliant strong arc and a loud snappy sound showing a sudden discharge as condensers are supposed to do and batteries never do.

The small condensers were less vigorous in discharging but the some snappy discharge indicated a condenser and not a battery discharge. These tests proved positively that condensers and not batteries were in the cases supposed by some to contain batteries. The boxes were completly emptied thus leaving no possible place for batteries to be stored.

During the time that the lights were burning the connections with the big switch were moved along the switch and vigorous arcing occurred, thus proving that electrical energy was passing through this apparatus.

5. Conclusions.

The electric lamps received energy from some source and during the demonstration, which lasted for about an hour, the lights were brilliant at all times; just as bright at the last as the first of the demonstration.

The lights on demonstration were a different color and seemed brighter than those on the house circuit.

The electric energy that lighted the lamps and heated the flat iron was not received from batteries in the boxes.

The electric energy that lighted the lamps and heated the flat iron was not received from the house circuit.

One is therefore forced to the conclusion that the electric energy was received from some other source and difficult as it is to understand, with our present knowledge of electrical generation, no other conclusion can be drawn from the demonstration as above described than that the energy was received by and through the apparatus ac claimed by Dr. Moray.

T. J. YATES

Mr. Yates has an M.A. in Electrical Engineering, Columbia University.

On December 13, 1930 Mr. Yates saw another test which he again described in detail. he noted a slight change in the apparatus which made a great improvement in the performance. He again described a careful examination of the system for any other source of electricity. He states that he inspected everything and that not an inch of space was overlooked. We will now quote directly from the letter.

"A crystal radio set was cut in on the lead-in wire from the antenna on one side and to the ground wire on the other side and perfect reception was had. If there had been power from other sources on the antenna or lead-in, by connecting the radio set to the ground wire, reception would not have been possible but a loud, humming

sound would be produced. This was demonstrated by connecting the radio set to the house lighting system. When the system was working, the lights were burning bright. The terminal attached to the antenna was disconnected. A vigorous arcing occured and the sparks jumped over an air gap as much as six inches. This would indicate that the power was high voltage and the nature of the sparks indicated a high frequency.

I do not understand the principle by which Dr. Moray produces the electric energy. The condensers and the coils of wire are common. The two cylinders called "oscillators" and the small conical shell called the "detector" are the only things not commonly known, but the system works. It produces electric power in abaundance and does all that Dr. Moray claims for it.

I do not own any stock or interest in the company that is promoting this enterprise and my only purpose in issuing this statement is in the interest of the advancement of science. I consider this development a great advance in the science of producing electrical energy.

Very truly yours
(Signed) Thomas J. Yates

This letter was subscribed and sworn to before a Notary Public on the 18th day of Decemher, 1930.

In later R E. devices a HF brush discharged of 18 inches in length was sustained and 50 KW of energy obtained.

Another distinguished feature of the Radiant Energy device is the characteristic whiteness of the light globes. Regular light globes purchased on the open market were used in all of the demonstrations, yet the light produced was quite different than that in an ordinary electric circuit.

On Jan. 5, 1938 Mr. Chester Clawson wrote the following. "For many years I was a producer of independent motion pictures and in this work necessarily used high-powered open-arc lamps. Through my exposure to these powerful lights my optic nerves were affected by the ultra-violet rays and ordinary light has always caused me considerable discomfort so naturally I was particularly impressed with the fact that in looking at your board of some thirty-five hundred-watt lamps, all burning at the same time, the light was very much less troublesome to my eyes.

Photographers have also noticed the different quality of the light produced with this device. In June of 1937 Mr. Keen Polk, a photographer whose experience covers thirty years during which he had been a newspaper photographer; official photographer of the United States over seas; and head photographer for the U. S. government in Washington, D.C. wrote "I began taking photographs of the Moray Energy machine, while it was being operated, some six years ago. The purity of the light has always greatly impressed me. The light appears to be much whiter than the light in bulbs lit with the ordinary electric current. To my eyes, it appears that there is less of the ultra-violet and red rays, than are contained in the regular light.

In all of the demonstrations that I have photographed, Moray has used the standard market electric light globes. The light produced by this machine is superior to any of the special lights used in my photographic work. On June 25. 1937 I photographed seven. negatives and discovered that dais light is rather difficult to properly photograph on account of its extreme brightness.

On July 6, 1938 Mr. W. Earl Lyman of the: Utah Photo Material Co. wrote toy Dr. Moray: During the latter part of May 1938, I photographed your Radiant Energy Machine May was very much impressed with same.

In my opinion the bank of lights photographed were much brighter than the Mazda Lights of similar work I leave had to do.

I used a non halation film acid was sure I could offset the light with a large #3 Super Flash Bulb, but your light burned into the film much deeper than I expected.

The pure white light you get should be a great help in photography."

Processing the negatives taken of the lights of the Radiant Energy device has also presented some unusual problems not ordinarily found in pictures of this type as is illustrated in the following three letters to Dr. Moray:

"Dear Sir:

We wish to thank you for the recent business you have given us, and hope we may have the pleasure of serving you again.

"For your information we wish to state that in all cases where negatives included any of your lights we found them to be of greater intensity than ordinary illumination. They seem to burn into the negative to such a degree that we found it necessary to cut special masks to hold back the immediate area of illumination in order to obtain any outline of the globes whatever. We found the average negative required about ten times the normal exposure in the areas where lights were used. This is especially interesting as in photographing ordinary lights when shining directly into the lens of the camera the light outline can be plainly seen even though the negative is dense at point of illumination and in the case of your lights the only detail possible to obtain lead to be brought out through holding back the dense area as mentioned above."

Very truly yours,

The Sun Photo Service
Signed D. R. Silvers

In a later letter Mr. Silvers again writes: "In regards to your inquiry on the change of light values or negatives changing their properties of value during a period of years, we state that, to the best of our knowledge any changes would have to be uniform in over all negative value and the ultimate results in printing would remain the same.

At the time we printed your latest group of negatives, we understood the photographer used a No. 3 flash bulb which under ordinary circumstances would offset any area of intense light or bank of lights other than the source of the No. 3 flash bulb.

We found that is not the condition in this case. This source of light seemed to burn into the negative to such an extent that we lead to shade out the light in order to obtain a background which the No. 3 flash bulb should leave illuminated.

To summarize, we found that in order to obtain a balance print quality, we had to mask out or eliminate this source of light in order to obtain any detail in the balance of the picture."

"In March of 1957 Mr. L. E. Remington, manager of the Shutter Bug in Salt Lake City wrote to Dr. Moray: In our Photo finishing plant we have recently made photographic prints from negatives supplied by you. Included in all of these negatives were banks of lights.

Needless to say, producing satisfactory prints from these negatives was extremely difficult, due mainly to the fact that the intensity range on the negative was far beyond the limitations of the photographic papers. On some of the negatives the range was so extreme that even with intense "burning in" we were unable to produce a print that satisfactorily covered all areas of the negative.

We noted several interesting characteristics in the negatives of these lights in contrast to normal incandescent or fluorescent lights. The intensity of these lights appeared greater than normally produced. They also, in some cases, produced a circular halo effect that has not been encountered previously. The most interesting observation was that, in spite of the intense density of the negative image of these lights, there was no complete "blocking up" such as would normally be found with other lamps."

As has been noted, electric light globes (standard articles bought on the open market) behave differently when used with the Moray Radiant Energy device then when used with regular current. The globes become exceedingly hot in one spot about the size of a dime, due to the fact that the gas in the globes becomes incandescent under the influence of the very high frequency current and because of the incandescent gas, the luminosity is much higher and whiter than with ordinary current.

Before we leave the question of outside power sources, let us consider one more letter written Dec. 22, 1958.

"To Whom It May Concern:

In the spring of 1938, 1 was invited by tile Securities Commissioner of the State of Utah to acompany Mr. Gull to the Laboratory of Dr. Henry Moray and inspect the Moray Radiant Energy equipment. My father, Mr. J. C. Jensen, an engineer, was also present. He has seen many tests made of the Moray equipment. This invitation was given me because I am an engineer and battery expert.

After seeing the Moray equipment light 30 one-hundred-fifty watt standard light globes, heat a 1000 watt soldering iron and operate a special high frequency motor for some time over an hour, I placed my measuring instruments on the antenna and ground connection. They were electrically dead. They were checked in detail for hidden wires, there were none. The box in which the equipment was housed was opened by commissioner Gull and myself. Every part of the equipment was taken out of the box, weighed and tested. Tests were made with sensitive volt and amp meters to determine if the box could contain batteries or if any of the equipment had any sort of battery action in them. They did not.

There were no hidden wires and nothing from which any battery current or any other power could have been obtained other than as claimed by the inventor.

The commissioner then requested permission to bore holes in the box in which the equipment lead been housed in order to satisfy himself that everything had been taken out and there were no hidden compartments. This was done to the complete satisfaction of all present.

I have been asked for my comments concerning tests and demonstrations of Dr. Moray"s Radiant Energy equipment, and the above is a review of the test and demonstration which I witnessed. I endorse this equipment as represented by Dr. Moray."

Signed A. B. Jensen,
Salt Lake City, Utah

A letter dated Sept. 26, 1928 written by Air. E. G. Jensen, relates that on Sept. 25, 1928 in Dr. Moray's Laboratory, a demonstration was given for the benefit of Dr. Harvey Fletcher in which three one-hundred-watt lights were lit and also a 575 watt flat iron was heated. After the demonstration, the apparatus was dismantled

for Dr. Fletcher's inspection and the various circuits and hook-ups were explained. Dr. Fletcher remarked, "It was a wonderful demonstration."

A feature of the demonstration was the breaking of the antenna circuit which caused a brush discharge spark of about nine inches to occur. Dr. Fletcher stated that the current was evidently high frequency. On the Thursday preceeding this demonstration, Dr. Fletcher spent several hours with Dr. Moray who explained the various circuits to him in detail. This conference was attested to in a letter dated Sept. 27, 1928 and signed by Robert L. Judd. At this time Mr. Judd relates that Dr. Fletcher had to return to the Bell Telephone Laboratories in New York and would be unable to make further investigations, but felt that he could accept any findings of Dr. Carl Eyring. He also suggested that one weekness of the device night be the inability to function over a long period of time and suggested an endurance test.

On Oct. 10, 1928 Mr. Robert L. Judd wrote a letter to Dr. Fletcher at the Bell Telephone Laboratories in New York. In this letter Mr. Judd recounts the details of an endurance test arranged with Mr. E. G. Jensen, Dr. M. O. Hayes, and himself. They set up the machine in a heavy tin covered trunk with a small hole in the top and another in one end through which the globes attached to the machine could be observed. After making some tests, the trunk was closed and locked and the key delivered to Dr. Hayes. The trunk was then sealed in three different places with the standard freight car seals. The details of each day were recounted, the principals involved visiting the laboratory many times to check the device. After a week the trunk was opened and the device carefully tested.

Mr. R. F. Haffenreffer, Jr.
Fall River, Massachusetts
Dear Mr Haffenreffer:

It has been some little time since I have had anything worth while to tell you about our electrical mechanism. We have though just finished a most interesting demonstration that I am sure you will be pleased to hear about.

You will remember that I told you of our unsuccessful attempt to have an examination of the mechanism made by Dr. Fletcher of the Western Electric Co. of New York, when he was here a year ago, and of our inability to make much headway since that time. I think I have told you that Dr. Fletcher is a very close friend of mine whom I met when we were both attending the University of Chicago. At that time he was working to get his doctors degree in physics and was assistant to Dr. Milican, and helped very materially in the demonstration and establishment of the ionic and electronic theory of matter. A few years after his graduation lie was called into the staff of the Western Electric CO. at New York, where lie has remained up to the present time. He has done some very remarkable work and for more than a year past has had direct charge of the television. A couple of weeks ago I learned that he was paying us another visit and accordingly took up with Mr. Moray the proposition of his spending some time on our mechanism while here. I know by reason of your knowledge of inventors, that you will fully appreciate the difficulties encountered in getting Moray to give Dr. Fletcher a chance to study and investigate his instrument. However, he did give his consent, and on Thursday a week ago Mr. Moray and *Dr. Fletcher spent the afternoon in a detail study of the drawings demonstrating the circuits involved and the theory upon which the mechanism is based. This was as requested by Dr. Fletcher.* On Tuesday last, Dr. Fletcher, myself and Mr. Jensen, another interested party went down to Morray's home. *Dr. Fletcher was afforded the opportunity of studying the antenna, the ground and their respective connection with the machine.* Moray then demonstrated that there was no life in any part of the machine, and explained to the Doctor what he was about to do. He then began his tuning in as you have seen him and in six minutes from the time of his commencement had sufficient power to light three one hundred watt lamps. Dr. Fletcher in observing the lamps stated that they were burning far above normal and that if they were to continue at that degree of radiancy they would soon burn out. While observing the lights various tests were made such as disconnecting the antenna and the ground. The lights were then screwed out quickly and a five hundred seventy five watt flat iron attached. This was heated to the "sizzling" point in about five minutes. After making such observations as were necessary to this test, the wire was disconnected and the lights again put on. After the lights had been burning for some little time, for some reason then unknown, they flickered a few minutes and then went out. The lights on the regular circuit in the house still going on. The globes were tested and found to be all right. *A later examination of the parts of the machine showed that one part of the detector, that piece of mechanism which is not yet "fool" proof, had slipped down out of place and in effect had disconnected that particular circuit. This happening pleased Dr. Fletcher and was considered by him a valuable part of the experiment. After the lights had gone out the mechanism was dismantled part by part and the Doctor given a chance to see that the mechanism was one intrical whole and no other connection than with the antenna and the ground.*

His conclusion was without further time or equipment with which to study the circuits, and the extent of them going through different parts of the machine, that the energy secured by the machine was what Mr. Moray contended for it or that Moray secured from his antenna and ground a force which set up in his tubes, the makeup of which were explained to the Doctor, some form of battery action which resulted in the electric current generated. He stated that if it were the latter however, the phenomenon was quit as remarkable as contended for by Moray, because in accomplishing what they did the tubes were far more powerful than anything known to science today.

His observation as to the possible weakness of the thing is it was some battery reaction in the tubes which were commenced and kept alive. by some form of energy from the atmosphere, was that the tubes would soon burn out and that it would be necessary to do further work with the tubes to give them long life. I told him that the tubes built two years ago last June had done services up to the last month when Moray, through their leaking on account of what he says is his crude way of making them, had had to make new ones. His answer to that was that if it is battery action the titles might be used for some time then left idle that they would rebuild themselves and thus go on serving as the tubes mentioned had clone. He told its that an experiment that would be very helpful in determining what the energy was or the efficiency of the tubes would be to run the machine just as long as it would go, then determine what pact quit first and if it were the tubes make observation as to what happened. I didn't know just what Moray's response to that suggestion would be, but yesterday he dropped in to say that he was very anxious to make the test as soon as possible, and asked that I assist him in figuring out the proper personnel of a committee, seal the machine tip in some way after it was lighted, and then make frequent observations as to its continued operation for the full period of time it would run. I expect to work out such arrangements as soon as possible.

From this demonstration it is established, I should say absolutely, that what we have is something entirely new and very wonderful and that there is no possibility for doubt on any phase of this proposition. Dr. Fletcher left for New York by automobile yesterday morning. He told me that following the time that he had to sit down' and think out this matter a little, he would write us and try and make some suggestions for further development.

With kindest regards, I am
Yours respectively,

_____

Original was signed .-by R. L. Judd,
Kearns Building, Salt Lake City, Utah

One outstanding example of how a discovery can be appropriated by others is in the "Moray Valve." During ,June of 1925, Moray's experimentation. in searching for a more stable detector for his Radiant Energy Device, blended certain substances which he had brought from Sweden in 1914 and had used in his Radiant Energy Device as a valve.

Moray failed in his search at that time, as far as getting a substance for the Radiant Energy detector, but discovered that by making "pellets" of a mixture of the Moray Lead, which withstands heat up to over 1800°F, and using pure germanium mixed with bismuth, iron sulphate triboluminescent zinc, and certain other impurities including the Moray fission Material, he obtained a substance that had wonderful properties as a detector or valve for radio signals. he made a specially constructed radio speaker, altho standard speakers also responded. With this germanium combination alloy used as a detector, it was found that radios would operate without batteries or tubes or any other source of power than that obtained from the radio transmitting station. His germanium valve, with a special radio circuit which he devised and a Special Moray constructed loud speaker, brought in radio signals which were loud and clear; the radio programs could be heard all over the building. Dr. Moray disclosed this fact to Atty. R. L. Judd and Atty. A. H. Nebeker witnessed Mr. Judd's signature on the 12th day of October 1925, describing how the valve was made to Attorney

Judd and showing them a drawing of the same which they signed in evidence. This valve and more data was also explained to Dr. Carl Eyring in the presence of Atty. R L. Judd, also in 1925. This valve was fully explained to Dr. Murray 0. Hayes in 1926 and at later dates. In October 1928 this Moray valve was explained in detail to Dr. Harvey Fletcher of the Bell Laboratories in the presence of Atty. R. L. Judd who wrote a detailed account of this disclosure. In July 1931, an application for patent was filed in this germanium valve as a detector and oscillator under serial #550622. "This valve and radio were explained and demonstrated to hundreds of people as late as June of 1938. Some of these gentlemen were — C. F. Clauson, J. C. Jensen, H. D. Snyder, Clive Gardner, W. Lewis Gardner, and many others who attested to these facts and signed documents.

In a letter to Mr. W. H. Lovesey describing this valve in action Dr. M. O. Hayes stated, "He connected his detector to a crystal set for receiving radio, in place of the crystal, and obtained better reception than with the Erla crystal, though the. antenna was merely one of the bell type, in my home. He also took a lump of lead treated according to the process he has discovered and used it in place of the crystal, and got wonderful reception on a radio — loud enough in fact to operate an old fashioned horn speaker of the type put out by RCA about 1923."

From 1930 to 1938 Dr. Moray made tests at various times with scores of people present of his special radio. This radio, on several occasions received broadcasts from Little America, from Admiral Byrd and his party from the Antarctic. These broadcasts came in loud and clear on occasions when regular radio broadcasting stations reported that interference was so severe they could not receive Admiral Byrd's broadcasts because of weather conditions.

This special RE radio with a Germanium alloy valve was also demonstrated to Felix Frazer of the R E. A. and be experimented with it during the months of March, April, and May of 1939.

As has been the case many times, the original discoverer of some great invention does not get the credit for having first made the discovery. This fact has been repeated in the case of the device now known *as the transitor*. This was first used by Dr. Moray in June of 1925 under the name of "Moray Valve" in many radios constructed and operated for many years. This is strongly documented in many references contained in the early records of the work of Dr. Moray by many witnesses.

(See Footnote also cut on patent papers)

EDITOR'S NOTE

Compiled from excerpts for the history of the T. Henry Moray research work on what he designated, at the time of it's discovery; as the Moray Valve. Details have later shown this valve to be the same as the discovery now known as the Transistor.

It was June 24, 1925, that T. Henry Moray discovered that by alloying Germanium with various substances he was able to make a valve for a radio receiver capable of reception of radio signals of considerable stregth without the use of tubes, batteries or any conventional source of power. This germanium alloyed material he also used successfully in the amplification of radio signals for radios he constructed and used in his home and the home of his sister's family, with reception loud enough to be heard throughout the house. He devised a specially constructed loud speaker which worked better than the then standard permanent magnet type commercial speaker.

A schematic drawing of this radio hookup and the place where the germanium "compound" valve was used was shown to and described to Atty. Robt. L. Judd in the presence of Atty. A. H. Nebeker and this drawing was duly verified on the 12th day of October, 1925. The same drawing was later signed by C. Fred Schade, May 22, 1931, and by Dr. Murray O. Hayes, L. A. Thomsen, R. J. Chapman, D. L. Farnsworth and D. Thomsen, March 21, 1931. On the same day of March, 1931, the above six gentlemen were permitted to examine a set of six drawings showing uses of the compound germanium valve and the description of the materials used with the germanium and the method of forming this compound into pellets and why germanium works best when these "impurities" are introduced in the pellet.

On November 14, 1927, the germanium alloy material with another radio hookup was submitted and sworn to before R. Howard Allington, a notary of Salt Lake.

On September 17, 1928, Atty. Judd who had signed a drawing that he had had explained to him, the. Moray germanium valve, on the 12th day of October, 1925, wrote a letter in which he stated among other things, the following "Dr. Fletcher spent the afternoon in a detail study of the drawings (plural) demonstrating the circuits involved and the theory upon which the mechanism is based. *This was as requested by Dr. Fletcher*."

Application dated July 13, 1931.

This valve is indicated in the circuit shown on figures 1, 2 and 3 and will now be described in detail. The valve may consist of a metal case 135 to which pieces 136 of bismuth may be attached, the attachment being effected by fuzing a portion of the surface of the bismuth and applying it to the case. A piece of iron sulphide may be attached to the bismuth by fuzing, the said iron sulphide, however, being insulated from the case 135 at the point 138. It is also advisable to use, at the points 138 between 136, 137 and 139, portions of germanium which has some very unique properties in the functioning of the valve when used as a booster or amplifier. At 139, in the form of a rounded stone, is a small mineral body containing ..... (material blanked out in this paper for security reasons but can say it describes the Moray fission material) triboluminescent zinc and germanium compressed into a hard, rounded stone. This rounded stone is delicately supported between the pieces of iron sulphide 137 and the upper piece of bisimuth 136. The stone 139 has remarkable amplifying

and rectifying properties, is also remarkable for the maintainance of a higher temperature than exists in its surroundings, as well as for its radiation of alpha, beta and gamma rays which produce an ionic reaction. It is by reason of this later property that this stone readily ionizes gases. It will be understood, therefore, that this stone may well serve as a valve which allows energy waves to pass in only one direction at a time, that is to say, from the antenna capacitor into the various circuits or from the circuits into the antenna capacitor without necessarily changing from H.F. or A.C. to D.C.

Extending through the case 135 but insulated therefrom, is a metallic pin 140, this pin being connected to the antenna lead-in and carrying a piece of molybdenite (molybdenum sulphide or a molybdenum metal combination of Moray mixture of the germanium alloy). This later contacts the stone 139. A wire 142 connects the case of 135 with the various hookups hereinbefore mentioned. An arm 143 extends through the case 135 and furnishes a support for the wire 142 while at the same time it is provided with an upturned portion having a nut 144 threaded thereon for the purpose of securing a tight covered sealed plate over the otherwise open mouth of case 135. This, with variations and hookup shown in figure 10, as used for the rectification and amplification of radio or other high frequency signals without the application of any outside current other than the incoming radio or Cosmic signal and small pencil sized dry cell batteries. Certain hookups require no battery cells whatsoever.

*See photostat patent application #550611.

The following is a copy of one of the signed papers on the Moray germanium valve which anticipates the transistor. This tracing cloth document was signed as having been read and signed by the following on December 16, 1937: K. K. Steffensen, Johanna Solmon. Christ T. Clawsen, J. C. Jensen, H. G. Snyder, W. Louis Gardner, Clive D. Gardner, which reads as follows:

"This and more data was originally explained to Dr. Carl Eyring of the B.Y.U. with Atty. R. L. Judd present in my home (Morays) in 1925. It was later shown to Dr. Harvey Fletcher of Bell Laboratories in the Fall of 1928. Later to Dr. Murray O. Hayes and later this was incorporated in the RE patent application of July 13, 1931, serial number 550,611 (dates furnished on request). The Moray valve and circuits involved shown on the drawwing 1, 2 and 3 were there described in more detail. The valve used a metal envelope shown at #135 to which bismuth was attached at 136 by fuzing. Iron sulphide was, or, one might say, may be added to the bismuth by fuzing. The sulphide being insulated (from case 135 at point 138, portions of germanium were used at point 138 between 136, 137 and 139. It has been found that germanium prepared by the Moray mixture, which was explained to Dr. Hayes, Messrs. Chapman, Thomson and others enough to establish dates in March, was the same as had been explained to Dr. Fletcher in 1928 in complete detail. All had been sworn not to describe what they saw, only to establish dates of data signed. Dr. Fletcher, according to Air. Judd's wool to me, had, in the presence of Judd, been placed under oath at Moray's request that he, Dr. Fletcher, would keep sacred what I (Moray) was about to disclose to him. I often refer to a detector tube as a valve, hence this Moray valve. The "rounded stones" shown in the drawing are small Pellets containing ..... (left blank on this copy but not on the tracing for security reasons) and germanium compressed into hard round pellets. Germanium may be mixed with other materials explained to Dr. Fletcher, Dr. Hayes and others. These pellets are supported, as shown in other drawings.

These combinations of materials are used in the various radio hookup-, which receive radio signals in good strength without conventional power supply. This Moray valve radio has been in operation at a home at 2505 So. 5th East. St. as also at 2484. So. 5th Fast St. as experimental research for several years (1928-1937). No ABC batteries or power source used. This was the radio valve used in the RE powered radio which scores of people heard, especially in bringing in Admiral Byrd from Little America (in the Anarctic). Molybdenum (molybdenum, sulphide or molybdenum metal germanium combination), wording changed somewhat to suit Dr. Hayes' wording as he wrote the patent application.

Impure germanium and Moray germanium compound mixture has some very unique properties in functioning in the Moray valve. Also used valves as boosters or amplifiers when several valves were connected in the circuit together as has been shown. (Part left out for security reasons) *See circuit diagram. For more complete information see other disclosures made after putting named parties under promise to tell no one. They were told all I was doing to establish date of conception of discovery and to maintain as much protection as I could by establishing these dates. The tracing is signed T. Henry Moray and then signed by the gentlemen named above, some on the 15th day of December 1937, some on the 16th day of December 1937, as shown on the linen tracing cloth drawing.

The Moray files' signed drawings, records and documents. together with scores of witnesses who heard the Moray radio operated by the Moray germanium valve, all prove that Moray discovered and experimentally operated the device now known as the transistor some twenty years prior to the time the Bell Laboratories did so. The records show this discovery was disclosed as early as 1925 to Dr. Eyring who was later with the Bell Laboratories and a cousin of Dr. Fletcher. Also that in 1928 it was shown to Dr. Harvey Fletcher who was the head of the division of the Bell Laboratories which came out with the transitor.

It is the opinion of the editors that it is certainly strange that two employees of Bell Laboratories came out with a germanium mixture that protyped the Moray valve. We doubt that the Bell Laboratories know the full story of this discovery as they being an honorable company would never have been a party to such an unethical action.

(Footnote Wood & Webber, Inc.)

Képaláírások:

- Photostate patent application #550611
- The Moray pocket radio 1 1/2 times actual size used Moray Germanium mixture. Moray valve now called Transistor
- Moray Valve Circuits
- Official U. S. Government picture taken by Dr. Frazer in April 1939 of the Moray radio using the special Germanium mixture valve. With special loud speaker by Moray that will work with Moray Valve. First discovered in 1925.

Wood and Weber

REPORT on MORAY IIADIANT ENERGY DEVICE

On April 7th and 8th, 1933, the writer in company with Dr. C. R. Bonzel and Mr. J. J. Jurgensen of Greeley, Colorado, visited Dr. T. H. Moray, at his laboratory, 2484 South Fifth Street East, Salt Lake City, Utah, and thoroughly discussed with him the device which was the particular object of this investigation, and other devices and products, of which Dr. Moray is the inventor.

We also talked with others in Salt Lake, who are or have been connected with Moray in the development of these inventions. We first met and talked with Mr. W. H. Lovesay, Purchasing Agent of the Utah Refining Co., of Salt Lake City, who been been closely associated with Dr. Moray in the development of this work, and who knows him intimately.

This is marked as it contains details of construction not deemed wise to publish.

I was impressed with the apparent honesty of Mr. Lovesay's opinion of the invention, and that he was wholly convinced of the integrity and honesty of Dr. Moray. At this conference Mr. Bringhurst, a business man of Salt Lake, was also present. he is secretarytreasurer of the Moray Products Co.

Mr. Lovesay described to us numerous demonstrations he had witnessed of the Radiant Ray apparatus, as well as other inventions and devices developed by Moray; and although he made no claim as understanding them, there was no question in his mind as to the honesty of purpose, integrity and ability of Dr. Moray. Some two hours were spent in going over various matters connected with the project, with Mr. Lovesay, who took the time out of a busy day at his own affairs to give its all possible help in our investigation. The balance of the first day and a part of the second was spent with Moray at the laboratory and in visiting others connected with the project.

I found that Dr. Moray was extremely open and frank in every way, and gave us every possible opportunity to investigate what we came for. He is, in my opinion, a man of marked ability in the line of research and invention, but needs assistance in developing it into it commercial business venture. I found no evidence of lack of integrity and honesty. He has evidently worked for many years in the investigations, and of course is thoroughly imbued with the nature and possibilities of the particular invention. The investigation convinced me that he has discovered something about the nature of energy which has not been known before, and which is not even now understood by anyone.

Certain theories have been advanced by him, and other scientists, to explain the phenomenon, but all that can be said about it is that certain results have been obtained that indicate unlimited possibilities for development along these lines, in the way of production of energy for all light, heat and power purposes.

I am thoroughly convinced that the device is not a hoax, or a fake, and that the results are not the results of induction from established power sources or batteries; but I do not pretend to understand the real nature of the source. This is something, that in my opinion, can only be determined by future research.

The device is not especially complicated, nor is it

This is masked as it contains details of construction deemed unwise to publish.

I talked with a number of reputable people who witnessed numerous demonstrations, and examined signed and sworn-to letters, describing the demonstrations. From all of this, and from the conferences with Moray, I am fully convinced that there is no hoax or fraud about the device. The commercial development at this time apparently hinges upon the construction of a vacuum tube especially invented for this purpose, which will eliminate

Masked, not for public information as it contains construction information

a tube, an which application has been made for a patent. He thinks it wise not to divulge the details until applications can be made for patents in foreign countries, and until sufficient capital is available to establish laboratory facilities, when the tubes can be perfected.

My conclusions are as follows:

1 — It is not a hoax or fraud in any sense.

2 — Dr. Moray has discovered a new principle in electrical energy that has not heretofore been known.

3 — That the nature of the energy is not fully known, but that Moray's theory of the world being surrounded by a sea of oscillating energy is as satisfactory as any.

4 — That energy that can be utilized for light, heat and power has and can be produced from the surrounding space by devices which Moray has developed, but which need perfecting.

5 — It would seem that any amount can be developed. That in effect we are surrounded by an unlimited reservoir of energy that can and some day will be utilized.

6 — That to demonstrate the commercial feasibility of the project, equipment and funds must be made available, under competent business administration.

7 — The results obtained so far indicate that such research undertaken in the proper spirit and under proper conditions, will result in the development of an unlimited source of energy that will revolutionize our whole industrial and economic life.

In addition to the radiant energy discoveries, Moray has developed other devices and products that should have widespread commercial value, if properly exploited. Among them is a simple radio device using neither tubes or battery, that can be manufactured inexpensively and widely marketed. Whether it is patentable or not remains to be seen, as no application has been made, but even with a very limited patent protection should have widespread commercial value.

I feel that if Moray is given the proper opportunity, under competent and sympathetic management, he will produce revolutionary results in many lines of research.

Respectfully submitted,
FRANKLIN P. 'HOOD
For Wood & Weber, Inc.

April 12, 1933

Képaláírás:

Official U. S. Government picture taken by Dr. Frazer in April 1939 of the Moray radio using the special Germanium mix. ture valve. With special loud speaker by Moray that will work with Moray Valve. First discovered in 1925.

Rossz minõségû fotókópia szövege:

MORAY SCIENTIFIC LABORATORIES
Dr. T. H. Moray
2484 South 5th East Street.
SALT LAKE CITY, UTAH

September 15, 1931.

To the Commissioner of Patents
Department of Commerce
United States Patent Office
Washington, D.C.

Dear Sir:

I, Thomas Henry Moray, a citisen of the United States, and President of the Moray Products Company, to whom the following patent was assigned:

#550,611 Radiant Energy Device Filed tiny 13, 1931

hereby revoke the power of attorney given to ?név1?, ?név2, Karkan & Sutton, Attorneys, 700 - 10th Street, Washington, D. C., and until further advice, it is the desire that all communications and correspondence in connection with this patent shall be directed to the Moray Products Company at 2482 South 5th East Street, Salt take City, Utah.

Respectfully,
MORAY PRODUCT COMPANY

Accepted
SEP 17 1932

In a letter sworn to before a notary public on Oct. 29, 1928 and written Oct. 10, 1928, Dr. Murray O. Hayes states:

To Whom It May Concern:

Below is a report of my observation of the Moray cosmic energy device.

The aerial used is about two hundred feet long and is about eighty feet above the ground, the wire is a copper cable approximately a fourth inch in diameter, and well insulated. The ground is the water pipe in tile basement of Dr. Moray's home.

The device was assembled in a trunk through the sides of which were holes for the connections to ground and to the antenna and for observation; the said holes were about one-half inch in diameter. There were two boxes about tell by twenty by four inches, one on top of the other; both were closed and the covers fastened with screws. On the upper box was lying an insulated panel about an inch thick by fifteen inches long and three inches wide; it is of slate or hard rubber or some material of similar appearance. On this were two binding posts that were connectible by means of a small switch; also mounted on this panel is a body about two and one-half inches square, wrapped in friction tape, front which protrude two poles about one-fourth inch in diameter, apparently of soft iron. A double receptacle for light globes was connected in the circuit, in one of which was a twenty watt globe, and in the other a hundred watt globe.

E. G. Jensen, R. L. Judd, and I were present and examined tile trunk to see if there were any connections other than the antenna and the ground, but found none. The small switch above mentioned was thrown several times, but without result; the connections to ground antenna were also removed, also without result.

Dr. Moray then took a magnet, which was a very broad, short limped U, and began to stroke one hole of it in the polls in the taped body; M. Jensen placed his fingers on the binding posts several times, and at last received a rather vigorous shock; Dr. Moray then threw the switch and the globes lighted. When the switch was opened the lights went off and came on again when the switch was closed. Removing either the ground or the antenna connection caused the lights to go out, but they came on again as soon as the connection was re-established. The time of excitation was ten minutes, and the lights came on at 7:59 a.m., October first.

The trunk was then closed and sealed with railroad car seals, and the numbers on the seals were recorded by Mr. Jensen. Each morning and night up to the morning of Oct. 4, I inspected the seals and observed that the lights were burning. About 10:30 on this date the detector was jarred out of adjustment by the felling of a heavy tree next to the house.

The evening of the same day Mr. Moray removed the detector in the presence of Mr. Jensen and me and in twenty minutes had it readjusted and reassembled ready to start. As soon as Mr. Judd arrived the stroking began and the lights came on in about ten minutes. The trunk was again sealed as before.

The device continued in operation until the morning of Oct. 8, and the trunk was opened in the presence of the three witnesses above mentioned after a run of eighty-four hours. The hundred watt lamp was removed and a standard 575 Hotpoint electric iron was plugged into its place; the iron was heated as quickly as though on the

usual house circuit. During this test a sixty watt globe was put in the place of the twenty, so that the total wattage was 635.

The antenna and ground connections were then removed until no current was delivered when the switch was closed, and five 100 watt globes were substituted for the iron, making a total power output of 560 watts. The lamps appeared to be as bright as when on the house circuit. It required four minutes of excitation to get it in operation again.

After again being disconnected until it ceased to operate it required but one minute of excitation to bring in the current.

While the test was in progress every test that could be thought of was applied to make sure that there were no hidden connections to the house circuit or to a battery; the house lights were turned on and then all main switches pulled, which turned off the house lights but did not in the least affect those in the test. After the run had terminated the trunk and table were examined for wires, but none were found except those to the antenna and to the ground.

As a further proof that the conversion of the energy was due to the mechanism in the box, Dr. Moray hit the table on which the trunk was standing, a moderate blow with a hammer whereupon the light flickered and went off, due to the detector being shaken out of adjustment.

It is to be noted that after a total run of 158 hours the device supplied 635 watts; inasmuch as a horsepower is but 74.6 watts this equals 0.878 of a horsepower or slightly more than 7/8 horsepower. This alone is sufficient to dispose of any suggestion of a battery.

In witness to the above I hereunto sign my name"

Signed, Murray O. Hayes
Duly verified and notarized.

During the early morning hours of September 3, 1926, Dr. Moray first successfully operated his sound detector device. After months of work in his laboratory, he was able to "pick up" conversation and music from thousands of feet away from his laboratory without instrument or wire connections to the point from which the conversations originated. Several days later the public was invited to listen to conversations originating in houses and from streets which were a considerable distance from the instrument in the laboratory.

In October 1929 a scientist from Russia, a Dr. A. A. Yakalov come to the Moray laboratory and witnessed tests of the Moray Radiant Energy equipment as well as listening to conversation brought in by the Moray Sound Pickup Device which was going on some five miles from the Moray laboratory i.e. in the Denver and Rio Grand R. R. Station, Salt Lake City.

By 1936 the Sound Detector Device had been improved to where it would operate radio loud speakers. Up until this time only radio head phones had been used. The signals were brought in loud and clear. A test of this equipment was given to a General Shinkle of the War Department and an accompanying Captain of the U. S. Army in December of 1936. These army gentlemen, with about eight civilians witnessed these experiments. The general said he was very much impressed and asked how the Sound Pickup Equipment might be obtained for the U. S. government. Dr. Moray told the general he would give it to the government free of charge, the only requirement being that the government give the device the Moray name. The general said he would report to his superiors. It was later reported to Dr. Moray and others by a U. S. Congressman that an official report had been filed in Washington, but that the government had not accepted the offer. This report was made by U. S. Representative Congressman Thomas Amlie.

Now for the question of induction.

As was suggested by Dr. Harvey Fletcher, Dr. Carl Eyring, who was head of the department of physics of Brigham Young University, saw a demonstration of the Moray device. In a statement dated Sept. 7, 1929 Robert L. Judd relates that a demonstration was given to Dr. Eyring in October of 1925. We quote:

Dr. Eyring was permitted to risk any questions he wished and after spending over an hour with the device in operation, he said that he could not find any fault wills what he saw; that the current was not obtained from batteries or hidden wires so that his oily conclusion was "induction," but that such induction was wonderful and unheard of before over such distance."

Dr. Eyring said that if the device would operate five miles from all power lines, he would be satisfied that it was not induction.

A demonstration was given in Emigration Canyon, there being no power lines in the canyon at that time, in the presence of Mr. Judd, Mr. O. W. Adams, and a Mr. Nebacker of the Judd law firm. A site was arbitrarily selected by Messers Adams, Judd and Nebacker. Mr. Adams and Mr. Nebacker erected the ground and antenna. A single one-hundred watt lamp was lit for a period of one hour.

Some days later Dr. Eyring, who had not been present at this demonstration, met these men at Dr. Moray's laboratory. We quote from Mr. Judd's account of that meeting. "We spent the morning going over all the theory and hook-ups and examined the device and the Dr. asked questions continually. He made several drawings and sketches. Dr. Eyring congratulated Dr. Moray on what he termed as a wonderful work and said that what he had seen and heard was electrically, mathematically and scientifically sound and corrected.

A statement dated December 1929 quoted below was written by Dr. Eyring in leis own handwriting.

"This discovery with its processes, mechanisms, and devices deals with and enables man to use the so called cosmic energy, acts energy radiated from the universe to operate any of the mechanical. electrical, magnetic, or optical devices for the utilization of energy or power.

"Cosmic energy as the term is here used, is energy which exists in the space surrounding the earth and which lave or may have, its source in the natural processes and movements of the earth, in the earth itself, and includes its atmosphere and component parts or elements on celestial bodies. These cosmic rays are continually bombarding the earth.*

To further disprove the induction theory concerning the Moray device, let us consider another test.

On October 29, 1926 Dr. Moray, Atty. R. L. Judd, and Mr. E. G. Jensen loaded the equipment into Mr. Jensen's car and drove up Daniels Canyon into the Strawberry Valley. Mr. Jensen gives a very detailed description of the weather, the location, how the apparatus was set up and the subsequent successful demonstration. The speedometer of the car verified that they were fifty-two miles from the closest power line when the test was made.

In July of 1950 Mr. E. G. Jensen verified all of the statements made in his letter of 1926 concerning the Strawberry test and another letter dated October 1928 telling of the before mentioned endurance test.

Now let us consider the fourth objection made in 1925 to 1945 to the Radiant Energy device on the basis that there is no such source of power. The discoveries of recent years make this claim look increasingly out of line. However it might be interesting to examine a letter written by Dr. Moray and witnessed as correct by a prominent Salt Lake attorney who was present during the conversation referred to and from which we quote in part.

The engineer who came here was a Mr. Pearson employed by a Mr. McKee, a high official in the north-west for the Electric Bond and Share of New York. Mr. Davis said Mr. Pearson did not believe in the Radiant Energy Device, not because of any fault he could point out of any evidence of anything being wrong or evidence of fake, but on the grounds that he did not believe there was such an energy to be had. That the device acted contrary to all known electrical laws on the incoming or primary side; but worked standard electrical devices on the output on the secondary side. He proved no standard meter would give a true reading of the incoming current; that a milli-volt meter gave a lesser voltage reading than the reading on the five volt scale or in other words the greater reading was had on the meter requiring 5000 times as much voltage to operate it. He made tests with batteries and other methods to check the meter and proved it to be in perfect operation and correct when used with other currents. Mr. Pearson tested the tubes and said they were OK and that he was satisfied they were all Moray claimed them to be and perhaps even greater worth and value than Moray might realize. In spite of this acknowledgment about the tubes and his OK of them he would not accept the Radiant Energy Device, although the tubes are the heart of the Radiant Energy Device, and Moray pointed out to Mr. Davis, the real invention is in the tubes.

Moray was very much pleased with everything, all and all, and as Moray told Mr. Davis, Mr. Pearson really OK'd the whole thing. Being of the frame of mind that there is no natural source of electrical wave energy to which Moray could tune his device, he would not accept the Radiant Energy Device as lighting the lights, but he accepted the tubes as they operated on this same Radiant Energy. They operated the radio and produced music which he acknowledged the best he had ever heard, the purest and best radio music ever produced. Being so prejudiced against there being such a source of current, it would be impossible for him to accept the device or the demonstration, or with an open mind understand what he was seeing. Yet in that opposed frame of mind he had to acknowledge that the current on the primary side acted as an outlaw current doing things which, from the standpoint of known laws are unreasonable and contrary to electrical law. This he should have reasoned, proved the results he saw were not and could not be obtained from any known source of electrical current or it would have obeyed these laws. His objection that on the primary side it was an outlaw current while on the secondary side it was able to operate known electrical devices, is very satisfactory because this only goes to show that it can be controlled when the proper methods are used.

Saying that the tubes are of great value and OK is the same thing as acknowledgment that the Radiant Energy Device is OK because as Moray said, the tubes are the heart of the Radiant Energy Device.

In 1931, Dr. M. O. Hayes wrote about a Dr. Gunn, a civilian scientist of the Naval Research laboratory who had proved that the earth is generating 200,000,000 amperes of electrical current.

There are hundreds of letters on record of experimental tests made by the Radiant Energy Device written by those who witnessed these tests. These were made for the purpose of establishing the scientific soundess of the theory upon which the device operated. The purpose being to enable the inventor to progress toward the perfecting of his invention by testing the workability and soundness of his various ideas, changes, and additions made to the component parts of the invention.

* It will be noted that Dr. Eyring attributes the energy to induction or to Cosmic Rays. Dr. Fletcher to battery action kept alive by energy from the universe and yet Dr. Fletcher pronounced the current high frequency. Please note, battery action is always direct current and never high frequency current so it could not be battery action.

A partial record of these letters was compiled front the original documents by a U. S. government investigator Dr. Felix Frazer and the original was signed by him.

Before we leave the account of demonstration, let us consider just a few more letters concerning them.

On January 10, 1938 Mr. George R. Pyper wrote a letter from which we quote in part:

"To Whom It May Concerti:

I have worked in electricity all my life, was with the Utah Power and Light Company for thirteen years and worked in all departments including sub-stations. I have been with the Kearns Corporation over seventeen years; and leave charge of all the electrical work for the Tribune and Telegram Publishing Company and in the Kearns and Tribune Buildings.

On December 23, 1937, I witnessed a demonstration at Dr. Moray's home at 2484, So. Fifth East of his electrical marvel box. He let me see inside this box and there was a transformer H. F., some of his cold tubes, and some condensers. Dr. Moray connected this box to an aerial and ground wire and lighted about thirty small 120-volt lamps. He then disconnected the ground wire from the outside and two of us held a counter poise antenna attached to glass insulators in the room and when he connected the box to this counter poise antenna I saw the same results.

During this demonstration and while the lamp and appliances were on I shorted the aerial and ground wires. There was no spark, it just turned off the power from the box. I then took hold of both these wires. There was no feeling and they were both cold."

Mr. Pyper continues with a further description of the demonstration and then concludes.

"I am satisfied myself from my experience in electricity that there was no fake of any kind or concealed batteries. Everything was in the open so I could see every operation."

Let us now consider a portion of a letter written in October of 1930 by Mr. W. H. Welling, then Secretary of State of the State of Utah. Mr. Welling described the device and the demonstration and told how he and Mr. Gaxiola, the Mexican Consul tuned in the system as the inventor had done, closed the switch and brought in the full volume of lights. He continues, "In order to make sure that the lights connected with the house circuit were entirely separate from the lights produced through the Radiant Energy machine, repeated test were made of disconnecting the entire house circuit in which event the house meter did not register at all. An electric iron was then connected with the house circuit which of course produced the ordinary reaction in the house meter. After the demonstration had been completed, the inventor raised the two boxes from the work bench on which they were located, showing that there was absolutely no connection by wires from below or from any place, save to the aerial and the ground wire.

At the conclusion of the demonstration, Moray dropped a stone weighing two or three pounds about two feet onto the work bench. The jar caused the lights to flicker a moment and go out. This simple demonstration itself seemed to show conclusively that the power derived was dependent wholly upon the machine and in no way upon the house circuit.

In a report of the Moray Radiant Energy Device, dated April of 1933, Mr. Franklin P. Wood of Wood and Weber, Inc. Engineers later of the U. S. government wrote in part:

"The balance of the first day and a part of the second was spent with Moray at the laboratory and in visiting others connected with the project.

I found that Dr. Moray was extremely open and frank in every way, and gave us every possible opportunity to investigate what we came for. He is, in my opinion, a man of marked ability in the line of research and invention, but needs assistance in developing it into a commercial business venture. I found no evidence of lack of integrity and honesty. He has evidently worked for many years in the investigation, and of course is thoroughly imbued with the nature and possibilities of the particular invention. The investigation convinced me that he has discovered something about the nature of energy which has not been known before, and which is not even now understood by anyone.

Certain theories have been advanced by him, and other scientists, to explain the phenomenon, but all that can be said about it is that certain results have been obtained that indicate unlimited possibilities for development along these lines, in the way of production of energy for all light, heat, and power purposes.

I am thoroughly convinced that the device is not a hoax, or a fake, and that the results are not the results of induction from established power sources or batteries; but I do not pretend to understand the real nature of the source. This is something that in my opinion, can only be determined by future research."

Now let us consider a letter written by Dr. Murray O. Hayes to Mr. W. H. Lovesy on October 24, 1929:

"Dear Mr. Lovesy

Pursuant to my promise to you at our recent discussion, I am writing to make of record the extent of my acquaintance with the construction and operating principles of the Moray device for utilizing cosmic energy.

You are already aware that I have seen many demonstrations of what this mechanism will do, and that I have seen the parts of which it is built. Recently Mr. Moray has shown to me the wiring diagram of the assembly, and I am free to say that I can find no inconsistancies in it, nor anything which does not appear to be logical and sound. While the hook-up appears to be very complicated, when looking at the machine, it is in reality very simple in essence, and based on recognized laws of electricity, when all is explained. There are many features which appear to be incidental, but they are in reality of basic importance.

He has also shown to me and explained the detector which be uses. In this he has applied a fundamental principle of electric circuits which, I believe, would not be noticed unless pointed out by him. This element of his device also, as above mentioned in respect to the circuits, has numerous features which appear incidental but are the heart of the matter and of first importance.

I was recently present when an electrical engineer representing a foreign government was given a demonstration of the energy machine. He at first said that amplification of radio waves accounted for what he saw, although it would be a real achievement to amplify such waves sufficiently to light six one hundred watt lights at one time, and also to heat a flat iron of the standard five hundred seventy five watt type; when he had seen the inside of the device he admitted that it could not have been what he had supposed. He remarked many times "It is very interesting."

This machine has been operated in my presence so many times, under so many different conditions of weather and of season that I am positively convinced that it is what its inventor claims it to be, and that its commercial adapation is feasible. I believe that Mr. Moray has explained all to me without reservation, and I am sure that this is a revolutionary and epoch making invention."

Sincerely yours,
Murray O. Hayes

On an attached sheet dated Oct. 25, 1929 to Mr. Lovesy, Dr. Hayes lists his education record and qualifications as follows: "A. B. with major in physics under Dr. Harvey Fletcher; M. S. including graduate courses in physics and mathematics; Ph.D. in geology. Five years in examining corps, U. S. Patent office. Acting head of department of physics, Brigham Young University, 1922-23, vice Carl F. Eyring, was finishing work for doctorate. To take bar examination soon.

It is very interesting to go through these original letters and records of demonstrations and read the detailed accounts of how thoroughly Moray's Radiant Energy device was demonstrated, examined, and actually taken apart. It is even more interesting to read recent letters by men who saw these early demonstrations. Some of them stand steadfastly by their original statements, recounting with surprising accuracy what they saw. It is very puzzling to read letters from others who saw so much but have had no direct contact for many years. "I have no way of deciding whether or not the invention is genuine, simply because he (Moray) refuses to let anyone see it or build one like it," is the way one observer put it. Others follow along this same line of thought. What could they possibly say if confronted by their two letters written thirty to thirty five years apart. Have they forgotten how much they saw, or has their memory been tricked by steady outside pressures?

The Moray energy equipment has been thoroughly investigated and tested. It has been experimented with under all kinds of physical and weather conditions. It has been tested many miles from all power lines before capable and disinterested electrical men and distinguished scientists from all parts of the world who could find no answer other than that advanced by the discoverer.

The discovery of the natural principles and laws through which energy has been captured and made part of the great discovery has been brought about by years of intensive work with this one please of energy in mind.

It should be just as easy to, accept the fact that a receiving set or electrical device has been constructed for the purpose of receiving the energy, waves from the universe as it is to accept a radio receiving set that receives "audio waves" transformed from electrical impulses as the radio does. One transposes electrical waves to mechanical while the other transposes energy waves into light, heat and power. The facts involved are the same in both the radio receiving set and this device. The radio receiving set receives man transmitted energy waves out of the air and transposes them into "audio waves," the Radiant Energy Device receives oscillations from the universe and transposes them into electrical energy. As in the reception the circuit radio waves, so in the case of the Moray device; the circuit is a tuned arrange ment to respond to the particular wave frequency "oscillations" which it is desired to intercept. A "valve" used to prevent the return of the energy to the outer circuit and force it to go trough the, power application circuit is a part of the invention.

The discovery reached the point where continued experimental demonstration produced no valued results as to proof of the device and each new experiment was becoming a rehashing of well documented facts. Dr. Moray has exhausted all suggested tests, all are on record and all are conclusive. Dr. Moray made so many experimental demonstrations and so many disclosures during the early years of Radiant Encrgy that he found he was putting his discovery into a position of jeopardy under the patent situation and the U. S. patent law of public use, Section 4886. This situation has lead to the present strict attitude Dr. Moray has had to take on demonstration of

the Radiant Energy Device. He must be very careful in the perfection of the Radiant Energy discoveries not to invoke public use. He will not jeopardize those who are interested in Radiant Energy by giving demonstrations which would cause them and him to loose their ownership.

Sometimes it is very difficult for an inventor to secure patent protection, particularly if the discovery is controversial in any respect which Radiant Energy is. Most people think that getting a patent is a straight forward thing but the red tape connected with such a procedure in a new and basic discovery is almost unbelieveable to one not familiar with the process. A patent application can drag on to the point where it is very difficult to finance and an inventor has to put a great deal of trust and responsibility upon the patent attorney handling the case. The complete mis-handling of the original patent application during the days of the Moray Products Company has taken years to straighten out.

To add upon all of the other difficulties involved, the patent office contested many of the points of the Radiant Energy application even though Dr. Murray O. Hayes wrote to Dr. Moray on August 7, 1937 from Washington, D.C. that he had examined every patent issued on devices for the reception of radiant energy. Most were obviously dissimilar and not a one shows even the remotest resemblance to the Radiant Energy machine. He also reported there were no patents like the oscillator tubes. Here are but two of the objections of the patent office. "Claims rejected as being drawn to an apparently inoperative device. It is thought it will not produce a sensible current because the cathodes are not heated to a point where they will emit an appreciable number of electrons" (such an objection is now obsolete.) And still another: "No natural source of electricity wave energy is known to the examiner and proof of the existence of such is requested." (This statement too is now obsolete.)

Another problem was brought to light in a letter from a Mr. John Y. Smith to Dr. Murray Hayes. We quote: "One of the parties interested formerly held a confidential position with the General Electric Co. and later with the Westinghouse Company. He nearly took my breath (Mr. Smith's) when I told him regarding Moray's fears that the proposition might be stolen from the patent office. He said it will just as sure as you sent it there. That the U. S. patent office is "honey combed" with employes of the General Electric, General Motors, and other large companies. *That he had helped* steal valuable data from the patent office at the request of the above companies. He said you were crazy if you sent a description of the device to Washington before you had plenty of money to follow through and influence enough to prevent a theft. So I confess after hearing him that I was in error scoffing at the fears of Moray."

In a court test, whether the use of an invention is "public use" which will act as a bar to securing a valid patent, or whether a particular use of the invention is merely an "experimental use" is a question of fact to be determined in each case by each individual judge. It is difficult to draw a sharp line between public and experimental uses. No one can venture a guess as to the attitude the courts will take on the question of public use. Dr. Moray will not throw Radiant Energy on the mercy of the courts. Ford Harris Jr. of the Los Angeles firm of Harris, Keith, Foster, and Harris cites a present trend toward stricter and narrower interpretation of patent laws. It seems reasonably certain that they will not become any more liberal in interpretation during the next few years.

It would be impossible to review in a paper such as this, all of the legal aspects and fine points which determine public usage of an invention. Instead let us consider just two opinions. Patent attorney Alwine of Washington, D.C. wrote: "Up to the time, and prior to the time you actually have on file all U. S. and foreign patent applications which it is desired to file, and sufficient technical data to complete patent applications to obtain full coverage, any demonstrations which are not experimental could endanger and cause you to lose all your patent rights to your invention — see Sec. 4886 U. S. patent law."

In 1939 when Dr. Moray was connected with the R. E. A., the Attorney General of the U. S. fully supported his views on demonstrations and the patent law. Dr. Moray must take a firm stand for the protection of future investors. There can be no more demonstrations until Radiant Energy is in the patent office with an allowable application.

Some scientific men have vigorously protested that Dr. Moray should make full disclosures of the principles connected with Radiant Energy to scientific men, publish full disclosures, and allow others to build full working models. Ordinarily in the case of new scientific theories this is the procedure. In these cases the theory often came years before the development of a practical application. But here we have a unique situation. We have an application developed along with the theory. We have an application which must be kept under responsible control. In the words of Franklin P. Wood, a United States R. E. A. Engineer, "If it is all he (Moray) thinks it is, (it) will more profoundly affect the human race than any other discovery in previous history."

Two of the more sensational efforts to put Radiant Energy before the public have been with a company known as the Moray Products Co., which was formed in 1931, and an association with the Rural Electrification Administration 1939-1941.

In 1931 the Moray Products Company was formed in Nevada as a stock company to finance the development of the Moray inventions. D. V. Farnsworth was President, C. Fred Schade was Vice-president, and Murray O. Hayes was Secretary treasurer. These men willfully and fraudulently deceived the court in stating their position

and power in the company. Dr. Moray gave these men his trust and confidence, particularly Dr. Murray O. Hayes. As had been seen in a previous letter, Dr. Hayes admitted that he had Moray's confidence and full disclosures. It was not long after the company was formed that Dr. Moray discovered that it was being used to further the dubious purposes of Messrs. Schade, Farnsworth, and Hayes. In 1932 Moray instigated court action and tried to save the company. In the words of Mr. John Belford, a Nevada attorney connected with the case, "The whole thing was an example of shiltiness and bad faith on the part of officials of the company."

There have been men who worked their way into Moray's confidence. Mr. Murray Hayes was one of these who defrauded Moray by missuse of a company's finances which had been organized to forward Moray's invention. The Public Auditor's report, in our files, on these dealings, states in part: "With regard to the item of $2,056.00, Murray O. Hayes took check #17 for $56.00, check #30 for $100.00 and =1,900.00 cash. There is on file a statement signed by Mr. Hayes listing expenditures of $1,867,80 but no supporting invoices to cover the expenditures. There is a minute order setting aside $2000.00 for patent expenses." The record shows all that can be accounted for in patent expenditures is $110.80. Should I go into detail this picture would become even worse. Remember, Moray is the one who brought these matters to Court action in an effort to save the company.

Auditor's report further states "Of the total expenditures on company account of cash and checks amounting to $7,521.20, we could definitely support by cancelled check $3,272.50. For the $3000.00 check issued Aug. 21, 1931, there is no statement on file as to how this money was spent." We could go on and on, but Moray at last could take it no longer and he took the matter to court. Murray O. Hayes and others were removed by Court Action but the company had had it's funds depleted. However, Moray worked for five years for nothing trying to save the company but the damage done was too great. The Judgment and Decree read: "It is hereby Ordered, Adjudged and Decreed That D. V. Farnsworth, C. Fred Schade and Murray O. Hayes be and they are hereby removed as directors," etc. And further "It is further ordered, adjudged and decreed That petitioner shall have and recover his cost of suit." Moray did not get one this, these men had depleted the treasury. Remember the date of this Court order, June 11, 1932.

"Dear Sir:

This will acknowledge receipt of your letter of June 9th, and also your letter of June 28th which Judge Brown answered. I have just gotten back from Chicago and went over to see Rowsen today.

As stated to you in my letter of June 9th, Rowsen informed me that a meeting of the directors had been held and that the number of directors had been increased to seven. Since this was done while these men were directors, I saw no way of attacking its validity. However, he today informed me that what he said was that they had been considering increasing the board. This is not at all my understanding of our conversation, and if the facts are as he states them I can see no reason why I should have agreed with him to permit them representation on the new board. As Judge Brown wrote you, E. H. Hursh has been appointed a director.

In view of our understanding, it appears to me that the only thing Rowsen can decently do is to resign, but this he refuses to do. He asked me to delay any action until he could take up the matter with Farnsworth, Schade and Hayes, two of whom are in the east. I informed him that I intended to institute proceedings immediately, and if he could arrange matters in the meantime all well and good. I am exceedingly chagrined that matters have taken the course which they have, and am determined to force the matter to as speedy a conclusion as possible.

I am preparing and will file a motion to modify the decree hereinbefore entered, removing Hursh and substituting one of Morays nomineers. The motion will be based on the ground of fraud and deceit, reciting the fact that Farnsworth, Schade, Hayes and Hursh at all times knew that there were four directors instead of three, and wilfully and fraudulently deceived the court. It is my personal opinion that Judge Curler will not look kindly upon these men playing ducks and drakes with his court.

I was sorry not to see you in Salt Lake, but was in a hurry both going and coming.

With kind personal regards, I remain"

Very truly your,
(Signed) John S. Belford

Some years age Moray saw and handled one such incomplete set of unissued patent application papers in the hands of Lionel Cornwell which were let out to these who had no right to have such papers by the above mentioned Farnsworth and Hayes. This was a breach of the ethical code all patent attorneys observe. (Dr. Hayes was the patent attorney). Details, however, were missing in these papers by art oversight no doubt, for as Dr. Hayes, before he made patent application, one time wrote "He, (Moray) has also shown to me and explained the detector which he uses. In this he has applied a fundamental principle of electricity which I believe would not be noticed unless pointed out by him. This element of his device, also as above mentioned in respect to the circuits, has numerous features which appear incidental but are the heart of the matter and of first importance."

So the fact these papers got out of the application Dr. Hayes had prepared, did not do R. E. too much harm but the intent to harm is evident by such actions.

Now keeping the date June 11, 1932 still in mind, after these men were removed by Court order, we read from a sworn statement made by Air. Farnsworth and Dr. Hayes before the United States Patent Office:

"Wherefore your Petitioner (Murray O. Hayes and D. V. Farnsworth (signing this statement under oath) prays that the said Moray be excluded from access to said application; that he be given no information concerning it and that no action taken in respect thereto by said T. H. Moray be recognized or sanctioned by the patent office." This sworn statement made to the U. S. Patent Office, is slated "18th day of July, 1932." Made under oath it is signed in behalf of the Moray Product Co. by D. V. Farnsworth as its president and Murray O. Hayes as its secretary. Remember they were removed by Court Order dated June 11, 1932 and so recorded. Is this not perjury when they had been removed by Court Order .June 11, 1932? Naturally when the, patent office learned the facts, this wrong was righted and Moray had his rights restored.

Again we read from a letter written by Murray O. Hayes under date of March 21, 1932, from Washington, D.C., The Patent situation on the Moray inventions is very good." "' Do not tell Moray what I have. told you, as we are trying to get hint to do certain things but he probably will not if he learns that things are going well here."

Reading again from a letter dated July 15, 1931, signed by Dr. Murray O. Hayes "There is a man working where I do (U. S. Navy Patent Division) who says he makes more from his private patent practice than his salary (from the Navy.) "He does it through an associate, but we intend to have an associate anyhow, so that is OK by us ..... I will be right on the job looking after our stuff." Another quote from a Hayes letter "I spent most of a day searching on the radiant energy device and the oscillation tubes but did not find anything even remotely resembling either one." "Keep me posted on developments there and I will do the same from this end for you."'

Murray O. Hayes testified on the witness stand in Reno, Nevada, that he and those associated with him had endeavored to put together a machine described by the patent papers and had failed. A public auditor's report showed a clear misuse of company finances. There were discrepancies on money set aside for certain purposes and the amount used. The expenditures were listed but not supporting invoices to cover them. For a $3,000.00 check issued Aug. 21, 1931, there was no statement on file as to how the money was spent. The story gets worse with the telling — meetings of stockholders were not called as in accord with Nevada law, and stock certificates were not properly issued.

On June 11, 1932 Schade, Farnsworth, and Hayes were removed as directors of the company by court order. It was further decreed that Dr. Moray should recover his cost of suit, but the treasury was depleted.

EDITOR'S FOOTNOTE —

It is a source of amazement to the editors of this article that the principles of the Moray Products Co. were allowed to walk away. The three (Farnsworth, Schade, and Hayes) with their partner in what they were doing, Mr. Harsh seemed to he on the outside of the Law. Yet as far as we can tell none were ever charged by either the courts or stockholders of the company. On top of this Hayes was allowed to practice patent law after it was proven in court that he had used the confidences of Dr. Moray and given this information to others. It was also ignored that these three gentlemen purged themself in the U. S. patent office and Hayes was still allowed to practice patent law.

When one knows Dr. Moray as I know him you can understand why. even if it is not good business on today's standards; he wishes no one evil and after going in debt to save the Moray Product Co. he himself would not sign the charges. The cost of the fight was borne by him alone and he was sick of the sound of it by the time it was done.

The fact that Moray was not responsible is a matter of all records, still he tried for another five years to save the company, but the damage was too great.

In July of 1932, more than a month after having been removed from office by court order, D. V. Farnsworth and Dr. Murray O. Hayes, in a sworn affidavit to the U. S. patent office as the legal officers of the Moray Products Company, tried to have Moray excluded from all records pertaining to his own invention. The patent office reversed this exclusion when legal proof was furnished as to the true situation.

Fortunately Dr. Hayes must have missed some of these details which had been pointed out to him, as he and his associates failed in their purpose to reproduce Radiant Energy.

Here were men who deliberately misrepresented their true purpose until they thought they could take over completely. No wonder Dr. Moray is cautious about letting himself and Radiant Energy be put in a position of jeopardy again.

When all legal action turned against these men, their attacks against Dr. Moray became of a personal nature. Perhaps we are not as far from the jungle as we would like to think.

Now let us consider the Rural Electrification Administration and its dealings with Dr. Moray. At the invitation of the government, in the summer of 1938, Dr. Moray made a trip to Washington, D.C. Another trip was made early in the year of 1939. We quote from a letter written by Dr. Moray to Mr. John M. Carmody, then administrator for the R. E. A. in Washington, dated March 17, 1939. Dear Mr. Carmody: "I wish to express my deep appreciation of the many courtesies shown to me by you and members of your staff during my recent trip to Washington.

I have now reported to my western associates, and have consulted with them concerning the proposal set forth in your letter dated Februry 25, as clarified by your letter dated March 3.

They are all extremely gratified by the interest which you have shown, and by the manifestation of your desire to help in the great work of preparing radiant energy for actual distribution to the people.

Nevertheless, as they analyze your proposal, it appears to accomplish little more than this: It gives me a few months work in merely repeating what I have already done before, and it gives me the opportunity to submit my radiant energy device to an exhaustive test by your staff but not the funds to do so, and it gives me the assistance of your recommendation to the Department of Justice that all necessary patents be issued.

My associates are fearful that your recommendation in regard to the patent would still leave much work to be done, and much money to be spent, which we do not have before the patent situation is in proper order. Also, they are not yet fully satisfied that the contemplated demonstration would not constitute a "public use," and that your whole proposal would not constitute a "sale" within the meaning of the present law. They are not yet prepared to take the step of abandoning our rights to patent protection, and the situation is sufficienly complex that they hesitate to bind ourselves to make a "public use" or "sale" within the immediate future.

In other words, although they greatly appreciate the helpful spirit shown by your proposal, they are fearful that it still leaves the great bulk of our problems unsolved, and that our acceptance of the proposal at this time might seriously embarrass some course of action which would give promise of putting us much further along the way."

However, after many more assurances of good faith and assistance in technical advice and help from the justice department in securing proper patent coverage, Dr. Moray decided to go along with the R. E. A. in the hope that here was a big enough source to help give radiant energy to the world in a safe and proper manner. The agreement with the R. E. A. was along the lines that they would furnish legal help in securing a proper

patent and technical help in the form of advisors and the loan of scientific instruments, these instruments to be returned to the government if the agreement should come to an end. Dr. Moray was put on the payroll of the R. E. A. as a consulting engineer at $25.00 per diem. In return Dr. Moray was to make all possible efforts to bring radiant energy to a commercial level. Other financial backing was also promised by those who contacted the R. E. A. This never materialized.

Dr. Moray built a new twenty room laboratory with a loan from private parties who interested the R. E. A. which was all repaid with interest. Subsequently many of the bills incurred in the building of the laboratory were unpaid and it fell upon Dr. Moray to meet them. As stated after the agreement with R. E. A. came to an end because certain parties among them insisted Moray turn matters over to include Russia, Dr. Moray paid for the laboratory out of his own resources. It took until 1949 for Moray to rid himself of the debt that this episode cost him. Not one red cent of R. E. A. money went into building the Moray Laboratory.

It is not even suggested that Moray's differences of political views extended to all the R. E. A. officials in Washington as a whole or to. the administrators. however, it was not long before Dr. Moray began to have doubts about some of his government associates. We quote from an account given by Dr. Moray. As early as February 1939 "I began to fear, from personal contact, that Washington had more radicals in it than I had the slightest idea of and it worried me. I expressed my fears to some of my associates in Salt Lake City upon my return from Washington in February 1939 and later so informed a Dr. Frazer whom the R. E. A. had called in as a scientific expert to consult with me on my work and as my body guard.

In answer to my letter expressing my fears that I lead gotten Radiant Energy mixed tip with liberals and radicals which I could not go along with, Dr. Frazer wrote me on March 27, 1939, "The only thing J. M. should not say or write is anything in connection with a threat. When he does that he is very wrong and should be told so, and in fact I have told him so upon many occasions. I realize that so-called "radicals" are feared out west, but the term is not feared here in the east except by a few reactionaries." So it was I seemed to be surrounded with radicals, liberals and what have you and their talks of "their daring plans" and "this man is one of us and that man is not."

Again we quote from Dr. Moray's notes. "Dr. Frazer came to Salt Lake City and began investigatitig Moray and Radiant Energy. The following copied from my notes made in April and May 1939: In April, 1939, a department of the United States Government on its own initiative, sent a gentleman to Salt Lake City who had been introduced to me as Dr. Frazer. I was told he was an electricl expert. This gentleman was in the Moray Laboratory for about a total of two months spending many hours each day making tests and taking pictures of the Moray Radiant Energy discoveries, especially the Radiant Energy powered radio, using the Moray germanium fission valve and gathering information for written reports to his superiors in Washington, D.C. After about two weeks he said it was necessary he go to Los Angeles, Calif. and it was their desire that I also go to California."

In California further conferences were held; Moray returned to Utah in about a week and Dr. Frazer came back in May of 1939 when he again continued tests and experiments. After weeks of these tests he said "I have tested and tested until I am fully satisfied and feel there are no tests left to make (he was also getting advice and suggestions as to tests from two scientists at Columbia University in New York). He also stated as long as I lave the device I will want to run tests, so I wish you would destroy the damn thing so I cannot ask for more tests."

"Dr. Frazer returned to California and I was again requested to follow him. All these trips were paid for by the U. S. government. While in California I mentioned the "Jensen" test where the R. E. current had been passed through a sheet of 1/4" plate glass and the device operated with no hinderance to the flow of current even when passed through the plate glass.

Dr. Frazer said if he could use the "glass" test that would be all anyone in the government could ever ask for. It was arranged that he make the glass test. The only requirement I made was that the government should furnish the glass for these tests so it could not be said I had "doctored" the glass. Twelve sheets of window glass were used and the current passed through this glass and the device operated as if the glass had not been in series in the circuit. Dr. Frazer said "that is enough, we will never ask for another test." He gave me several copies of pictures he had taken of the Radiant Energy Device used to power the R. E. radio. Dr. Frazer grabbed a hammer and smashed the R. E. device, before I could stop him saying "Now I cannot ask for any more tests."

At one time, just before Dr. Frazer left Salt Lake to go to Los Angeles, after swearing him to secrecy I showed my confidence in him by disclosing details of three of the Radiant Energy tubes to such an extent I permitted him to make detailed drawings of these tubes for patent purposes. As I wrote then "I think that speaks for itself as I have only permitted one other scientific man to ever get that far into details of the construction during my entire work with this research."

In April of 1940 Dr. Moray wrote: "One former high government official in writing me, trying to convert us to doing what Felix, Woods, and others from the REA wanted us to do — disregard all patent protection and patent laws, said "Two years ago I made the statement that Democracy had probably less than five years to run

in Europe and that the process of disintegration there was probably not more than five years further advanced than here."

In other words America would, in five years or so, be controlled by their so called "liberals" (to me communists) : therefore I should have no hope of my, work succeeding except with them. I need put no confidence in the protection of the laws of the country as they have been.

I was told I lead better do as I was told so I could stay in the government employ because in a little while everyone would be working for the government.

They also brought representatives from Russia to talk with me and turned certain papers I had loaned the REA over to these men.

I later wrote: "I wish I could have someone come here from our government who believes in the strength of our laws, who believes that the government that Washington and Lincoln stood for is not going to perish front the earth; someone who believes in the continued strength and protection of our United States laws, including the patent laws, and with faith in the preservation of the principles of the spirit of '76; someone who will not have a pet hobby of, to quote, "Our daring plan" and who does not live for "the expected change in our national structure."

On Tuesday morning, December 2, 1941, on page 2 of tile Salt Lake Tribune, one play read comments made by Rep. Thomas D. Whiter on the REA that made me feel I had made no mistakes with tile REA. Washington Dec. 1. (AP) Representative Thomas D. Winter (R) Kansas, Monday demanded an investigation of tile rural electrification administration, which he asserted was "obstructing national defense as surely as a paid saboteur."

"The true friends of farce electrification," he said in the house, "may as well face that fact, may as well realize, that this federal agency has fallen into the hands of a gang of communists, fellow travelers and political second story workers who do not hesitate to sabotage the national defense program in the interests of preservation of their political theories and perpetuation of their payroll."

Again we quote Dr. Moray. "I was constantly being sent to California by the REA for many reasons including the investigation of spiritual seances, the REA paying for these trips. With all there was to do, including recovering from a serious bullet wound, (Dr. Moray was shot while in his laboratory on March 2, 1940) and with all their trying to convert me to being "one of them," together with the building of a new 20 room laboratory (paid for by Moray not the REA), there was little time in these short months to accomplish what one would like to accomplish in the work with R. E. Then too, how far would any scientific research of this magnitude be getting on $25.00 per day plus the loan of a few scientific instruments."

After Moray was shot, things went from bad to worse. Dr. Moray would not be threatened into giving Radiant Energy to men whose motives he had every reason to question.

The association was ended in February of 1941 when the scientific equipment loaned to Dr. Moray was returned to the government.

On October 16, 1956 Dr. Robert Craig, a former deputy administrator for the REA, who did not follow those referred to by Rep. Winter and left the REA, wrote that the development of Radiant Energy has been a slow, laborious task, one of the greatest difficulties being that Moray has stood all alone. People who should have been interested were more concerned with immediate returns than with the important long range returns. Naturally during such a long period, many questions arise as to protection rights, interests, etc.

Again on Nov. 14th, 1959 Dr. Craig wrote, and we quote, "Permit me to say that I have known Dr. Moray now for about 20 years and have observed him single-handedly trying to get acceptance of some of his ideas and discoveries, particularly in the area of "radiant energy." Many of the now-accepted areas in atomic and nuclear physics were outlined by Dr. Moray as early as the middle 30's.

At one time or another I have endeavored to help him by bringing his work to the attention of people in the government without any great success. *Of course, no longer do they dispute the basis of his work.* However, to bring pure research to successful commercial application involves time and money, particularly the latter. While we can spend millions for missiles that are abortive and no one seems to mind, a few hundred thousand dollars available to this man would obviate, I believe, much of the need for missiles. Of course, this is my own idea in the matter but I do believe a helping hand now to Dr. Moray could do more towards solving world tension than the mere building of bigger and bigger armaments to protect us from the "have-nots."

"I can assure you from my personal knowledge of Dr. Moray that here is a unique mind and an ability which would be worthwhile developing."

There are hundreds of letters of record of experimental tests made of the Radiant Energy device written by those who witnessed these tests. These were made for the sole purpose to establish the scientific soundness of the theory upon which the device operates. The purpose being to enable the inventor to progress towards the perfecting of his invention by testing the workability and soundness of his various ideas, changes and additions made to the component parts of the invention.

In the following pages are a few of these letters taken at random and not edited along with a few photographs of the experiments.

Washington, D.C.
October 16, 1956

Dear Sir:

In reference to your letter of October 12 regarding Dr. Henry T. Moray of Salt Lake City, Utah, I would like to say that I have known Dr. Moray now for about sixteen years. During that time he has spent his own money upon research in the development of radiant energy and various other high frequency projects.

One of the difficulties that Dr. Moray has faced that I know of to my own knowledge is inadequate financing to bring to complete fruition some of his discoveries. Unfortunately, people who should be interested have seemed to be more concerned with the returns they would immediately get than the development of discoveries which would be of immense benefit to all concerned and upon their logical development repay many times over the investment needed to bring these discoveries from the laboratory stage to commercial application.

Because of the difficulties of the past in finding wholehearted contribution. Dr. Moray has stood all alone, earning from other researches and from laboratory job work sufficient funds to provide for his needs and advance the major program of his interest. Naturally this is a slow and laborious task and of course many questions arise during this period as to protection of rights, interests, etc. I know this, that generous support without strings attached which would be prohibitive would have the result of real achievement in the field of high frequency.

Sincerely yours,
ROBERT B. CRAIG

TO WHOM IT MAY CONCERN:

On March 16, 1929, I witnessed a demonstration of the apparatus invented by Dr. T. H. Moray by which he produces electrical energy. A report of that visit has already -been made.

On December 13, 1930, I witnessed a second demonstration of the same set; only slight changes in the apparatus were noted although a great improvement was made in the performance. The condensers, coils and other parts noted at the previous test were now in one small box about 10"x10"x30". To start the set operating instead of stroking with the magnet, as formerly, now, two discs — one hard rubber, the other of iron — were rubbed together and produced an electric charge. The electric charge, on being discharged onto the act started the set operating and once it is operating, it will continue to charge itself.

The lamp rack which formerly held 6 100-watt lamps is now displaced by a larger rack which holds 32 50-watt lamps, 3 100-watt lamps and a receptacle to receive an extension plug and cord. On the other end of this cord was a 575-watt electric iron. During this test. all of the electric lamps were lighted at one time and were more brilliant than other lights in the room which were supplied from the house circuit. When the lights were oil bright — the electric iron was plugged in. There was no noticeable blinking or sudden diminuation of lights as is usual in house lighting systems when an electric iron was on. The lights were as bright is before the iron was cut in. The iron heated quite rapidly slid in about 2 1/2 minutestes was hot enough to be used for ironing.

I made a thorough and careful examination of the entire system to see if it were possible for the electricity to have been introduced on the system from some other source. Every part of the system was inspected — the antenna, the lead-in wire, the switch; the switch was removed and examined; the leads from the switch to the box containing the condensers and coils; the box itself was lifted and examined; the lead-, from the box to the, lamp rack; the lamp rack was lifted and examined and the ground wire from the switch to the water pipe on which it was grounded; not an inch of space was overlooked where it would be possible. to introduce any metal that would carry the power and I am prepared to say that no such connection existed from which power could be had from any other system.

A crystal radio set was cut in on the lead-in wire from the antenna on one side and to the ground wire on the other side and perfect reception was had. If there had been power from other sources on the antenna or lead-in, by connecting the radio set to the ground wire, reception would not have been possible but a loud. humming sound would be produced. This was demonstrated by connecting the radio set to the house lighting system. When the system was working, the lights were burning bright. The terminal attached to the antenna was disconnected. A vigorous arcing ocurred and the sparks jumped over all air gap as much as six inches. This would indicate that the power was high voltage and the nature of the sparks indicated a high frequency.

I do not understand the principle by which Dr. Moray produces the electric energy. The condensers and the coils of wire are common. The two cylinders called "oscillators" and the small conical shell called the "detector" are the only filings not commonly known, but the system works. It produces electric power in abundance and does all that Dr. Moray claims for it.

I do not own any stock or interest in the company that is promoting this enterprice and my only purpose in issuing this statement is in the interest of the advancement of science. I consider this development a great advance in the science of producing electrical energy.

Very truly yours,

In witness to the above I hereunto sign my name.

THOMAS J. YATES, E.E., ME.

STATE OF UTAH
COUNTY OF SALT LAKE

Thos. J. Yates, being first duly sworn, deposes and says: That he has read the foregoing statement and acknowledges that he wrote and signed the same as above set up.

(Seal)

THOMAS J. YATES
Subscribed and sworn to before me this 18th day of December 1930 R. J. Chipman.
Notary Public — residing at Salt Lake City, Utah.

My commission expires May 7, 1934.

Washington, D.C.
November 14, 1958

Dear Mr. Anderson:

Your letter with reference to Dr. T. Henry Moray came during my absence from the city so I have been delayed in answering it.

Permit me to say that I have known Dr. Moray now for about 20 years and have observed him single-handedly trying to get acceptance of some of his ideas and discoveries, particularly in the area of "radiant energy." Many of the now-accepted areas in atomic and nuclear physics were outlined by Dr. Moray as early as the middle 30's.

At one time or another I have endeavored to help him by bringing his work to the attention of people in the Government but without any great success. *Of course, no longer do they dispute the* basis *of his work. H*owever, to bring pure research to successful commercial application involves time and money, particularly the latter. While we can spend millions for missiles that are abortive and no one seems to mind, a few hundred thousand dollars available to this man would obviate, I believe, much of the need for missiles. Of course, this is my own idea in the matter but I do believe a helping hand now to Dr. Moray could do more towards solving world tension than the mere building of bigger and bigger armaments to protect us from the "have-nots."

I can assure you from my personal knowledge of Dr. Moray that here is a unique mind and an ability which would be worthwhile developing.

Sincerely,
ROBERT B. CRAIG;
Dr. Craig was formerly a high U. S. Gov. Official, is Vice President of a large International Company and other companies.

(C o p y)

THE STATE OF UTAH
OFFICE OF THE SECRETARY OF STATE
SALT LAKE CITY,
October 8, 1930

M. H. WELLING
Secretary of State
GEO. A. SEAMAN
Deputy

TO WHOM IT MAY CONCERN:

I witnessed a demonstration of the Moray Radiant Energy machine, October 5, 1930. There were present Mr. Gaxiola, Mexican Consul General to the United States, J. R. Murdock, Mr. Buehner, Dr. M. O. Hayes, besides Dr. Moray and C. F. Schade and D. V. Farnsworth.

The essential parts of the machine were contained in two boxes, one directly on top of the other, each box about 14" wide and 4" by 24" long. On the top of the upper box was an electric switch on an insulating base. There was also attached to the upper box two soft iron poles wound with wire which in turn was covered with ordinary friction tape. Ten standard electric light globes, each of 100 watts, were connected to the interior of these boxes. A heavy copper wire led from one of the boxes to an outside aerial, a second similar wire connected the boxes with a water pipe going into the ground. Several members of the party took hold of both wires at the same time which showed there was no current in them before the demonstration began. Dr. Moray also put the terminals of the connections which led into the boxes in his mouth to prove that there was no current in the boxes.

After having . connected these terminals with the outside aerial and with the ground wire, Moray then took a small magnet and stroked the soft iron pole pieces above mentioned, the windings of which were connected to the interior of the boxes. He explained that the stroking was necessary to set the device into an "electrical oscillation," and that when it was "oscillating" in tune with what he called "radiant energy" it would continue so to do and bring in this energy in a usable form when the switch was closed. After this stroking had continued for a few seconds less than five minutes, Moray closed the switch and the lights came on very brilliant. The lights gave off very much more heat than the ordinary electric lights of similar voltage attached to the house circuits which with the added brilliance clearly: indicated that more than the usual voltage was going through these 100-watt lamps. This was clearly shown in another manner when the inventor took out one light and attached to this socket an ordinary Hotpoint electric flatiron of 575 watt capacity. There was no dimming of the nine remaining lights. The iron was heated with great rapidity and when in operation with the lights added was drawing from this machine 1475 watts of electrical energy. I am told that this is practically two horse power. After watching the demonstration for some thirty minutes, Moray disconnected the lead-in wire. The lights of course immediately went out and when connected they did not immediately return. Later on, both myself and Air. Gaxiola, the Mexican Consul tuned in the system as the inventor had done, closed the switch and brought in the full volume of lights.

In order to make sure that the lights connected with the house circuit were entirely separate from the lights produced through the radiant energy machine, repeated tests were made of disconnecting the house circuit in which event the house meter did not register at all. The iron was then connected with the house circuit which of course produced the ordinary reaction in the house meter. After the demonstration had been completed, the inventor raised the two boxes from the work bench on which they were located, showing that there was absolutely no connection by wires from below or from any place, save to the aerial and the ground wire.

At the conclusion of the demonstration, Moray dropped a stone weighing two or three pounds about two feet onto the work bench. The jar caused the light to flicker a moment and go out. Moray explained to us: "This was because the detector is not perfect, and one part slips when so heavily jarred, but this is all that remains to be done to make the device a practical commercial product. This simple demonstration itself seemed to show conclusively that the power derived was dependent wholly upon the machine and in no way upon the house circuit.

Before witnessing the demonstration I had read affidavits certifying to similar tests made in Emigration Canyon seven miles from a power line, and in Strawberry Valley, 26 miles from any power line, when the machine operated with the same degree of success that it did in Mr. Moray's laboratory.

The inventor explained that this astonishing exhibition when understood was a matter of ordinary physics and predicted that there could be developed from the energy all about us power and light and heat sufficient to take care of many times the present known needs of man.

Respectfully
M. H. WELLING

LETTER FROM DR. POLLY

Baltimore, Md.
November 8, 1936

TO WHOM IT MAY CONCERN:

On the occasion of a recent visit to Salt Lake City (Sept. 1936) I arranged, because of my own interest in various reports I had heard, to visit with Mr. T. H. Moray and discuss with him some of his experiments.

I was happy to find his laboratory well equipped with a number of costly electrical measuring instruments, and soon became convinced that he understood their uses.

His radiant energy device, as he calls it, seems to involve no mysterious circuit, altho the electrical valve upon which it depends is novel. The apparatus does not depend on any battery or other source of electricity than the antenna. In other words the power obtained is not derived thru the medium of a secondary power source — no feeble current is built up as in a radio set by vacuum tube amplifiers. However, no violation of the laws of thermodynamics is implied.

I saw no evidence that he was perpetrating a hoax and I gladly write this in appreciation for the time he spent with me.

O. L. POLLY

Dr. Polly receved his degree PhD. in Physics from Baltimore, Md.

Kansas City. Mo.

Dec. 21, 1931 (3231 Broadway)

Mr. T. H. Moray
2481 Smith Fifth East
Salt Lake City, Utah.

Dear Sir:

l have received many days ago your pamphlets related to your wonderful invention which I personally inspectedd in your home last year in the company of Hon. Milton H. Welling, Secretary of State• there.

I am still interested in the future of this invention and its industrialization, arid would like to know if you will

Blanked out, contains personal data.

Yours very sincerely,

C. W. GAXIOLA

Mexican Consul General of the United States

Since the R. E. A. episode, Dr. Moray has turned his energies to discoveries in many other fields in order to obtain funds but always with the purpose of pushing R. E. to the fullest extent of his resources and time.

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ATTACHED RESUME

Reference is made to the following publications:

1. — Whose Who in Engineering, years 1923-1924-25
2. — History of Utah, Published in 1932 by The American Historical Society, Inc., Chicago and New York
3. — Famous Utahns
4. — Utah's Distinguished Personalities

In 1905 began experiments with then so-called wireless and other electrical devices

1907 to the present time have experimented with alternating currents of High Potential and High Frequency and with rays beyond the light rays.

1922 discontinued commercial electrical engineering and turned wholly to scientific research.

1926 research was started with radiations from radioactive substances especially with high grade colnotite from southeastern Utah and Colorado, branching into the study of artificial radio activity and the artificial transformation of the nuclei of a number of elements and fission reactions. Research in the study of rays from 1.000 Angstroms to those of 10-5 Angstrom Units and beyond has been going on since 1939. This research has extended into the disintegration of the nuclei using our own special constructed tubes to cause bombardment by swift moving alpha particles and neutron bombardments to accomplish artificial transformations as stated above.

In this research we have found and AEC assay reports show "The sample appears to be fused uranium dioxide." The samples assayed as high as 85 per cent U^3O^8 equivalent. One material, the report stated, might be an artificial product.

This is a breeding or ageing process ill which none of the waste material is removed.

CHAPTER SIX

TO SUMMARIZE

QUESTION: Is there any question about the PRACTICAL features resulting from further research and development, and about the FINAL OUTCOME of the Project?

HOW do we KNOW and HOW can we be CONVINCED that further development will ACTUALLY PRODUCE the conditions, as well as the PRACTICAL and sufficiently ECONOMICAL "Radiant - Energy" Units, devices and methods, leading to COMMERCIAL application of "RADIANT ENERGY?"

Is it a matter of SPECULATION or has Research and Development during the last 35 years, produced SUFFICIENTLY SOUND mid REALISTIC FOUNDATIONS which would ACTUALLY GUARANTEE the SUCCESSFUL OUTCOME?

ANSWER: The "FIRST STAGE" in almost any undertaking of consequence is in "BELIEVING" that a certain thing can be accomplished. All major and minor developments in all phases of progress, throughout the ages, have proven this fundamental truth. CREATIVE IMAGINATION, combined with the power of "BELIEVING," were responsible for even the most primitive discoveries and applications of common-place "FREE-TRANSFER" of energy such as, the action of the wheel, the lever and fulcrum, and the pulley.

Advancing tediously and gradually, always following the NATURAL TENDENCY of EVOLUTIONARY PROCESSES, which no-one and no power can retard, hinder or hamper with impunity, a few bold pioneers devised means and methods of utilizing the NATURAL POWER inherent in wood, coal and oil, to be followed by the process of harnessing electricity in its crudest form.

The application of "ALTERNATING CURRENT" which was widely opposed for wider and more economical use, succeeded the limited nature of "DIRECT CURRENT." The telephone was held back 60 years and radio 157 years after their discovery. With Radiant Energy we are continuing to advance, no matter what hinderance. We are gradually approaching the seemingly "LAST FRONTIER" in the recognition and application of an UNLIMITED UNIVERSAL POWER, termed, for lack of a better description.

RADIANT ENERGY:

"Nikola Tesla," the electrical wizard and discoverer of "Alternating-Current," said in 1904 (and reiterated the assertion in 1933 on his 77th birthday)

"Ere many generations pass, our machinery will be driven by *power obtainable at any point in the Uni*verse. Is this energy static or *KINETIC?* If static, our hopes are in vain; if KINETIC, and this we *KNOW FOR CERTAIN,* then it is a mere question of time when *man will succeed in attaching his machinery to the very WHEEL-WORK of NATURE."*

Incidentally, Nikola Tesla was NOT referring to socalled "Atomic-Energy" or nuclear energy, but to the energy which is continually bombarding the earth from outer space.

SERIOUS, SANE and SYSTEMATIC Research, Development and EXPERIMENTATION, coupled with a high degree of perseverance, and willingness to make almost super-human sacrifices, will sooner or later lead to *"DEFINITE KNOWLEDGE"* and CONCRETE DEMONSTRATION of UNIVERSAL PRINCIPLES or POWERS involved, and the realistic application of them.

Thus, having arrived at the second stage, we do not have to "BELIEVE" anything with regards to essential issues at hand. We either "KNOW" or "DON'T KNOW." Knowing what we do, we say so and PROVE IT. *Not* knowing it, we say so too, and explain WHY we don't know. This is a matter of great consequence to us and to all those who concern themselves with such vital developments of world-wide significance.

We have been forced to give up the idea of "WISHFUL THINKING" a long time ago. Consequently, we are proceeding with the greatest degree of CERTAINTY and here is HOW and WHY:

In 1914 T. Henry Moray said, and it has since been reiterated several times in his copyrighted articles, "It is the belief of the writer that all space is saturated with energies which are doubtless electrical in their ultimate energies or very closely allied to electrical action. The relation of matter to energy and energy to matter then becomes the potential of the universe, one continuous series of oscillations, oscillating to and fro like a great pendulum across the universe." See *Scientific American,* May 1958 page 44, Feb. 1960, page 53, June 1960, page 64.

WHAT ARE THE REQUIREMENTS for further De*velopment* and *Research:*

(a) Parts: *POWER TUBES, VALVES, OSCILLATORS,* etc.

(b) Means and Methods *(c) MEASURING INSTRUMENTS* and *METERS* so that a *PROTOTIPE* for COMMERCIAL production can be produced? To bring it from a supersensitive laboratory instrument to a rugged commercial apparatus. There is ONLY ONE DOMINATING REQUIREMENT LEFT TO

ACCOMPLISH before "RADIANT ENERGY" UNITS are ready for COMMERCIAL PRODUCTION, viz., the *STANDARDIZATION* of the *POWER TUBES* and / or *VALVES* as well as OSCILLATORS in order to get POSITIVE, UNIFORM RESULTS from every tube made. This essential scientific development and engineering call only be accomplished with the use and application of SPECIALLY DESIGNED and CONSTRUCTED *MEASURING INSTRUMENTS* and *TUBE-TESTING* Equipment which is built and calibrated for use with the Energy from the Universe, just as in the measurement and utilization of DIRECT and ALTERNATING current circuits.

"RADIANT ENERGY" is of a nature that Instruments available for measuring present-day electric energies are of no value when used in testing RADIANT ENERGY VALVES, OSCILLATORS and other Modalities which are part of Radiant Energy Devices and Equipment.

It might be said that the major part of this please of research and development for the construction of "Radiant Energy" Units constitutes Engineering Techniques.

STANDARDIZATION of *POWER TUBES* and / or *VALVES* and *OSCILLATORS:*

It is absolutely essential to standardize the POWER TUBES in order to obtain UNIFIED RESULTS from every tube. At present, when 100 tubes were constructed in the laboratory, only perhaps ten or twenty of then, would meet requirements. The others failed to measure tip to the necessary standard. Sometimes only a few operated as required by the CRITICAL Balance and combined SYNCHRONOUS Resonance action called four to accelerate with the magnetic: fields in the Universe. As a comparison with Radio Tubes, RADIANT ENERGY POWER TUBES must function as VALVES, and some as OSCILLATORS, and so on. Each tube most be in a certain position in the circuit, for they will not operate in any other position in the circuit. They also have to synchronize and balance perfectly one with the other, in their relation with each other.

COST (approximate) of *RADIANT ENERGY POWER TUBES*

A "Radiant Energy" Unit calls for a set of 29 Power Tubes, the cost of which, at this developing stage, is approximately $500.00 for each tube. Standardization of function, type, nature and manufacturing methods of such Power Tubes will soon lead to a very economical cost in actual production, making it possible to be within the total cost of the finished Unit for Commercial use.

STANDARDIZED MEASURING INSTRUMENTS and *METERS*

Highly specialized Measuring Instruments and Meters, allowing TRUE READINGS of the Radiant Energy Power Tube's characteristics, are not available in Industry or Commerce at the present time. While special types of such Instruments have been designed and constructed by T. Henry Moray and Assistants, these have not been entirely satisfactory, not giving ABSOLUTE readings under the frequency and other energy characteristics. The further development of the Instruments by the Inventor and Assistants and noted Instrument Designers, is part of the project, prior to construction of the commercial prototype of the "Radiant Energy" Unit.

COST (approximate) of further *Development* and *Construction o f MEASURING INSTRUMENTS* and *Meters:*

Estimates received from leading Instrument Designers, working in conjunction with the inventor and his Assistants, would place the initial cost of further development and construction of the first instrument as quoted some 20 years ago at about $750,000.00. Further production from such prototypes would reduce the cost to be in line with other standard Measuring Instruments and Meters, used for similar purposes.

TIME FACTOR:

While it is almost impossible to determine the exact time required for the completion of those last phases of Development of Power Tubes, Valves and Measuring lnstruments, leading to final preparation for commercial production of the Radiant Energy Units, it has conservatively been estimated for 24 months, or possibly less, after this final project is accomplished.

It is certain, however, that the combined efforts of the Scientists and Engineers taking advantage of Talent, Facilities and past Experience, their aim will be achieved in the shortest possible time, provided monetary means and ways are provided without interruption and interference as it is estimated R.E. development is 90% completed.

ESTIMATED TOTAL COST for *COMPLETION OF FINAL PHASES of "RADIANT ENERGY" PROJECT: covering:*

(a). Development and Research for STANDARDIZATION of POWER-TUBES, VALVES, OSCILLATORS and other Modalities, as well as MEASURING INSTRUMENTS and METERS;

(b) Other essential and incidental Scientific and Engineering work and activities:

(c) Equipment and other facilities;
(d) Overhead

all leading to the final construction of a COMMERCIAL PROTOTYPE, from which Engineering Plans may he developed for ACTUAL MANUFACTURE of this and similar "RADIANT ENERGY" Units — and also development and methods for application of this Universal Power for other Machinery, Equipment and Appliances. $5,380,000 *(Five-Million, Three Hundred and Eighty Thousand Dollars)*

To summarize what has been accomplished Energy has been received by and through this apparatus. An 18 inch high frequency brush discharge was sustained and energy up to 50,000 Watts obtained from one unit. Another distinguishing feature is the whiteness of the lights as determined by the expert photographers. The characteristics of the current obtained determined by those who have witnessed expermental tests prove a new source of energy. All the facts establish something entirely new has been discovered. There is no possibility for doubt on any phase of this method of obtaining energy from the Cosmos.

The above shows that so much of this development bas beets accomplished, that so much is being offered for so little, as compared to other energy projects now under development.

REFERENCES

Applied Nuclear Physics by Pollard and Davidson — page 70
Astronomy by Dr. Robert Baker — page 303
In the release of energy, where is the seal of energy, whence it came
Evolution of Matter by Dr. Gustave LeBon
*Evolution of Forces b*y Dr. Gustave LeBon
Experiments with. A. C. Currents of High Potential and High Frequency Experiments by Dr. Nikola Tesla — 1904
Radiant Energy by Dr. Edgar L. Larkin — page 17
Sky and Telescope — July 1956, August 1956, March 1959, pages 241-243
Element formation in the Stars is also energy transformation in the Stars
Scientific American May 1958 — page 44
Scientific American, February 1960 — page 53
Scientific American, June 1960 — page 64
The Nature of the World and of Man — University of Chicago Press — pages 16, 17 — 136, 137 and other pages
Foundations of the Universe by Dr. M. Luckiesh — pages 5, 14, 43

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