Thomas Townsend Brown



Journal Book Two

77. Hydrostatic Pressure resulting from Shaped Electric Fields

<u>78.</u> Some Specific Structures for the Development of Hydrostatic Pressure

<u>79.</u> A Specific Design of Electric Flying Saucer Utilizing Transverse Propulsion and Positive Ion Field

80. Possibility of a Critical Radius in the Witmer-Jeans Expression of the Attraction of Hemispheres with Guard Rings

- 81. Theory of Pressure Confinement
- 82. The Use of High-Resistance Electrodes in Electro-Aerodynamic Devices
- 83. The Asymmetrical "H" Electrode Arrangement
- 84. High-K Dielectric Slabs for Use in Loudspeaker Structures
- 85. Problem of Vibrating Wires in EK Devices
- 86. Ferex 7 Treated with an Ion-Conducting Salt
- 87. The Use of Capacitors for the Detection of Gravitational Waves
- 88. Consideration is now being given to rewiring the systems as follows
- 89. A Tribo-Electric High Voltage Generator
- 90. Tribo-Excitation of Sands and Clays
- 91. Triboexcitation of Sorrento (FL) Red Sand
- 92. The Plan for Further Testing of Triboexcitation of Various Materials

<u>93.</u> Beneficiation of Super-Light Hydrogen by Positive Ray Excitation in the Electrolysis of Water

- 94. Excitation by Sparking
- 95. Antigravitational Materials in Nature
- 96. Gravitic Excitation by Positive Ion Bombardment

97. Lunar Type Sidereal Electrometer

- 98. Explanation for the Thrust of the Sidereal Radiation Electrometer
- 99. Torque and Resistance Change in the Brown Sidereal Radiation Recorder
- **100.** Resistance of a Copper Wire
- **<u>101.</u>** Theory of a Resistance Cross for Extraterrestrial Factors. Theory and Development
- **102.** Set-up of Resistance Cross
- **103.** Model A Differential Resistor
- **104.** Alternate Form of Model A Differential Resistor

105. Ion Momentum Transfer as an Explanation for the Cause of Thrust (Torque) of the

- Sidereal Radiation Electrometer
- **<u>106.</u>** A Combined Resistance-Dielectric Constant Bridge
- **107.** Change of Resistance with Electrostatic Potential (of the Earth as a whole)
- **<u>108.</u>** Another Form of Resistance Capacitance Bridge
- **109.** The Structure of Space and the Significance of K-mu Waves
- **<u>110.</u>** Model A Differential Resistor Bridge
- **111.** Model B Differential Resistor Bridge
- 112. Circuit of Model B Differential Resistor Bridge
- **<u>113.</u>** Some Thoughts about Gravitational Permeability (m)
- **<u>114.</u>** A Semiconducting Rod as a Sensor for Earth Movement thru Space
- **<u>115.</u>** Velocity-Sensing Differential Resistance Bridge
- **<u>116.</u>** Improvement in Velocity Sensor
- **<u>117.</u>** Variations in Resistance Bridge Output
- 117-1. A Velocity-Vector Sensor
- 118. Results of Tests of Models A-14, 15 and 16
- **<u>119.</u>** Conductor Density and Resistance Variation
- 120. Affecting the Reading of Model A Sensors by Altering the Electrostatic Potential
- **<u>121.</u>** Electron Mobility and the Role of Phonons
- **122.** Momentary Losses of Electrical Conductivity.

77. Hydrostatic Pressure resulting from Shaped Electric Fields

Walkertown, NC; Aug 23, 1958 Referring to Jean's Mathematical Theory of Electricity and Magnetism, p. 177, an electric field consists of the following stresses in the dielectric medium: (1) a tension $KR^2 / 8$ pi per unit area in the direction of the lines of force; (2) a pressure $KR^2 / 8$ pi per nit area perpendicular to the lines of force; (3) a

- R- TOK 21 in all directions If

hydrostatic pressure is negative, an expansion of the dielectric will both increase the volume occupied by the dielectric and will also increase the

21

value of K inside the dielectric. The hydrostatic pressure will be outward. If

[blank]

78. Some Specific Structures for the Development of Hydrostatic Pressure.

Walkertown, NC; Aug. 30, 1958 A general theorem for the development of hydrostatic pressure from electric fields requires the use of electrodes which provide a conical tube of force. The direction of the force is outward from the apex of the cone.



(i) Point and cylinder.



(ii) Cylinders of different diameter (iii)



[Blank]

79. A Specific Design of Electric Flying Saucer Utilizing Transverse Propulsion and Positive Ion Field.

Walkertown, NC; Sept. 17, 1958 It is not generally recognized that repulsion of like electric charges cannot take place unless these charges are within or near a different charge. For example:



In case 1, the charges are both grounded and both are within a grounded container. The entire system, however, is at the potentiality of the Earth. In case 2, the charges are alike and within a container, all of which is elevated in potential above that of the Earth. Still there is no repulsion.





5%

For better configuration, it may be drawn as follows:



Here two bodies are negatively charged within a container of like sign. A positive charge is within the container also. Lines of force connecting the positive charge to the two negatives are roughly parallel. Hence a repulsion exists between these lines. The points of anchorage A and B are forced apart, thus transmitting the repulsion to the two negatively charged bodies. It is the repulsion of the lines of force anchored to the bodies --- not the repulsion of the bodies themselves. Briefly, the action is as follows:



There is also a force tending to elongate the positive charge.

Other representations of this action are as follows:



With the positive charge as a fixed anchor, the negative charges are forced as shown, with the longer arm "throwing" the charge at a proportionately greater velocity but less force. It is this principle which is suggested as supplying in the case of the "flying saucer" to be described.



The anode: "A-frame" --- must be shaped to satisfy the field-shaping requirement and provide maximum backing for the repulsion field.



Hydrostatic pressure profiles have revealed the tri-arcuate form as best for most purposes --- stability, control and horizontal thrust, especially when a positive ion source is provided at the side of the dome.



Ions generated and released at this point are repelled downward and outward by the electrons and negative ions released near the crest of the dome.



The positive ions then stream outward until caught by the lines of force from the cathode.



Page 9



Upward air stream in center assists lift when ship is operating in atmosphere Or when approaching the earth, there is increased hydrostatic pressure under the ship.



Confinement and increase of positive pressure as ship approaches a landing.



Electrostatic lifting forces all over the top of the anode. The lower side of the cathode has a few lines which pull downward by mainly are horizontal with a slight downward component. Repulsion exists between the two systems as shown.



Page 12 An interesting situation exists when one charge is greater than the other



Anode angle follows cathode angle acting as a mechanical amplifier.



Long cathodes may eliminate downward force by cutting out the center.

Page 15 80. Possibility of a Critical Radius in the Witmer-Jeans Expression of the Attraction of Hemispheres with Guard Rings.

Walkertown, NC; Sept. 25, 1958



In Fig 1, the radius of the center sphere is super-critical, that is, it is above the value required to produce an inward force on the outer sphere, i.e., a contraction. In Fig 2, the radius of the point charge is sub-critical, i.e., it produces an outward force on the outer sphere or an expansion. If this is true, the force on the outer sphere inwardly is not strictly related to the inverse square of the radius. Conceivably there would be a critical value at which there would be no force present. This probably will be at some ratio of the two radii. If the outer radius is constant, the force of the outer sphere acting inwardly would diminish as the radius of the inner sphere is reduced and would reach zero at the critical ratio of radii or at a certain radius of the inner sphere or both. Further reduction of the radius of the inner sphere would cause a reversal of the force acting on the outer sphere thus producing expansion or outward force notwithstanding the existence of tension lines radially disposed.

Experiments are suggested to test his hypothesis: Exp. No. 1. Split tube: shit the G 1. ti, F) Tube with Sp 2 N Cap. F. to prevent Z Heat Đ Đ Tube fifed selled in Nac Θ fell jan rated metal de Œ frie de

Exp. No. 2. Tube with cap. Tube fixed. Cap is repelled. Exp. No. 3. In vacuum





81. Theory of Pressure Confinement.

Walkertown, NC; Sept. 29, 1958. In plotting the lines of force in various electrode configurations, it becomes apparent that some rather surprising results could be produced which, at first glance, would seem to be in direct violation of the basic electrostatic laws. For example:



When outer electrode is uncharged, the two oppositely charged electrodes are attracted. When it is charged as shown, repulsion results.



Repulsion of oppositely charged hemispheres. In the case of a simple saucer, it is advantageous to ground the cathode, allowing the anode canopy to carry a high charge relative to ground. The situation would then be as follows:



Pressure system around saucer. And in vacuum, the following structure is suggested:





All tension lines would ac to pull canopy downward. However, pressure confinement under canopy would tend to lift it.

During the period from October 1958 to October 1967 (9 years) no notes were made.





Strips of partially conducting material, forming electrodes for fan or loudspeaker. 83. The Asymmetrical "H" Electrode Arrangement.



Useful for eliminating current thru modulation transformer and for increasing discharge.

Page 23 84. High-K Dielectric Slabs for Use in Loudspeaker Structures.



Fig. 2 has the advantage of increased electric gradient near the modulating electrode (fine wire) at the center.

85. Problem of Vibrating Wires in EK Devices

March 8, 1968 Where the fine wires are placed midway between plates, an oscillation (probably relaxation type) takes place and the wires have a tendency to vibrate sideways. Solution 1: Place 2 wires 1/8" apart in line with the midpoint between the plates. Solution 2: Same as above, but laterally. It appears that the second solution is to be preferred.



Wires have tendency to spread apart.

Discharge pattern goes to the leading edge of each plate independently. **86. Ferex 7 Treated with an Ion-Conducting Salt** 3-8-68 Plate material of Ferex 7 is highly sensitive to humidity changes --- ranging in resistivity form 10^7 to 10^9 ohms/cc³. It is suggested that a hygroscopic agent such as lithium chloride, calcium chloride or sodium silicate in dilute solution might serve to increase and, at the same time, smooth out the effects of humidity.

87. The Use of Capacitors for the Detection of Gravitational Waves.

Stanford Univ. Hospital, Palo Alto, CA; May 31, 1970. During April of this year, four 1 ufd 25 KV capacitors were installed in the small test lab in Atherton, CA and connected in a bridge circuit with 2 power supplies (15 KV each) and indicating a recording equipment. The circuit for each of the two systems is as follows.



Operated at full voltage --- approx 17 KV (+) and (-). Results: Loud pops in the loud speakers, seem to have origin in the 500 uuf ceramic capacitor. Several times, a slightly variable (approx 10 Kc) whistle was heard which lasted sometimes several minutes, ending abruptly.

Page 26

88. Consideration is now being given to rewiring the systems as follows:



The above system may be useful, especially when the capacitors are widely separated ---say above 100 ft --- vertically or horizontally, to indicate the direction of the incoming gravitational waves. An alternate scheme might be:



Or an audio transformer, together with amplifiers and loudspeaker may be substituted for the Brush recorder if audio frequencies are present.

89. A Tribo-Electric High Voltage Generator.

Catalina Island, CA; March 26, 1973. If it is true that tribo-electric generation results from contact potential differences in dielectrics of differing dielectric constant and if it is true that the sliding motion or friction merely extends the effective surface of the dielectrics in contact and if it is true that the dielectric with greater K is always positive and the potential difference is related to the difference in dielectric constant, then it follows that a new type of generator is feasible. Using barium titanate (> 10,000 K) rubbing a dielectric in the range less than 10, at high speed, would give the BaTiO₃ a positive charge relative to the other dielectric with which it is in sliding (frictional) contact. The possibility of using liquid or gaseous (negative) dielectric should be considered. Such as CCl_4 , benzene, toluene or transformer oil. A liquid with low elec. resistivity should be considered in order not to limit the current output of the generator. Both the BaTiO₃ and the liquid should have as high electrical conductivity as possible in order to conduct away the charges developed.

Rotating discs or rods of barium titanate in electrically leaky oil might be a starting place. The setup would be as follows:

11 2m ugahor

The action is simply oscillating the barium titanate rod at high speed under oil. The rod should become positively charged and the oil negative. If the electrical conductivity of the rod and the oil is high enough, useful current may be generated. This form of electric generator may be especially useful in directly generating high voltages. Where discs are employed in place of rods, the units may be stacked in series for high voltage generation.

Basic patent claims would read: (1) Method of generating electricity consisting of rapidly moving a high-K dielectric solid with respect to a low-K dielectric fluid (including gases), utilizing the difference in electrical potential between said solid and said fluid and conducting said potentials away. (2) A frictional electric generator comprising one or more rotating high-K electrodes immersed in a low-K fluid. T.T. Brown (3-26-73) Witnessed: J. Patrick Quillin (3-26-73)

90. Tribo-Excitation of Sands and Clays

In reviewing Record Book No. 1, I am impressed with the amount of thought I gave during the years 1955 and 1956 to the hypothesis of gravitationally anomalous materials and the methods by which these materials were (in nature) produced. Considerable thought was given to methods for artificially producing lighter-than-normal materials. In those days, such thoughts were rank heresy in respectable scientific circles and this is still the case today, although there are some researchers who tend to question some of the long-established postulates. One of these, of course, is the postulate of equivalence, accepted by Einstein and other leading theorists. Now there seems to be some question. The original Oetvos experiments equating gravitational mass to inertial mass have been repeated by Dicke to an accuracy of 1 x 10⁻¹¹, seeming to confirm the equivalence. I firmly believe, however, that equivalence exists only when weak fields are present or utilized in the experiment. Strong fields would, I believe, show non-equivalence. Hence, the experiment described on page 40 of Record Book No. 1, entitled Centrifugal Differential Hydrometry might produce materials whose gravitational mass differed greatly from their inertial mass. This experiment certainly should be performed without further delay (it has already been 17 years! --- Inexcusable neglect)

But what is of immediate concern --- to get the ball rolling again --- is the creation of gravitationally light materials by friction (Coulomb friction). This may be termed Triboexcitation. On page 80 of Record Book No. 1, (Aug 26, 1956), the matter of triboexcitation s set forth. It merely calls for the use of a susceptible material such as aluminum silicate (clay) or some of the rare earth sands such as monazite. This material is placed in a glass (or quartz) container and shaken vigorously for a length of time. In short, the method merely calls for vibrating, in a paint shaker or the like, a glass bottle of certain clays or sands. This experiment, in crudest form, was performed today. A pint Mason jar partly filled with Sorrento (red) sand-clay from Sorrento, FL was weighed at the Avalon Post Office --- 1 lb-14-1/2 oz. It was then vibrated for 20 minutes at Chet's Hardware store on a paint shaker, then weighed (immediately) again. This time the scales did not balance in the same position but definitely balanced at 1 lb-14-1/4 oz; apparently a loss of 1/4 oz. Of course, the scales could be in error or there was a human error in weighing. These possibilities I certainly recognize. But further tests will tell us.

If the 1/4 oz loss of weight was real, this experiment may be history-making. It may have represented a loss in weight of 1 part in 122 or 0.819%. This would mean an excitation of 8.19 millghos (see p. 79, Record Book No. 1) If excited to this amount, the *g* of this material (immediately after shaking) would be approx 972 cm/sec² rather than 980 cm/sec²! I intend to repeat this experiment, using the paint shaker, on the Sorrento sand and a more accurate balance than that at the Post Office. I have also ordered today, 1 lb samples of various monazite sands to be tested in a similar way, possibly also increasing the shaking time to 30 minutes or perhaps 1 hour. Later, if these effects persist, more refined, highly accurate quantitative tests are envisioned, possibly at USC or Stanford Research Institute. T.T. Brown (3-28-73) Witnessed: J. Patrick Quillin (3-28-73)

91. Triboexcitation of Sorrento (FL) Red Sand.

Catalina Island; March 30, 1973. Test No. 90 has been repeated today, making sure that the weighing was accurately done at the Avalon Post Office (It is now confirmed by the Postmaster, Pete G. Salamunovich). The sample of red sand which was tested was contained (as in Sec. 90) in a glass Mason jar. In two day since the last excitation test on March 28, the weight had returned to normal; i.e., 1 lb-14-1/2 oz. It was then shaken for 30 minutes and then immediately (within 3 minutes) weighed. It then weighed less than 1 lb-4-1/4 oz, having lost at least 1/2 oz, possibly 0.3 oz. This loss of weight (if 0.3 oz is considered) represents a greater degree of excitation than that recorded in Test 90. This may have been expected, as the duration of shaking was increased 10 minutes. This represents a loss of weight of 1 part in 101.6 or 0.984%. This represents an excitation of 9.84 millighos or a value of g approx 970.6 cm/sec² ! This apparent confirmation is intriguing, to say the least! T.T. Brown (3-30-73)

92. The Plan for Further Testing of Triboexcitation of Various Materials

Catalina Island, CA; March 30, 1973 Orders were placed on March 28 for 4 1-lb samples of Monazite sand from various places --- Australia, Florida, etc.) with Ward's Natural Science Establishment (recommended by USC) and also 1 lb of loess (from Kansas). This material should be received within the next two weeks. An order was placed today with Fisher Scientific Co. for a balance which should be received within the next two weeks. This should permit, even crudely, the extension of this research. If continuing positive results are obtained, it is planned to take the project to Stanford Research Lab at Menlo Park or at Pasadena for further confirmation, using more refined methods and equipment. T.T. Brown (3-30-73) Witnessed: J.P. Quillin (3-30-73)
93. Beneficiation of Super-Light Hydrogen by Positive Ray Excitation in the Electrolysis of Water.

Catalina Island, CA; March 31, 1973. On page 8 of Record Book No. 1, it is noted that C.F. Brush once performed some experiments producing what he termed super-light hydrogen. It was stated that this was done by some sort of preferential selection of ions in or during the electrolysis of water. No details are available at this writing. The question is asked --- what sort of preferential selection of ions. How can ions differ? Electrolysis of water to produce H_2 and O, normally is carried on within and under the body of water. The positive (H) ions and negative (O) ions migrate to the negative and positive electrodes respectively, and (following electrical neutralization) rise to the surface as atoms of gas. The ions are the ions of the respective elements H and O. Where can there be preferential selection of ions? Let us change to a situation where electrolysis takes place at the surface of the water, rather than underneath. Then by using positive rays impinging on the water surface, induce electrolysis.

The apparatus may be something like the following:



The thinking behind this experiment is that the high velocity positive rays (possibly H ions) generated in the vicinity of the positive electrode strike the surface of the water with considerable additional energy gained from the high voltage electrical field. Dissociation taking place at the surface, together with possible gravitic excitation may produce super-light hydrogen. It is not known whether Dr Brush used high-energy ion rays in his electrolysis, but it appears in any event, to have attractive possibilities. This method might be used to produce other gravitationally-anomalous gases as well. T.T. Brown (3-31-73) Witnessed: J.P. Quillin (3-31-73)

Page 37 94. Excitation by Sparking

Catalina, CA; April 24, 1973. When a high voltage DC spark, traverses a space (let us say) of an inch or more the velocity of the component ions is considerable. Negative ions and electrons leave the cathode and accelerate toward the anode --- ionizing the gas molecules and atoms en route --- a conducting path is created by this "leader" permitting a high current positive ion cascade from the anode toward the cathode (usually the earth). The impact of these charges on the cathodic target could excite the material of the target gravitically. It is possible that lightning striking sand and/or clay could excite this material. This was proposed in Record Book No. 1, page 14. A development of this thought is recorded in pp. 92-96 also. Material susceptible to gravitic excitation, when struck by high velocity positive ions (or particles) could become excited so as to lose weight. Hence, exitation may be accomplished by sparking.



In the literature relating to the germination of seeds, it is recorded that germination of certain seeds has been speeded up by sparking. One wonders if then the seeds were gravitically excited and if gravitic excitation might affect life processes! Another natural phenomenon, which appears during lightning strokes, in the so-called "ball of fire". It is recorded that balls of fire, ranging in size from that of a golf ball to that of a basket ball, have been observed to come down chimneys, float around the room (like a toy balloon) and vanish. It has been considered by some scientists that the energy of the lightning stroke could have created (or released) antimatter, and that a timy nucleus of antimatter was being annihilated --- forming a reddish ball of luminescence. I am wondering, actually if the ball of fire could be gravitically excited nitrogen or oxygen caused by positive changes which were present in the lightning stroke. The visible (red) radiation from the ball of fire could be the energy being released by gravitic decay. In any event, the whole area of gravitic excitation by positive bombardment is intriguing.

95. Antigravitational Materials in Nature

.Catalina Island; April 24, 1973. There are several synonyms for antigravitational materials, such as contra-terrene materials (CTM), antigravitic matter or antimatter. All are supposed to act oppositely in the (normal) gravity field. All such materials in the pure state are believed to loft in the Earth's field, being repelled by the Earth and, if free, will accelerate (fall) into space and be lost. Hence, it would appear to be unlikely that antigravitic materials would ever be formed on Earth unless they were rigidly associated with and weighted down by terne materials. Such antigravitic matter in the presence of ordinary matter would likewise tend to decay. Even anti-matter, in the present accepted hypotheses, would react (violently) with matter, undergoing complete annihilation, accompanied by tremendous release of energy. It is presently believed that a matter-antimatter reaction would release far more energy than nuclear fusion.

It is conceivable, however, that matter and antimatter would "live together" if suitably insulated from one another. The "Liedenfrost" theory may provide such an answer. But even this requires the gradual radiation of energy. Hence, if antimatter were ever found trapped in ordinary matter, it would be revealed by its thermoactivity, being constantly warmer than the environment. The decay of excited terrestrial materials emitting heat, is similar (possibly related) to antimatter in the presence of matter. In searching for anti-gravitational material in nature, one would look for two things: (1) The spontaneous evolution of heat, and (2) Retardation in gravitational acceleration (value of g). Charles Thomas Brush, in various articles in the Physical Review, found such materials in the complex silicates, lavas and clays. His experiments, performed at the Case Institute of Technology indicated retardation of g. Confirming tests performed at the National Bureau of Standards revealed a real and readily measurable evolution of heat. The scientific community has never recognized Dr Brush's important discoveries in this field. No adequate theory to explain his results has ever been worked out

Nevertheless, Dr Brush led the way, and someday his work will be recognized. There are several interesting materials which apparently are faintly antigravitic in nature. These are: (1) Sandusky clay (near Sandusky, Ohio)

(2) Loess

(3) Monazite (rare earth elements)

(4) Certain lavas, and volcanic glases. Either these materials an infinitesimal fraction of antimatter (insulated by Leidenfrost effect) or they are excited terrestrial material --- excited by cosmic radiation, sunlight or nuclear radiation or by a prehistoric event such as meteoric impact. One would look. For example, to the ejecta from meteorite craters, such as the Barringer Crater in Arizona, for residual or vestigial material, excited by the impact (white sand, south rim). Or, in lava flows, were material has emerged from deep within the possibly radioactive interior of the Earth. Or, in loess from deserts such as Sahara or Gobi, where susceptible excitation has lofted, decayed and returned to Earth.

The rare earth elements --- most of the lanthanides are interesting possibilities. In the gravitational periodic table (prepared by the Townsend Brown Foundation) the rare earth elements have strangely low specific gravities, indicating gravitic excitation. These materials should be studied intensively for retardation of g and spontaneous evolution of heat. It is interesting to point out in this connection that the lanthanide series of elements is homologous with the actinide series of radioactive elements. Is it possible that the actinides are "radioactive" and (similarly) the lanthanides are "thermoactive", (?) both giving off energy! The element tantalum (atomic No. 73) is also anomalously light (sp gr 16.6) and may likewise be interesting to investigate. It is 15% lighter than (I believe) it should be. Aluminum is 30% lighter and silicon is 31% lighter. The compounds such as aluminum silicate (clay) and silicon dioxide (sand) are the materials Brush studied. Phosphorus is 21% lighter, Sulfur 14% lighter, and Chlorine 13%. Ytterbium has the greatest anomaly of all, 59% lighter than normal, according to the table.

If, in the course of biological evolution, the Creator has utilized anomalously light materials to advantage --- such as in the flight of birds or insects --- should we no look in this direction for clues? Suppose we consider the chemical composition of bird bones or that of the bodies of insects. Or certain air-borne pollens and spores. Calcium, however, is only 5% lighter than normal, according to the table. However, calcium may be combined with other elements (in the case of bird bones). Strontium, the homologue of calcium is 16% light. Maybe bird bones have more strontium? Monazite sand is interesting, consisting of small rounded grains, varicolored, it has many of the rare earth elements. Centrifugal hydrometry could beneficiate this kind of material easily. (See p. 40, Record Bk 2). Tektites, believed to be of extraterrestrial origin (possibly from the moon) may be strewn on the Earth from lunar impact craters could be highly susceptible material (to gravitic excitation). Although extremely rare and expensive, tektites should be studied for information on gravitic excitation.

96. Gravitic Excitation by Positive Ion Bombardment.

Catalina Island, July 13, 1973. It is proposed that rather simple experiments might be helpful in proving or disproving the idea that a loss of weight might accompany positive ray bombardment. A laboratory setup could take two forms, as follows:





Excitation cells are weighed before, during and following the application of high voltage. Results would be considered positive if the weight followed this type of curve:



In Fig. 1, excitation may take place at atmospheric pressure. The positive corona around the fine wire in the interstices between sand grains may excite the grains immediately adjacent. That excitation may then spread by gravitic conduction from grain to grain, hence to the entire volume eventually. In Fig. 2, the susceptible material is placed in a partially evacuated glass tube and bombarded by positive ions. Loss of weight may follow. T.T. Brown (July 13, 1973 Witnessed: Linda Ann Leach (7-13-73)

97. Lunar Type Sidereal Electrometer

Catalina Island; July 13, 1973. Except for very first experiments performed at Janesville, Ohio during the period from 1923 to 1930, all experiments wherein force is developed by massive high-K dielectrics the rotary form has been used. The sidereal radiation electrometer used in 1937 and 1939, and all years since, was a rotor of differential high K_m sectors. For some time, it has seemed possible to make a linear unit, one which may have surprising directional characteristics. The directional ability of the rotary electrometer (if any) is limited undoubtedly to the plane of the rotor. A linear electrometer should have a pronounced maximum in its longitudinal direction, and this would be a great assistance in determining the direction of origin of the (cosmic) radiation. In essence, the differential dielectrics and reactor elements would simply be straightened out into a line --- so that linear thrust would occur rather than torque. On the following page, such a linear electrometer is illustrated. In this particular form, the force causes the insulating fluid (transformer oil) to flow, and sensing depends upon the pressure differential of the oil at the two ends of the electrometer.



Alternate Sensor (electrical) may be possible with the above design, instead of the manometer. (1) Measure current to reactor rod and/or

(2) " " " dielectric sections A recording galvanometer would be required since current is in the low microampere range. T.T. Brown (July 13, 1973) Witnessed: Linda Leach (7-13-73)

Miscellaneous Data: Earth's orbital velocity: 30 km/sec

Earth's axial velocity: 0.4 km/sec Toward 16h R.A.: 19 km/sec (by observation of star field) Toward 5h R.A., 70 degrees S. Dec.: 208 km/sec (Miller ether drift computations) Star field toward 70 degrees S., 5h RA: 227/km sec (toward Great Magellanic Cloud). According to Maris, *Physical Review* 54(6): 478, Sept. 15, 1938, atmospheric (barometric) pressure is: highest at 17h ST at 80 N highest at 5h ST at 50 S lowest at 17h ST at 50 S

appears to indicate an incoming thrust on the barosphere --- possibly the entire earth --- from a direction in space 5h RA in the southern hemisphere. Gravitational waves that bathe the Earth (Press, p. 344) --- ELF (Extremely Low Freq.): 10^7 to 10^4 sec --- ~ 0.1 pc to 20 AU wavelength VLF (Very Low Freq.): 10^4 to 10 sec --- 20 AU to 3 x 10^6 km LF (Low Freq.): 0.10 Hz to 100 Hz --- 3 x 10^6 km to 3000 km MF (Medium Freq.): 100 Hz to 100 KHz --- 3000 km to 3 km HF (High Freq.): 100 KHz to 100 MHz --- 3 km to 3 m VHF (Very High Freq.): 100 MHz to 100 GHz --- 3 m to 3 mm

Miscellaneous Data: Beneficiation of gravitationally anomalous fractions by centrifugal (differential) hydrometry. Heavy solutions: Thallium formate, Acetylene tetrabromide, Sodium malonate.

98. Explanation for the Thrust of the Sidereal Radiation Electrometer

Catalina Island; Aug 19, 1973. Reasons for the thrust and for the variation in thrust are the two dominant questions. One cannot be fully answered without the other. In computing and analyzing the sidereal radiation records, it must be borne in mind that the instrument scale (with 50 as center) is inverted, so far as torque or thrust is concerned. For example, in the 1937 and 1939 records, a reading of 40 represents twice the thrust (or torque) as 20. In future instruments the method of reading should be revised. This would mean, then, that the 16h ST peak would actually be a thrust minimum. In the case of lunar hour angle --- the passage of the meridian (transit) of the moon actually causes a lessening of thrust. In this connection, it is interesting to note that the Dayton C. Miller observations with the interferometer, both in Cleveland and on Mt Wilson, show minima at 16h ST. And this brings to my mind the statement made by Dr Miller in Cleveland, when he looked at our electrometer records, that they are "inverted".

The physical connection between our "thrust" and the presence of the moon is certainly far from being readily explained. The first thought, naturally enough, was that it was tidal and related to the gravitational field or gravitational potential. This still may, or may not, be the case. The relation between our thrust and Miler's residual "ether drift" is even more difficult to explain.

I have no doubt that Miller's very laborious electrometer readings are accurate and scientifically

valid --- whether there is an ether or not. Miller's work is monumental, certainly one of the classics of physics. His determination that the Earth (and the entire solar system) is moving away from the galactic center toward 5h RA 70 S decl. at 227 km/sec is worthy of more consideration from scientists today than it is receiving. I have taken the time recently to study carefully Miler's Report and have come to the conclusion that the interferometer arms change in length as the system is rotated with respect to the Earth's movement thru space. Miler believed that the velocity (total time) of light was changing. He did acknowledge the possibility of the Lorentz-Fitzgerald contraction, and I believe Miller came to the conclusion that his observations showed only a fraction of the expected fringe-shift because of the almost complete cancellation resulting from the Lorentz contraction. The operation of this contraction was not (as stated) 100% but left a residual of 5% which appears to be what Miller observed.

Whether an ether does or does not exist is hardly the important point. What is important is that Miller observed something. The result was not entirely negative, as contemporary relativists would have us believe. My interest is --- what relation exists between Miller's interferometer and our electrometer. One relates to the transmission of light and/or physical dimensions. The other relates to electric fields or electrical conductivity. It is possibly true that there are other related parameters such as gravitational potential, electrostatic potential of the Earth (as an "isolated" sphere in space), the dielectric constant and/or magnetic susceptibility of ambient space (k-mu density) and these possibilities may eventually come into this complex picture. Random or cyclic disturbances from gravitational waves could further add to the confusion. It appears certain that the Miller interferometer is related to the Brown electrometer. See chart (Fig 1):



Comparison of sidereal curves ---

--- Miller's interferometer on Mt Wilson (1926)

---- Brown's electrometer at Philadelphia (1939)

If there is truly a physical relation between the two phenomena, what is it? Hypothesis: (1) The interferometer arms could be changing length. The cohesive forces in matter (steel in this case) are largely electric. Electrostatic attraction (valence bonds and interatomic cohesiveness) could be affected by: (a) Dielectric permeability of medium (b) Magnetic """

(c) Velocity (contraction)

(d) Gravitational flux density

(e) Unknown factors (2) The electrometer thrust could be affected by: (a) Conductivity differential (resistance)

(b) Dielectric permeability (susceptibility

(c) Unknown factors (3) The relationship must be (it would seem) due to the electrical factors the two instrumentalities have in common. Let us look at the structure of the electrometer in detail. Realizing that the thrust requires electrical energy, current is the dominant factor. Variations in thrust must be accompanied by (or result from) changes in current.

As a causative factor, electrical conductivity would be a likely candidate. It could be affected by: (a) ionization from penetrating radiation

- (b) electron migration
- (c) temperature
- (d) physical contraction (velocity)
- (e) " " (gravitational waves)
- (f) gravitational potential
- (g) electrostatic

(h) unknown factors Electrical resistance is not a simple thing. As a reciprocal of conductivity, resistance of ordinary substances, metal wire, etc., is not just a function of temperature but a host of other factors as outlined above. Let us look now at the structure of the electrometer with this much in view.

ICAY IONV -= low nesistance (marble) threat oil flow -> white _ high resistance (oiled wood) ------- Ka. Manager 1 Fig 1. Contraction in the last marthe word word ----high R Voltage Low threat High R profile ----Positive ion - net flow Cumulative Presidential Colorador plate reactor unidirectional) 14 ----Charles and 192. e aller and the

It will be seen from Figs 1 and 2 that the voltage profiles of dielectric blocks of different resistivity act upon ambient regions of charged oil (ions) to move the body of oil with respect to the dielectric blocks. Hence, the thrust upon the dielectric blocks, and the oil in the opposite direction, arises from the electrostatic migration of positively-charged oil regions (we may even refer to them as ions). The magnitude of the thrust (torque of the rotor) depends upon the: (1) resistance difference between high and low conductivity blocks

(2) ion density (conductivity) of the leaky transformer oil. *Summary: In the foregoing, the torque of the electrometer is a direct function of the total current., There is no other energy source. High voltage is used to provide the electrostatic attraction for ion migration and ion-momentum transfer to the ambient body of transformer oil. The oil must be slightly conductive (leaky) to provide ions. The oil moves in one direction, the dielectric blocks in the opposite direction.*

The question which now comes to mind is why does the thrust change. Why does the differential resistance change with extra-terrestrial factors? There could be a resistance change in any one, two, or all three of the resistance bodies: (a) Low resistance block (marble) (b) High " " (oiled pine wood)

(c) Transformer oil Only further critical testing will reveal the answer. All could be affected by penetrating radiation, nuclear or cosmic rays. Magnetic fields would not. I mean, of course, such magnetic fields as normally surround the instrument (terrestrial magnetism). A test performed in 1939 by Pomerantz (Bartol Res. Fdn.) indicated no observable change in torque resulting from placing a piece of radioactive copper (isotope) on the lid of the electrometer. This test was performed while the instrument was in its constant temperature vault in the basement of the Randal Morgan Lab of Physics, Univ. of Penn., Phila. No other test with radioactive material has been made. In any event, the sidereal and lunar characteristics of the torque are not correlated with penetrating radiation of any known type.

Other non-ionizing radiation such as neutrino flux (from the sun) and gravitons from space can certainly penetrate the electrometer shielding but it is difficult to see how they could influence torque. One factor may be of immediate interest, and that is the electrostatic potential of the Earth (as an invisible, insulated sphere in space). All planets obviously receive charged particles from the sun. The solar wind consists of highly charged particles and presumably also electrons. The Earth intercepts and captures particles in constantly varying amounts. Hence, the net charge could be varying greatly, possibly to the extent of several million volts. The moon likewise may be charged, probably differently from the Earth. An electrostatic field could exist between the two. This could explain the effects of the moon upon the electrometer. Inductive effects of the Moon upon the Earth could readily alter the electrostatic charge on the Earth side facing the Moon. Instrument records indicate substantial changes with lunar phases and lesser changes with lunar right ascension, declination and lunar distance (apogee and perigee). Only two explanations come to my mind: (1) electrostatic potential and (2) gravitational potential.

To my knowledge, there is no accepted method for measuring the electrostatic potential of the Earth. There is no reference potential. It would be like a mono-polar voltmeter. In the literature, the work of Prof. Fernando Sanford (Prof. Emeritus of Physics, Stanford Univ.) comes to mind. Shortly after 1900, Prof Sanford published "Terrestrial Electricity" (Univ. Series Math. And Astron., Vol. II, No. 1, L.C. QC 806.S3 AS 36L56, Vol. 2, No. 1). In this volume, as I remember, Prof. Sanford conducted investigations with a quadrant electrometer and obtained some striking evidence of lunar electrostatic effects. I am trying to locate this reference at the present time. Sanford reports that it is out of print. L.A. Public Library has misplaced its copy. My program for the immediate future is to concentrate on the possibility that the electrometer is indicating resistance changes. I will be looking for other research and other evidence that include resistance changes which are not accounted for. This is especially important if these changes accompany any of the lunar cycles or are correlated with sidereal time

99. Torque and Resistance Change in the Brown Sidereal Radiation Recorder.

Catalina Island; Aug 19, 1973. Since the instrument scale is inverted, and since an increase in torque requires an increase in total current, it necessarily follows that an increase in instrument reading (instrument units) means an increase in resistance. Considering the 1937 (Ganesville) records: (1) Resistance is maximum 2 hr after moon crosses upper meridian (2) Resistance is minimum at noon, Solar time.

(3) Resistance is maximum at 16 h ST

(4) In all annual charts, "instrument units" parallel "resistance" in direct relationship. If the resistance if a conductor is related to absolute electrical potential and if the potential of the Earth changes, then"

100. Resistance of a Copper Wire

Catalina Island; Aug 19, 1973. In 1892, Prof Sanford prepared a report of experiments performed at Leland Stanford Univ. on the resistance of a section of copper wire 1 mm diameter, 120 cm long. The report subtitled "Some Observations upon the Conductivity of a Copper Wire", published by the University. LA Public Library R 537.22.4 His copper wire, reported at 1 mm, therefore was 0.039" diameter or No. 18. According to resistance tables of pure copper (99.5%), the resistance of No. 18 is approx. 0.00635 ohms/ft. Sanford reports approx. 0.03400 ohms at 22 C for the length of 120 cm.

Sanford: 0.0280 ohms/cm; Tables: 0.02508 ohms/cm. In the Sanford experiments, the resistance changed with temperature according to the equation: $R_{temp} = 11 T + 3159$ Sanford attempted to observe any (theoretically possible) increase in resistance due to the immersion of the conductor in liquids and/or gases of high specific inductive capacity (K). His results, while indicating to him at least, a systematic positive result was s irregular and confusing, that he concluded hoping "to pursue these investigations much farther during the coming year (1893), and to accumulate data from which it may be legitimate to make comparisons".

101. Theory of a Resistance Cross for Extraterrestrial Factors. Theory and Development.

Catalina Island; August 19, 1973 In the preceding section, reference was made to the work of Fernando Sanford. A copper wire 1 mm diameter, 120 cm long was tested repeatedly and an anomalous change in resistance was noted. Statistics from the Sanford data indicate that Sanford was confused by the irregularity. On page 10 of his report, he states, "The cause of this irregularity is unknown to me". In working over his statistics, correcting his results for temperature variations, I have come to the conclusion that the resistance changed radically from day to day and even from hour to hour. Such a change in secular or cyclic fashion, Sanford apparently did not recognize. There is no report in the literature to my knowledge at this time that Sanford continued these observations in subsequent years (as he wrote he intended to do). Resistance anomalies, computed from Sanford data (corrected for temperature variations) show both secular and cyclic changes. These are 3 peaks which are evident between Feb 22 and May 19, 1892, on March 7, April 6 and May 5 which appear to be related to the position of the moon.

1892. Daily Average Resistance of Cu Wire (1 mm diam/120 cm long) in air and Various Dielectrics. Peaks at March 7, April 6, and May 5. 29 day period.



Phoned Mt Wilson Observatory to get Ephemeris for 1892. Mrs Henderson reported on 8-21-73 the lunar phases as indicated above. The peaks occur 6 days before full moon in each case. These peaks seem to coincide with instrument minima. In this case, then, the instrument increases torque as resistance (of copper) increases. This is exactly opposite to what might be expected if torque is a function of current.





A critical examination of the variations in resistance observed in the Sanford data brings one squarely face to face with the possibility that electrical resistance of copper, and possibly all substances, does vary in a secular and possibly cyclic manner. To my knowledge this phenomenon has never been observed before. If it has, it may have been attributed to experimental error or below the limits of reliable observation. If found to be verified by repeated experiment it could represent one of the most significant discoveries in physics. Any possible correlation with extra-terrestrial causative factors could be equally significant. In view of Weber's

experiments, supposedly involving the effect of gravitational waves upon large metal cylinders and the like, one naturally wants to consider the possibility that such cylinders undergo electrical resistance changes longitudinally and transversely. What effect, if any, could resistance changes have upon the physical dimensions or shape of such cylinders? Going back to the change in resistance of the Sanford 120 cm copper wire, could the resistance change cause a corresponding change in length? Or, did a change in length cause the resistance change? Could Weber have observed changes in the lengthwise/crosswise shape of his detectors by simple resistance measurement of the metal itself?

Two possibilities become apparent: (1) If extraterrestrial factors cause a change in resistance directly, then does a change in dimension follow? If so, the physical movement follows the resistivity "signal". There would be a lag or so-called inertial distortion. Further, resistance changes would not be limited by or reflect the mechanical "follow-up". If the metal "detector" is resonant (as any metal object is), the driving signal may be independent and non-resonant. Hence, by observing resistance changes in gravitational wave receivers one may avoid the serious limitation of resonance or "ringing" of the metal mass. (2) If the extraterrestrial factors cause a change in dimension (as gravitational waves are alleged to do) then the change in

resistance follows the change in dimension. If, in Weber's detectors, the resistance "rings" also, then it is pretty clear proof that the resistivity of the metal follows the change in dimension. The following experimental set-up is suggested as a means by which this mater may be resolved. It is essentially a sensitive resistance bridge with long East-West/North-South arms. It will be referred

to as a Resistance Cross.

102. Set-up of Resistance Cross.

Catalina Island; August 20, 1973. It is proposed that a "resistive cross" be defined as a resistance bridge with extended linear arms. The cross may be fixed in the N-S/E-W direction or it may be made to rotate like a turnstile. Coiled resistors are not used, only linear lengths of wire. In terms of the Sanford experiment, one arm may be similar to the single length of wire coaxial within a copper tube.



This is the experimental setup Sanford used. Resistance varied over a range of 6⁴ ohms 1.76% (temp. compensated) during the period from Feb 17-May 19, 1892. A basic resistance cross would consist of four such arms in a bridge circuit with null voltage output when balanced. Any imbalance would cause a voltage. Several sizes of resistance cross may be foreseen; the smaller ones may be rotatable, whereas the larger ones may be fixed --- say in the N-S/E-W direction.

The rotatable cross: The rotatable cross may b as large, let us say, as the interferometer used by Miller on Mt Wilson in 1926. Its use may be similar in many respects and so may the results. After all, if Miller's interferometer arms were contracting (in the alignment of the earths motion through space), then too, the resistance arms of the cross would contract for the same reason. The resistance would change in concert with the change in length. One would expect to obtain in the resistance data possible the same results as Miller obtained in his fringe shifts. It is intriguing to believe the observations of electrical resistance might provide information as to the

velocity and direction of the earth's movement thru space. The field cross: The largest fixed cross may have arms several thousand feet in length. Preferably, these arms would be in shielded conduit at least 2 ft under the surface of earth for reasons of temperature stability. The same

bridge circuit would be used. Such a cross would rotate because of the Earth's rotation and this

arrangement might be comparable to Weber's large cylinder. Again, the resistance data may

indicate a sidereal effect just as Weber's is doing --- toward the center of the galaxy! In this

connection, Weber's results may be related to Miller's results may be related to Miller's results, both see maxima at 16h ST. So, too, the electrometer records of 1937 and 1939 show maxima at 16h ST. I am sure there must be a common denominator somewhere that would tie all these phenomena together. Going further into the construction of a large fixed resistance cross, the following suggestions may be made: (1) Multiple linear conductors in each arm. (2) Use of wire with low temperature coefficient of resistance, such as Stableohm 1040 (+/- 5 ppm).

(3) Use wires in pairs only, both Stableohm going and coming.

(4) AC excitation to avoid earth current effects.

(5) Use a rapid response recording galvanometer arranged for AC input.

(6) Constant voltage AC supply.


It is proposed that the fixed cross be constructed in several sizes, starting with the smallest, as a pair: Step 1 --- Arms 10 ft long. No. 26 Stableohm 1040. 10 pairs (20 lengths) per arm. 200 \Leftrightarrow per arm. R = [] per arm. Step 2 --- Arms 2 ft long. No. 26 Stableohm 1040. 50 pairs (100 lengths) per arm. 200 \Leftrightarrow per arm. R = [] per arm. Using a 2-point recorder, compare the simultaneous readings of the above. Purpose: To determine the effect of increasing the arm length. Resistance remaining constant. If results are positive and funds become available arms lengths up to several thousand feet may be considered. In such cases an installation in the desert in long trenches 2 ft deep may be worthwhile. Conduits with adequate internal insulation would be required. In long arms, leakage may be a problem and these details would have to be carefully worked out.

In this connection, the thought has occurred to me that lead-covered multi-pair telephone cable might be used. This would offer adequate insulation and protection against moisture and could be buried in a trench. But the conductors are of copper and the temperature coefficient is 3900 ppm, whereas Stableohm 1040 is +/- 5 ppm. Whether the temperature stability of the lead-covered cable in a trench 2 ft deep (or more if possible) would make the difference remains to be worked out. The best possible combination, of course, would be to use Stableohm conductors in a lead-covered cable, also buried to a depth where the temperature is relatively constant. Vertical arms: Another variation which should be considered is the use of a vertical arm in relation to a horizontal arm. Then, of course, many different installations are foreseen, in many locations on the Earth's surface. Such installations should be telemetrically interconnected so that coincidences may be noted.

103. Model A Differential Resistor.

Catalina Island Island; Aug 27, 1973. The most satisfactory explanation of the torque of the electrometer, at least to me at this writing, is related to the difference in the resistivity of the marble and wood sectors of the rotor. The electrostatic field adjacent to the sectors (facing the reactor plate) is asymmetrical in its effect upon (+) charged oil domains (all these positively charged oil ions if you will), so that the ions are pulled (predominantly) in one direction by the sectors, and this causes a net torque on the rotor. In other words, the oil moves around in one direction and the rotor turns in the opposite direction. Difference in torque with time of day, etc., is merely a reflection of the resistivity difference at that moment. Although this arrangement, in the form of a torsion electrometer, is convenient and reliable in many respects, it is fundamentally indirect. A more direct approach would be to measure (and record) the resistance differential electrically and hence, not be subject to inertial lag such as that introduced by a rotor mechanically. Several forms of differential resistor bridges are possible but all of them operate by reason of the same principle: i.e., that electrical conductivity of all materials is no a constant --as has been supposed --- with time of day (lunar, solar and sidereal time) and perhaps even the motion of the Earth in space". Fernando Sanford (p. 62) observed these variations during the period of his experiments in 1892 but obviously was confused by his own measurements and did not attribute the variations to cosmic factors. The sidereal radiation electrometer as described on p. 50, has made possible at least 5 years of observations which show most convincingly these cosmic factors. It is quite logical then that these same factors could (and probably do) influence the electrical conductivity of (at least) marble and pine wood. Sanford's work shows that copper too is affected. It follows that other materials, conductors and semi-conductors, must also be subject to the same phenomenon. It is the purpose of this investigation to examine this anomalous change in resistivity as it occurs in (1) metal wires, (2) semi-conductors, (3) insulating materials.

As stated on p. 68, one of the first experiments proposed is that of utilizing the resistance bridge with (1) arms of wire of different metals, or (2) arms of the same wire in different orientation, such as a cross. A resistance cross utilizing Stableohm 1040 was diagrammed on p. 70. Such a detecting device may be vector sensing, and may provide some evidence of the direction in space from which this anomalous cosmic effect comes. Another form of resistance bridge uses aluminum wire versus platinum wire. Platinum as a higher specific resistivity (10.6) than aluminum (2.65). But platinum has a density of 21.4 while aluminum is 2.7, approx. 8 times heavier. If mass is a factor this difference should be significant, gravitationally speaking. If dielectric constant is a factor, assuming a relation to atomic number and/or mass, again a significant difference should be evident. On the matter of dielectric constant, metals theoretically should possess extremely high dielectric constants (specific inductive capacity or electric permitivity), but the great electrical conductivity prevents its determination in the usual way.

In any event, a bridge made of aluminum versus platinum wire is suggested. Such an experimental setup is as follows:



At 6 V DC --- steady current diam., 12 ma. At 2 VDC --- " " ", 4 ma. Measuring instrument may be a micrometer 100-0-100 ua, or preferably Brush galvanometer with amplifier for recording rapid fluctuations <100 cps. For simplicity, the wire may be strung lengthwise between two supports 1 ft apart, then cabled within shrink tubing. There would be 8 terminals as follows:



PS

The foregoing structure would be about 1/2 inch diameter, 1 ft long. A wood rod may form the center support for rigidity. Leads would be cabled and in identifying colors. Power may be supplied by a 6V storage battery or even a 2V dry cell. Protection against temperature changes would have to be provided. First observations will reveal how serious this problem is. It is entirely possible that this linear wire structure may be vector-sensing. If it is founded to be directional, alignment with the source of fluctuation may be possible. This is an intriguing thought. Certainly, this structure is readily portable. The recording instruments may also be portable and battery-operated, so that installations in various geographic spots are possible. Several units of this type must be ready and operating for the advent of the passage of the Earth through the tail residue of the Kohoutek comet. Mt Wilson should be one of these locations.

104. Alternate Form of Model A Differential Resistor.

Catalina Island; Aug. 30, 1973. In reviewing the foregoing entry (p. 74), the thought occurs that the same results may be obtained by using readily available resistor components rather than to go to the trouble and expense of winding special forms. The disadvantage would be that mass or density differential would not be as great. No commercial resistors, for example, are made with aluminum and tungsten (or platinum) wires. However, a considerable mass differential may be obtained by using carbon and wire-wound resistors which are cheap and readily obtainable. Non-inductive wire-wound resistors are suggested. Standard carbon resistors are probably adequate, at least to start with. Variable wire-wound resistors in the 10 kiloohm range may permit adjustment to zero null. The bridge would simply be:



Each resistance = 10,000 ohms. Total current drain at 10 V = 1 ma.

Certainly, the foregoing setup is the easiest and cheapest to construct. Positive results would be startling and very significant. I wonder if such a bridge has ever been constructed with the express purpose of attempting to detect secular or cyclic variations.





Referring to p. 55 of this notebook, it is noted that the most immediate probable explanation for the torque of the electrometer lies in the movement of the charged domains (ions) in the oil bath. It has long been observed that torque occurs only when the transformer oil is leaky, that is, slightly conductive as a result of a small moisture content. Perfectly dry transformer oil produces no torque.

Proof of this conductivity appears in the readings of the panel meters --- representing current to ground (+). This current depends upon the distance (inversely) between the rotor and the reactor plates. Normally it is 2 ua for the upper reactor and 7 ua for the lower reactor. The lower reactor was nearer the rotor and this would account for the higher current.



Recognizing that this current represented ion flow, it is obvious that the ions would flow in the direction of the field gradient. The velocity or kinetic energy would depend also upon the intensity of the electric field at that point. In general then, the net ion flow would depend upon the shape and intensity of the electric field at the sides of the dielectric sectors facing the reactor plates. Three situations are illustrated in Figs. 1, 2, 3. In Fig. 1, the adjacent sectors of the dielectric rotor have equal (high) conductivity so that the electric gradient between the electrodes is virtually linear. In Fig. 1, the 2 adjacent sectors of the dielectric rotor have equal (high) conductivity so that the electric gradient between the electrodes is virtually linear. Note: It must be remembered that where there is transverse leakage the electric gradient thru the dielectric can never be strictly linear. In Fig 1, for sake of explanation, this is overlooked. Again, in Fig. 1, positive ions migrating from the region of the positive reactor move in the direction and extent indicated by the vectors. In this instance, the vectors balance and there is no net flow. In Fig. 2, dielectric B has lower has lower conductivity (higher resistance) and the gradient is shifted downward because of the transverse current drain. The field is distorted as indicated by the vectors so that imbalance exists. This imbalance causes a net flow of oil (ion momentum transfer) in the direction indicated. Reaction to this force causes the dielectric pair to move in the opposite direction. In Fig. 3, dielectric B has still higher resistance (with respect to A) and the thrust is increased.

The foregoing is probably an oversimplification of an exceedingly complex situation. Here we actually have to consider the resistivity of A and B but also that of the oil and the relative interaction of all three. If varying resistance is the cause, the reasons for such varying resistance are still obscure. Ionizing radiation could affect the ion population in the oil. It could also conceivably affect the resistance of the dielectric sectors. But it seems inconceivable that the relatively small changes in, let us say, cosmic radiation could produce such relatively great changes in torque as have been observed since 1937. And again, of course, the correlation with sidereal time and certain lunar factors seems to rule out ionization changes as a cause for the variations in torque. Some other as yet unidentified cosmic factor must be affecting "simple electrical resistance". In terms of the "dogma" of electrical engineering, this thought is rank heresy. The resistance of conductors, of all materials actually, is not known to vary except with temperature. I am not forgetting the photoconductivity, ionizing radiation, ad other related phenomena, but these do not appear to be factors here.

In brief, what we seem to be observing is a basic change in resistivity of metals, and probably all other materials as well, which is related to extraterrestrial factors. It appears, further, that the change in resistivity is not the same for all metals (or all substances) but varies with some other factor such as mass (density) or dielectric constant. To observe this phenomenon, we must use (preferably) a resistance bridge with arms of dissimilar metal. This means resistors of aluminum wire versus tungsten (which is less expensive) or even commercially available resistors such as carbon b\versus wire wound. This is based upon the assumption (for the time being at least) that a mass differential is the important factor. The resistive bridge concept is a significant improvement over the complicated sidereal radiation electrometer, (1) because it is simple electrically, (2) because it is simple electrically, (3) no inertial lag, (4) more accurate and (5) far better frequency sensitivity especially in the higher range. An in-line resistance bridge, also the resistance cross (p. 71) may also have the advantage of being directionally sensitive, so that it may actually "point" to the source in space.

106. A Combined Resistance-Dielectric Constant Bridge.

Catalina Island, Sept. 2, 1973. When the sidereal radiation electrometer was designed in 1931 at the Naval Research Lab, the prevailing thought which I expressed at that time to Drs Hulbert, Maris, Gunn and Dawson was that I was looking for a mass and dielectric constant effect. I referred to the adjacent sectors of the electrometer rotor as high K_m and low K_m, the former being marble and the latter pine wood. In the analysis on p. 80 and 81, Dielectric A relates to marble and Dielectric B relates to pine wood. See also p. 55, also p. 46. In the previous sections of this notebook, the emphasis has shifted from the original idea to a consideration of electrical resistance. To completely abandon the idea of dielectric constant (electrical susceptance) at this point may be a mistake. Mass differential has not been abandoned It appears in the considerations of the "mass" of the resistance wires in the vaporizing arms of the resistance bridge. (p. 79).

Certainly, the lunar effects such as hour angle, phase, etc., as indicated by the sidereal radiation electrometer could be caused by the electrostatic potential of the Earth in just this way. In this respect, the electrometer could be operating as a monopolar voltmeter, a concept not easily today. It must be recalled, however, that Sanford's "Quadrant Electrometer" which he described in his "Terrestrial Electricity" did appear to be doing just that. If electrical resistance does change with absolute electrostatic potential --- why does it? Is it a matter of electron density --- call it, carrier abundance? Does increased negativity cause increased conductivity? Or looking at it in terms of resistivity, is resistance a direct function of positivity? The 1937 and 1939 readings of the electrometer reveal strong lunar and solar effects which could be attributed, in terms of the above, to resistance changes caused by earth potential changes. A problem arises when one tries to explain the sidereal (16h) peak in this way. Is there an inductive effect toward the galactic center?

Or, is there hitherto unknown particulate radiation from the galactic center? And also what was causing the (residual) fringe shifts in the Miller interferometer? Was this due to a change in the velocity of light or the length of the interferometer arms? I suspect it is the latter. I suspect that electrostatic potential can change physical dimensions too, but I am puzzled as to why this effect is directional. If electrostatic potential is scalar, why did Miller's interferometer

arms contract differentially? And how was it that he was able to deduce a net movement of the Earth thru space? Actually, his computations indicated movement opposite to that expected by astronomers, i.e., toward 5h RA at 208 k/sec rather than toward 16-17h RA at 19 m/sec. Is there a relation between net charge and velocity? Is there a relation between net charge and the Lorentz-Fitzgerald contraction? Or, putting it another way, how does this relativistic contraction affect conductivity and/or electron density. Does "absolute motion" create a conductivity (or resistivity) vector? If electron density is altered in the direction of absolute motion and conductivity is affected, then I can see where the velocity vector enters the resistance picture.

This, then, in summarizing, may mean that resistance decreases in the alignment of absolute motion, and to an amount dependent upon the rate of motion. This hypothesis provides a reason for the operativeness of the resistance cross (p. 71). The arms of the cross in the alignment of absolute motion would decrease in electrical resistance. The arms normal to that motion would not change in resistance. One wonders now if Weber's results could be explained not on the basis of gravitational waves but upon the basis of resistivity changes. If the large aluminum cylinder suffers resistance changes, longitudinally versus transversely, and these changes affect its shape, strain gauges might pick it up. Velocity vectors would give it preference for alignment with the center of the galaxy and correlate with Miller's observations that the velocity is actually in the direction away from the galactic center (5h ST). Weber concluded that gravitational waves are coming predominately from the galactic center. Resistance measurements may indicate instead merely absolute motion toward 4h RA (See Science News, Aug. 18 and 25, 1973, Vol. 104, No. 7 and 8, 97-128), p. 108.

In the above reference, it is also noted that the recessional velocity of galaxies, calculated from their red-shifts, is not isotropic. It is clumped and the clumping may indicate a velocity of the solar system in the direction of 5h RA. Again, this may confirm Miller's findings. See p. 114 of the foregoing Science News reference. Now then, if these resistance changes do occur, there must be a reason for sudden changes such as might shock-excite Weber's cylinders. Gradual changes, such as the lunar effects, could not be picked up by Weber. The electrometer reveals not only slow long-term cycles, sidereal and secular variations but also rapid changes which tax (and may largely escape) detection by the massive rotor's movement. A resistance cross and bridge could easily pick up such rapid changes. For this reason it is recommended that a Brush recording galvanometer be used in connection. This will indicate changes up to 100 Hz. For higher frequencies it is recommended that the sensing system include sonic amplifiers and loud speakers. I can well imagine that sounds will be heard and this is intriguing. Perhaps frequencies of 1580 Hz and 1661 Hz (Weber's resonant frequencies) will appear from time to time, such as may possibly be exciting his cylinders.

If electrostatic potential (of the Earth) causes these resistance changes exclusively, the capacitance of the Earth as a whole will probably limit the frequency --- let us say, the upper frequency. The capacitance of the Earth (as a conducting sphere in space) is said to approximately one Farad. This is an enormous capacitance and, unless the driving potential is of equal magnitude, could well smooth out most of the higher frequencies. Another source of "apparent" resistance variations might be the voltage contributions from changing K of space --- so-called "K waves". Space may be defined as K-mu. The velocity of light is dependent upon both the electrical permitivity and magnetic permeability of the medium thru which it passes. C = 1 / sq. root k mu If k waves exist, they probably are not limited to the velocity of light (C) since K is more basic. K waves may be instantaneous (infinite velocity) and be truly "action at a distance" as envisioned by Newton. Actually, magnetic permeability is the counterpart. Both K and mu, so far as space is concerned, go together. But for the present, let us consider only the effects that a variation in K can produce on the apparent resistance of a conductor.

For the sake of explanation, let us consider a simple charged condenser (capacitor). If the dielectric constant (wrongly named because it may not be constant) changes, the voltage changes inversely. In other words, the terminal voltage of any capacitor (for a given charge) is inversely proportional to its K (the dielectric constant of its dielectric). Hence, a section of wire is also a capacitor. The dielectric constant of a metal is theoretically considered to be very high. Any change in its K will affect the terminal voltage of the section. But a current must be flowing for the capacitance effect to be present. Resistance and capacitance are therefore related. A variation of K in a conductor can create an EMF which may add or subtract from the IR loss of the conductor, giving the appearance of a change in resistance. K waves from space (if they exist) may cause apparent variations of resistance of a conductor, just as they would cause variations in the terminal voltage of any capacitor.

It follows then, that resistance of electrical conductors may be affected by: (1) absolute electrostatic potential changes resulting from electron density and motion thru space; (2) K waves. Long range, comparatively slow variations may originate in (1) while rapid variations could only originate in (2). Note: It must be borne in mind, in making the distinction above, that the capacitance of the Earth (p. 92) may also be subject to K waves, so as to change the absolute potential. Such an effect may actually be present for the slow variations (long waves) but may average out the faster variations. On p. 85, the effect of mass was discussed briefly as the combination Km. Mass (density) and K were grouped together. The function of mass in these considerations is not quite clear and will be taken up in later pages. In general, mass is so interlocked with dielectric constant in metals that these two factors are virtually inseparable. Wire with high mass, such as platinum or tungsten, is considered also to have high K, and it is chosen in the resistance bridges (herein discussed) for this reason.

Wires with low mass, such as aluminum, and also carbon resistors, are thought to have low K. The differential resistance bridges set forth in the previous pages make use of high K_m and low K_m arms. In general, the high Km arms conduct more current/unit length and therefore must be longer to have equivalent resistance, although with certain metals this is not the case. One wonders, quite naturally, why this resistance variation has not been observed --- considering to what great sophistication the electronic technology has reached in recent years. The thought is discouraging to say the least. I have no idea. Maybe it is simply that when variations were noticed, they were blamed on experimental error, temp. errors or random fluctuations in experimental equipment. Maybe, the idea of combining heavy and light conductors as arms of a resistance bridge was never considered. Possibly there was no theory to predict any effect or to justify the experiment. Only time will tell. We shall see.

108. Another Form of Resistance Capacitance Bridge.

Catalina Island; Sept. 6, 1973. A bridge operating strictly on the basis of a capacitance change with DC feed will produce observable variations, if theory is correct, only during a change in the incoming factor (whatever that factor may be). In other words, it is strictly a "rate-ofchange" function. If an incoming K wave strikes a charged capacitor, the terminal voltage will change only while the K (potential) is changing. Steady K potential creates no voltage. The same may be said of an inductance when a mu wave strikes it. Steady conditions produce no voltage. Any steady potential can, it would seem, produce a mu wave strikes it. Steady conditions produces no voltage. Any steady potential can, it would seem, produce an effect only thru, or by means of, resistance. Most capacitors have internal resistance, being the resistance of the dielectric. This "leakage" current is inseparably linked with capacitance "emf" so that the total is either additive or substractive.

In this respect, the deliberate combining of capacitors with resistors is probably needless. The resistance of the capacitors should suffice to observe cosmic factors. A satisfactory circuit may be as follows:



The bridge will balance in steady state when the resistances of the capacitors match. Any variation on the K ambient will immediately create an imbalance, with the capacitance providing the rate-of-change potential and the resistance providing steady-state effect. Higher voltage should provide greater sensitivity. 25 KV capacitors are suggested, both oil-filled (Pyramid) and ceramic. But matching should be on the basis of resistance, not capacitance. This circuit (Fig. 1) is a radical departure from that tested at Atherton, CA in 1970. See p. 25.

109. The Structure of Space and the Significance of K-mu Waves.

Catalina Island; Sept. 7, 1973. On p. 92, it was suggested that space, so-called empty space may actually have structure. It was inferred that because of this structure, manifested as the ability to store energy, that light was limited to a certain fixed velocity (c). The principal factors of this structure are the twin energy-storage means K and mu, being the routes by which electric and magnetic energy can be stored as electric and magnetic fields respectively. Probably, if it were not for the progressive storage of energy, light would have infinite velocity. As it is, the progressive delays causes by the creation of these "energy pockets", their momentary storage and their release from storage limits the speed of light. When these pockets increase their capacity, as when K-mu is greater, the speed of light is further reduced. This is readily seen when light passes thru transparent dielectrics of greater dielectric constant (K), such as water. Hence, K represents the velocity control produced by the temporary storage of the electric (field) component of the moving light wave or quantum.

In the same way, mu represents the control produced by the temporary storage of the magnetic (field) component. The region of space in this part of our galaxy appears to have an average fixed value for both K and mu. This value is referred to as "unity". The question arises, is there another region somewhere where the value of K and mu is more or less than unity? If so, light would have a correspondingly different velocity that it has here. It is precisely this velocity change that causes the refraction of light. The index of reflection is a measure of a differential in K. The purpose of this discussion is to set forth the idea that K is not necessarily constant in space, nor is mu constant. The idea that regions of differing K and mu exist in so-called free

space has not been accepted in today's technology. Let us postulate the existence of such regions and that they may propagate thru space. What would be their velocity? And would the velocity necessarily be limited to the speed of light? I think not.

K and mu cause light to be velocity. Limited thru the application of C = sq root K mu, but K and mu are not limited. K and mu may, more accurately, be classified as actions at a distance, although wavelike characteristics may be present. How could such waves be detected? K waves would affect a capacitor. Mu waves would affect an inductance. Both would generate a voltage change. This, in short, is the purpose of performing the bridge experiment described in the foregoing sections. A capacitance bridge, with arms of differential K, and an inductance bridge, with arms of differential mu. Both can be combined in the form of a simple bridge, as:



1.

I doubt if a K wave can exist without its counterpart, the mu wave. Both are probably effective together. Both probably increase and decrease in phase. Otherwise, tank circuits would show frequency variations and this, to my knowledge, has never been noted. Space vehicles have traveled to Mars, sending back telemetric signals which are accurately monitored. No shift in frequency has ever been noted, at least to the extent I would expect if K and mu varied independently.

Certain theoretical physicists have considered mass (m) to be indicative of gravitation al permeability, just as K represents magnetic permeability. The respective fields act upon m, K and mu in much the same way. If m is to be considered in this light, then it should also appear in with the factors describing space. So that the speed of light in free space has yet another limiting factor, as:

Is it possible that the resistive bridge as described on p. 77 owes its operability upon a mass differential, just as that of Fig. 1 (previous page) depends upon K and mu differential (in two balanced arms of the resistance bridge) produces a consistent effect that is steady state, then it cannot be either K or mu. Mass may be the causative factor: K and mu could contribute only transient or rate-of-change effects. M may produce so-called steady state

Gravitational waves, since they carry energy, probably are limited to the velocity of light thru the same mechanism of energy storage in space as that caused by K and mu. It is difficult to imagine the connection between simple electrical resistance and gravitational permeability. It is not so difficult to see the connection between capacitance and magnetic permeability. Changes in the latter two are revealed (in the bridge) as an emf. Could the change in resistance actually be the result of a counter emf? If a counter emf is generated in a wire, due to cosmic variables, it may be masquerading as a change in resistance. One would accompany or be indistinguishable from the other. A counter emf would impose an electrostatic field longitudinally in the wire, or conversely, a generated electrostatic field could cause a counter emf. Either way, the very presence of the fluid would cause physical (dimensional) distortion in the same amount and direction as the field. Hence, I am wondering if Weber's cylinders may not contract/extend because of the electrostatic field which accompanies the cosmically-induced change of electrical resistance. In this respect, the Weber cylinder may be functionally similar to the resistance cross (p. 71). Unlike the mass-differential resistance bridge (p. 77) the resistance cross has the same metal (same density) in both arms. The imbalance results from the azimuth 90 degrees difference in the direction of the arms. So it is with the Weber cylinder. The resistance cross (if it proves out) should show a resistance imbalance between the N-S arm and the E-W arm. This may reveal solar, lunar and sidereal cycles, even secular changes which are long-term and comparatively slow-moving. Diurnal rhythms, due to the rotation of the Earth, may become recognizable. Weber's cylinder, and associated circuitry, is not sufficiently sensitive to reveal these slow-moving rhythms. It can only indicate shock-induced effects (events) or response to frequencies with which the cylinder resonates mechanically. The resistance cross, on the other hand, may be infinitely more useful because of its great sensitivity to both periodic and aperiodic excitation. The resistance cross, if it made to be rotatable as a turnstile, may show effects similar to the interferometer of Miller. In the above discussion of the possibility of an electrostatic field accompanying the resistance (mechanically) shorten the arm in which the field is longitudinal. This may be the mechanism for the Lorentz-Fitzgerald (L-F) contraction. It is apparent that the L-F contraction theoretically is not adequate --- otherwise Miller would not have obtained consistent positive results. An electrostatically driven contraction may be adequate. Considering further the possible explanation(s) for the change in resistance, the idea was explored earlier in this notebook that electron density might affect conductivity. Now, if contraction occurs due to a longitudinal field in a conductor, would not the conductivity increase? It is the electrostatic field longitudinally in the conductor that causes the electrons to flow. An increase in that field would cause an increase in the flow --- hence the conductivity. Increasing the field would tend to shorten the wire also, hence the contraction longitudinally. These are all so-called "steady-state" effects. Mass (m) rather than K or mu is the motivating factor. At the moment, I am inclined to think of resistance change as primarily caused by an emf concurrently with an electrostatic field, As a matter of fact, being a little more precise with the K and mu factors, it would be the electrostatic field which could cause the emf in both instances. In summary then: (1) K ambient change causes an electrostatic field in the dielectric which reveals itself as an emf. This is a rateof-change function. Capacitance change. (2) Mu ambient changes causes an electrostatic field in conductor or the inductor which reveals itself as an emf. This is an inductance change. Rate-ofchange. (3) M ambient change causes an electrostatic field within a mass which reveals itself as an emf across the mass which is indistinguishable in effect from a change in resistance. Steady state. Absolute motion (thru space) causes a rod to contract in the alignment of the motion. It also causes an electrostatic field aligned in the same direction. The field may cause the contraction. An emf is also generated by the field proportional to the rate of motion. If the rod is conducting a current, the emf will either aid or hinder such current, the emf will either aid or hinder such current. If it aids, the resistance will appear to decrease. If it hinders, the resistance will appear to increase.

The electrical polarity of the m-induced field will depend upon the direction of absolute motion thru space. Subject to experimental confirmation, let us assume --- no, on second thought, I take this back. We will run into trouble. For the time being, we should assume only that contraction takes place, and that contraction causes an increase in conductivity or decrease in resistance. In the case of the resistance cross, the arm in the alignment of motion will probably have lower resistance than the transverse arm. In Fig. 1, p. 79, the alignment of the bridge with absolute motion would lower the resistance of the carbon arms with respect to the wire-wound arms. This is based on the assumption that the low K, low mu, low mass arms are more susceptible to the effects of the respective ambients.

110. Model A Differential Resistor Bridge.

Catalina Island; Sept. 8, 1973. Today, at 2 pm, an experimental Model A was placed in operation. The arms of the bridge are as shown in Fig. 1, p. 79. 2 Ohmite 10,000 ohm wire wound resistors, 1 fixed carbon 10,000 ohm and 1 variable carbon 10,000 ohm are used. The variable resistor proved helpful. The null was deliberately set to 14 ua (100 ua DC meter), 6 V. The following observations were made: Overnight observations were made. Resistance as indicated by the microameter did vary. Current reading increased during the afternoon from 14 ua to 14.35 ua then by 10 pm had dropped again to 14.00 ua. At first, this was thought to be related to a room temperature change from 73 \clubsuit F to 73.5 \bigstar and then back to 72 \bigstar at 10 pm.

The following morning the resistor system was deliberately heated to 90 F but the current reading did not change. It remained at 14.00 ua! Voltage has now been increased to 19 V DC, 1.76 ma total current drain and a new set of observations started.
111. Model B Differential Resistor Bridge.

Catalina Island, Sept. 9, 1973. If the resistance effect is directional with respect to motion in space, and if the sensitivity is a function of resistance, then a slight change in the form of differential resistor appears to be warranted. We will call this Model B. Each arm would have a very low resistance return circuit, such as a copper rod or tube.



In Fig. 1, the return path is thru the copper tube. In Fig. 2, it is thru the rod. This appears to be a better arrangement than that shown on p. 71 for directional ability. This basic design will be investigated as a next step.

112. Circuit of Model B Differential Resistor Bridge.

Catalina Island, Sept. 9, 1973. It seems important, in arranging the circuit of this bridge that the current flows unidirectionally thru the 4 arms of the bridge. It would be possible, then, for the electric fields within the conductors of all 4 arms to share the same alignment. This would seem to be necessary if the device is sensitive to the motion of the Earth thru space and/or the direction of the galactic center. Therefore, the circuit is as follows:



113. Some Thoughts about Gravitational Permeability (m).

Catalina Island; Sept. 11, 1973. When one considers that electric permitivity (or dielectric constant K) represents the storage of electric energy in space and mu (magnetic permeability) represents the storage of magnetic energy in space, then the question is: If m represents gravitational permeability, how can it also represent the storage of gravitational energy in space? Let us consider a simple tank circuit, a so-called "ringing circuit", consisting of a capacitance, an inductance and, of course, an inevitable resistance.



Energy storage alternates between the region of A to that of B. In A, the storage is enhanced by K, the permitivity of the dielectric. In B, it is enhanced by mu, the permeability of the core (iron) or the region around B. Also in C, the resistance, it could be enhanced by mass m (of the conductor).

In other words, as viewed from the capacitor's voltage, the energy storage shifts as



Every 90 degrees, the energy storage shifts from capacitor to inductance and return. Resistance enters the picture when current is flowing in the conductor (including the winding of the inductor). This current is in phase with the magnetic field, hence, gravitational storage coincides with magnetic storage. Within the capacitor, the leakage current (thru the dielectric) is in phase with the voltage across the capacitor, hence, gravitational storage coincides with electric storage. Therefore, since gravitational storage occurs with both electric and magnetic storage, the frequency of grav. storage is doubled over the voltage frequency of the tank circuit. However, since the electric (field) polarity is reversed with each successive grav. storage (both in the capacitor and the rest of the circuit), the gravitational vector reverses at the source frequency as the tank circuit.

The direction of the electric vector determines the direction of the gravitational vector,



The gravity vector within the conductor is in the same alignment as the flow of electrons (opposite to the "flow" of the classical current). The complete gravitational field, out into the ambient, may look like this:



The gravity vector within the conductor acts upon the mass (m) of the conductor to move it (if free to move) from (-) to (+) as indicated above.

Masses in the ambient, solid, gaseous or liquid, would (if this is true) move in the opposite direction. Hence, action and reaction would be equal. However, in free space, where there would be no masses in the immediate ambient, the quantum arises --- would the conductor still possess a "gravitator" force One might answer the question in the affirmative by rationalizing that the so-called ambient actually extends to infinity so as to encompass all mass in the universe! In a tank circuit there are three components, (1) the capacitor, (2) inductor, ad (3) the leads connecting same. Gravitational storage would seem to exist in all three, but not necessarily in phase. In the capacitor, max. grav. storage exists when the capacitor is fully charged. At this point in time, the leakage current is maximum across the dielectric.



Since the dielectric is also the conductor, the gravity gradient is from (-) to (+) (electric) and the mass of the dielectric is within this concentrated gravity gradient and hence processes a force in that direction. Calling such a structure a gravitator, (see lab notes of 1926-27-28-29).

This structure more in the neg to pos direction when charged. This is what happened, even in vacuum. One of the basic problems in those years was to understand the energy relationships. It was not understood that leakage current in the dielectric was involved. No distinction was made between condensers for this reason. The force developed seemed to be a function only of voltage --- hence, wattless. There was no understandable channel for the conversion of electrical energy into kinetic energy. I was even believed that the kinetic energy was somehow derived from the gravitational field! Now that we believe the conversion is directly from electrical to kinetic energy, the whole idea of the gravitator makes more sense. In those early experiments, it was known that the gravitator force was a function of mass. Lead monoxide loading was common practice. The conductivity of the mass was never investigated nor appreciated. A simple experiment to test the present concept might take any of several forms: (1) bifilar suspension of a wire conductor;

(2) bifilar suspension of a massive dielectric rod;

(3) rotatable (torque) suspension of a coil of wire.



By placing any of the above in an insulating fluid such as oil or carbon tetrachloride (more dense), the force may be increased. Fluid would move in the opposite direction.

In the case of a rotor having sectors of different conductivity, a net circular current (as in [3], previous page), could produce torque on the rotor as a whole. The reaction on an ambient mass (such as oil) or on metallic reactor plates would be in the opposite direction. This could represent an additional and quite independent explanation for the operation of the sidereal radiation electrometer other than that set forth on pages 55 and 80 of this notebook. It could be that both explanations apply, each one contributing to the torque. Energy Relationships ~ At this point, it would appear that the IR loss in a conductor, when the conductor is free to move (and does move) is not 100% converted into heat. A portion (unknown at this time) is converted into kinetic energy. I am not talking about any electromagnetic effect but purely about the possible electrogravitic interaction. The electromagnetic field thru which (as a consequence of such field) a current is passing, A gravity gradient appears in the alignment of the electron flow. Any mass within that gravity gradient tends to "fall" in the same direction (as the electron flow). At the positive (elec.) terminal of the semi-conductor, the gravity gradient fans out into the ambient space to the negative terminal, as show in Fig. 2, p. 112.

The gravity gradient(flux) is greatest within the body of the semiconductor. The intensity is a function of the potential difference and the current. F = || E / || watts. Thrust (electrogravitic) is a direct function of the mass of the semiconductor; being the effect of the gradient upon the body of the semiconductor. This thrust is truly a ponderomotive force. Semiconductor sections may be placed interrelated with high insulation sections as:



All active gravitator sections could be placed in line and electrically connected in parallel. Additional mass could be added (as lead plates) between gravitator sections as:



In developing the concept set forth on p. 110, gravitational storage represents the existence of closed flux-domains in space. Such domains represent energy. They are formed by electric fields and electric currents operating jointly. In semiconductors, an electric field (potential difference across said conductor) causes the electric current. Both field and current are necessary to create the gravity gradient and the flux domain. The domain persists so long as the field and current persist. When the field collapses, the domain collapses and the energy temporarily residing in the domain (if no thrust is utilized) returns to the electric field (and circuit). If motion is permitted, the energy resident in the domain is balanced between kinetic energy and electrical energy when the domain collapses. Could it be that the motion of the Earth in space changes the ratio of electric field and/or conductivity of the semiconductor? Could it affect the resistivity of metals for the same reason? Could this explain the Miller interferometer fringe shift? It is all highly complex to say the least. The flux domains resulting from electric magnetic and gravitic fields are remarkably similar in pattern and in the way they arch out into the ambient.

(1) The magnetic field from an inductor fans out into the ambient as:



Dipole N and S orients with lines of force. Its intensity is influenced by an iron core (mu). (2) The electric field from a capacitor fans out into the ambient as:



Dipole (+) and (-) charges. Orients with lines of force. Its intensity is influenced by dielectric constant (K). (3) The gravitic field from a resistor (semi-conductor) fans out into the ambient as:



Dipole --- terrene and contra-terrene orients with grav. gradient. Its intensity is influenced by mass (m). The core mass in this instance could be the mass or density of the resistance material (usually wire). Tungsten better than aluminum or carbon.

Several thoughts occur at this point. First the gravitator experiments conducted in the 20's may not have been too far wrong. As stated on p. 114, the need for leakage current as a result of the applied high voltage was not understood nor appreciated as essential to the operation. Lead monoxide was mixed with paraffin or beeswax to obtain a massive dielectric for use in the capacitors. The relation to gravitation was believed to be solely the function of a capacitor. Leakage meant simply a loss. Now, it seems that leakage current is as important as the high voltage field, maybe more so. The high voltage field must be of such intensity as to drive the electrons thru the semi-conductor vigorously. Just what is required remains to be determined. Both field and current are necessary to create a gravity vector within the semiconductor. As stated before, this vector is in the same direction s the electron flow, i.e., from negative to positive. This vector or gravity gradient passing thru the mass of the semiconductor causes the conductor to move (when free to move) in the same direction (passive grav. mass). The gravity gradient then arches out with reduced flux density) into the surrounding space and then returns to the opposite (negative end) of the semiconductor. The pattern resembles the magnetic field around a bar magnet.

Any mass resident in the ambient part of the gravity field will obtain a ponderomotive thrust in the opposite direction. This was discussed on p. 112. It is possible that such a gravitator may be sensitive to "absolute" velocity, the motion of the earth in space. It may operate very much like a DC motor, with its motion resulting in a generator action \blacklozenge producing a counter emf. Such a counter emf would alter the input current, making itself evident as a change in input resistance. The gravitational permeability of the ambient space would also alter the total flux density and it too would make itself evident as a change in input resistance. At least two factors, therefore, may affect the wattage demand of the gravitator: (1) velocity thru space and (2) gravitational potential of that region. Such a gravitator, fixed to the Earth, would operate, I believe, as a sensor for both the movement of the Earth and the gravitic potential of the region thru which the earth passes. Two additional factors may influence such a sensor, (1) the electrostatic charge upon the Earth and (2) the transient pulsing or cyclic effect of gravitational waves (possibly from the center of our galaxy).

The electrostatic charge of the Earth would affect the conductivity of the semiconductor directly --- increasing negativity causing increased conductivity. Note: This could be easily checked by an experiment wherein the resistance (carbon-metal) bridge is placed upon an insulated island and the potential altered several hundred thousand volts. The sensitivity to gravity waves is the same as the sensitivity to the ambient gravitational potential or flux density. Incoming gravity waves affect the gravitic permeability of the ambient region, hence the flux density thru the semi-conductor, then the counter emf and back to the input resistance or wattage demand. In 1946, the Giocobini Zinner comet caused rapid erratic fluctuations of the

electrometer, while the Earth passed thru the residue of the comet's tail. No explanation has

been advanced. I suppose we could speculate that this strange effect was caused either by (1) rapid variations of gravitic potential or permeability of the ambient region, or (2) variations in the electrostatic charge of the Earth, both effects being caused by the impingement of particulate matter upon the Earth from the comet tail.

Next March (1974), the earth will pass thru the tail of the Kohoutek comet, and I hope to have several resistance bridge recorders running, in the hope of getting another look at this strange manifestation. All of these efforts may help in tying together the theory covering the Miller observations, the Sanford experiments on resistance, the Weber gravity wave observations (or whatever the are) and my own observations for the last 50 years (which have never been formally published. Today, we have ordered a 2-channel recording galvanometer (Brush) with adequate amplifiers to observe the resistance variations in several different bridges. Surely, something worthwhile will come of all this effort and expense. We are also consulting with Dr Pres at Cal Tech and plan to have another meeting with him next week, at which time we will give him photostats of electrometer records (recently processed) covering readings for the ears 1937, 1939, 1946, 1947, 1948, and 1949.

114. A Semiconducting Rod as a Sensor for Earth Movement thru Space.

Sept. 12, 1973. On p. 121, it was proposed that the gravitator may be sensitive to the absolute motion of the Earth thru space --- inferring as to both the direction and extent of that motion. The simplicity of this hypothesis is overwhelming and I am inclined to carry it further in an attempt to test it --- possibly "to absurdity". It was stated that, in effect a massive rod would have lower resistance, higher wattage demand when aligned with a motion vector opposite to its internal electric field (meaning in this case the direction of electron flow from neg to pos.). When aligned in the same direction as its electric field the resistance would increase, resulting in lower wattage demand. This then is equivalent to the motor/generator effect where, as velocity increases, a counter emf is generated which reduces (and even reverses) the wattage demand of the motor. Hence, it would seem possible that by merely rotating the gravitator (altering its direction in any way) that a change in resistance would occur.





Case #2 --- Low wattage demand (high resistance) In the above representation, (f) is the ponderomotive force resulting from the action of the internal (synthetic) gravitic field caused by the joint E1 (electrogravitic) effect. In Case 1, this force is opposed by the existing motion, so as to cause increased wattage demand (lower resistance), whereas in Case 2, the existing motion is assisting so as to cause lower wattage demand or higher resistance. This "directional sensor" capability was referred to on p. 84 and may be tested shortly when suitable resistance units become available. If this concept is valid, it may offer some explanation for the behavior of the Miller interferometer. Although the steel arms of the interferometer were not charged, nor were they given any electric gradient deliberately, the intermolecular structure of the steel may have developed such gradient by electrogravitic (more precisely gravito-electric) induction from its motion thru space. This may have caused inter-molecular contraction. Perhaps, this may turn out to be the mechanism of the L-F Contraction. But why the Miller effect exceeded the theoretical L-F contraction or (more exactly) was only about 1/20 of the total expected shift, all of which should have been cancelled by the L-F contraction, remains unexplained. The relativists are simply ignoring it! Then, of course, the systematic and cyclic change in resistance observed in 1892 by Sanford appears never to have been seriously considered. To my knowledge, few (if any) physicists today have ever heard of Sanford's results or, for that matter, would consider them valid if the subject were brought up. For such reasons, difficult to understand, the ideas presented in this book will undoubtedly be classed as rank heresy. But we hope this will not alter the truth, which will eventually emerge. Only time will tell. Now comes the controversy regarding the validity of Weber's work allegedly purported to have observed gravity waves --- now, more particularly the effects correlated with sidereal time. Weber has stated he believes he has been receiving gravity radiation from the galactic center. If our electrometer records for 1937 and 1939 are considered in the same light, we also might make the same claim that radiation was being received from the galactic center. But the question I raise at this time is --- Does velocity (of the Earth) thru space contribute? Could the Earth be running thru regions of varying gravitational potential such as may result from clouds of dust, variations in the density of the solar wind, etc. If the gravito-electric concept is valid and electric fields are intimately tied in with gravitational potential, what of possible variations in the electrostatic charge of the Earth --and/or the Earth-Moon system. Why is it that the electrometer, consistently for 6 years, has shown an effect readily correlated with the phases of the Moon? Weber's equipment records only "events", sudden shock stimuli which cause his cylinders to resonate mechanically. Of course, as Weber reasons, the stimuli could also be the arrival of a wave of that same frequency. Perhaps evidence, even, of a "whistler" train of waves of varying frequency which resonate (at one point) with the cylinder. Could it be that Weber's cylinder, longitudinally and transversely, resembles Miller's interferometer arms? Did Miller's "arms" respond to gravity waves?

To my knowledge, Miller reported no sudden fringe shifts such as Weber might call an "event". If he had, he may have attributed it to an earthquake! The interferometer has the advantage over the Weber cylinder, of providing "steady state" readings. The electrometer has the same advantage. The resistance bridge likewise has this advantage, and with a possible sensitivity many orders of magnitude greater. I can see a similarity, both in structure and function, between the four instruments mentioned above. All appear to depend upon the same set of phenomena, the relationship between electric and gravitational fields. Of the four, I like the resistance bridge (differential mass) the best and feel it has the most to offer in the futureI certainly hope we can proceed without delay to build and test various bridge and various resistive elements in the light of this new concept. Possibly not only will the results add greatly to the fund of scientific knowledge but may provide new devices for astronomical measurements and new methods, such as the gravitator, for commercial utility.

115. Velocity-Sensing Differential Resistance Bridge.

Sept. 13, 1973. On p. 125, the possibility that a resistor may be sensitive to absolute motion was considered. If the resistor were aligned with the motion, it is suggested that the resistance would change with polarity. Two methods, therefore, come to mind which may make possible a continuous reading velocity sensor or speedometer to indicate the absolute motion of the Earth thru space. (This, of course, is impossible in the view of today's technology). Nevertheless, method No. 1 may take the form of a resistive bridge where similar arms carry currents in opposite directions, as:



Here, the resistance balance is established between pairs of arms where current is flowing in opposite directions. The receding would be maximum when the resistors were aligned with the movement and minimum when at right angles to the movement.

The practical value of such an instrument would be enormous, especially in this age of space travel. It would be, in effect, a compass for space, unaffected by the magnetic field of the Earth. Not only that, it would confirm (finally) the earth's movement away from the galactic center toward that point in space (as Miller believed) approx 5h RA \$70 Decl. at about 208 km/sec. Method No. 2. If resistance changes with polarity, according to the original premise, the in-alignment resistor will act as a rectifier, as:



The greater the resistance differential the greater will be the indicated voltage DC. No motion, hence, no resistance differential would produce no DC voltage. While the circuit illustrate above contributes a half-wave rectifier, the same principles apply to a full wave rectifier (by using 4 & 2 pairs --- of resistors properly aligned). A capacitor is shown merely to smooth the DC output.

Page 131 116. Improvement in Velocity Sensor

Sept. 14, 1973. A possible improvement over the circuit shown in Fig. 2 (previous page) is as follows:



In this circuit, the metal tube enclosing the resistance wire carries the return current making the sensor non-inductive.

117. Variations in Resistance Bridge Output.

Sept. 16, 1973. Containing the observations started Sept. 8 (p. 107) two systems are now operating: No. 1 --- 10,000 ohm --- 19 V, Output ~ 10 ua.

No. 2 --- 200,000 ohm --- 38 V, Output ~ 10 ua. The former is connected to indicate conductivity while the latter indicates resistance of the wire-wound arms. Observations to date show a true reciprocal relationship. Continuous variations in readings are readily apparent, some rather rapid fluctuations are occasionally seen, but these are of such small magnitude that exceedingly close observation of the 0-50 ua meter is necessary to detect them.

Tomorrow, I understand, the 2-channel Brush recording galvanometer will be delivered and this instrument will have such amplification and sensitivity that these rapid fluctuations will be ready observed and recorded. At 10:05 pm, I happened to be watching the meter with a magnifying glass and saw a sudden jump from 9.95 to 10.03 ua, fluctuating at the high level for about 30 sec then returning the former reading. There is no question that rapid fluctuations exist. The Brush will be able to record anything up to 100 Hz. If higher frequencies are present, it will require a scope. Also, if there are frequencies in the audible range, a suitable amplifier and loudspeaker may provide some fascinating information. Even the variations as I have just witnessed may be audible. The next two or three weeks (when we have the proper equipment) will certainly be interesting. The microammeters used in this experiment (p. 107) are 1800 ohms. Maximum deflections so far has been 9.5 to 10.0 ua or 0.5 ua = 0.0009 V or approx 1 mV. The Brush recorder therefore should have ample sensitivity. Also an audio amplifier, using the crystal microphone pickup, should provide adequate amplification for ~ 1 mV.

117-1. A Velocity-Vector Sensor.

Sept. 17, 1973. On the premise that the variation in resistance is "felt" by the more massive conductor (wire-wound arms) primarily when the conductor is in the alignment of absolute motion, the following thoughts emerge: (1) The flow of current (in the conductor) is in the alignment with the absolute motion. (2) Current vector and velocity vector are unidirectional. A velocity vector sensor may, therefore, have this circuit.



In the above circuit, current flow in the carbon resistors is in opposite directions (canceling) while that in the wire-wound resistors is unidirectional. It is the thought that the indicating meter will read maximum or minimum when the wire-wound arms of the bridge are aligned with the earth's movement, thru space, and only when so aligned. As to whether it will be maximum or minimum, an analysis is as follows: (1) Based on the counter emf theory (p. 124), when current flow (opposite to electron flow). (2) The meter reading, therefore, would be maximum when the wirewound arms and the current in those arms is in the same direction as the absolute motion. (3) Hence, such a bridge would "point" in the same direction that the Earth is moving. It would be a kind of "Space Compass". It is entirely possible that the current or energy asymmetry may introduce a torque on a carefully balanced system so that the system would actually align itself at a position of minimum current flow. (4) In summary then, such a space compass would align itself so that the positive end "points" in the direction the Earth is moving in space. I am wondering if this may not be as Miller predicts: 5h RA �70 Decl. (See p. 130).

The basic diagram of such a system where current asymmetry provides mechanical torque so that the space compass actually aligns itself toward the point in space toward which the earth is moving is:



Mounting has 3 degrees of freedom. This is predicted on the belief that a counter emf is generated in any conductor or semiconductor, with polarity as indicated above, when it is moved longitudinally. If that conductor is carrying a current, the resistance will be increased and the current will drop to a minimum.



Simple circuit showing (in red) the polarity of emf created in a conductor by its motion thru space. This means that an electric field of the same polarity is impressed upon all matter by absolute motion. This electric field ma be the mechanism of the L-F contraction.

118. Results of Tests of Models A-14, 15 and 16

Nov. 9, 1973. It is now quite apparent that the bridge structure outlined on p. 79 is operative. The results are quite surprising as to magnitude. The two arms of the bridge are of wire-wound and carbon composition resistors of approximately the same resistance. It is adjusted at the start to a null voltage which is fed to both strip-chart recorder and a visual digital readout. Three models have been constructed. A-14 (45 V at 600 K), A-15 (300 V at 1.2 megs) and A-16 (6 V at 10 K). All units are running concurrently. Records for the past two weeks indicate a consistent drift downward on all three units; i.e., toward the negative on the charts (which probably means that the Earth is becoming increasingly electropositive). It has not yet been determined which arm of the bridge is changing the more, the wire-wound arm (sp. gr. 7.8), or carbon comp. (sp. gr.2.0). I suspect that it is the carbon side. And I am wondering why this variation has not been discovered before this or predicted in resistance theory.

While all three models indicate a common trend, there are individual consistent differences which were not foreseen. These differences must be explained. They obviously are not sporadic or random. When one examines the basic differences in the construction of the three models, it appears that voltage (applied) and resistance are the only operating factors. Hence, one might classify the three models as follows: Model --- $V \times R$ (voltohms) A-16 --- 6×10^4

*A-14 --- 3 x 10*⁷

A-15 --- 3.6 x 10⁸ If voltage represents the "driving" field which acts upon the conducting electrons and R represents the "distance" or gradient thru which this force acts, then F_d = work or energy. Hence, it is possible these three models operate at three different energy levels, perhaps some kind of quantum relationship. If this is found to be the case, we might actually have the evidence for many energy level, only three of which we may have identified. Following this line of reasoning, there may be a series of so-called "spectral bands" in this newly-discovered phenomenon, expressed as follows:

Spectral Bands (energy levels)
Exponent (V x R) Model
+10 A-17
+9 A-17
+8 A-15
+7 A-14
+6 A-14
+5 A-14
+4 A-16
+3 A-16
+2 A-16
+1 A-16
0 A-18
-1 A-18
-2 A-18
-3 A-19 Accordingly, it is now propos

-3 --- A-19 Accordingly, it is now proposed that we construct Model A-17 with a total R = 10 megaohms and V = 1 KV. Also Model A-18 --- R = 1 ohm, V = 1.5 (battery) These models will be constructed in the Menlo Park shop (Polytec) during the week of Dec. 3, 1973. Additional recording and printout instruments are being installed and will be operational during the week of Nov. 12 and thereafter. More definitive information will become available.

119. Conductor Density and Resistance Variation

Nov. 9, 1973. Contrary to the opinion expressed on p. 136, a provisional examination of the circuit and performance of Model A-15 appears to indicate that the wire-wound resistors, rather than the carbon-comp. resistors, are responsible (largely) for the anomalous resistive variation which the bridge detects. This would bear out the hypothesis that the bridge functions because of a mass differential of the two arms. Here, the density of the wire (arm) is 7.8 whereas that of the carbon (arm) is approx 2.0 --- a differential of 5.8. It is believed that the carbon (low mass) arm holds relatively steady while the iron (high mass) arm suffers a (larger) change, a spreading due mainly to the higher-density arm. This is certainly evidence of a gravitational relation. In the Sanford experiments (p. 63), measurements were made of a copper wire vs (it is assumed) an iron-wire resistance decade box. Therefore, the copper (sp. gr. 9.0) is measured against iron (sp. gr. 7.8) --- differential 1.2. Both iron and copper would vary in resistance, but the variation in copper would be the greater.

An experiment is planned (p. 77) using platinum or tungsten wire-wound resistors. Here, the mass differential would be appreciable --- approx 16 gr/cm³. It is supposed that the tungsten would show the greater resistance variation. This combination would be superior to the iron-carbon combination by a factor of about 3. In the use of tungsten wire in velocity sensors (p. 129) it is preferred for the same reason. Aluminum wire, it seems, would be preferred over carbon-comp. because of its greater stability and freedom from resistor noise. However, since the drawing of aluminum into very fine wire is difficult (smallest size approx 0.001 inch) the higher resistance bobbins are quite large. Where size is no problem, aluminum wire resistors have a definite advantage. Therefore, the combination of tungsten with aluminum is preferred. Assuming that tungsten (or the more massive wire) is primarily receptive to these strange newly-discovered resistance changes, one may draw certain conclusions regarding sensor performance which are based on observations over many years. Some of these conclusions are as follows: (1) Resistance decreases as the original electrometer readings increase.

(2) Resistance decreases as Earth negative charge increases.

(3) Decreases as moon crosses upper meridian.

(4) Decreases at 16h ST (Ohio 1937)

(5) Decreases to minimum 4 days after full moon.

(6) Elevation ? The above may be subject to correction or revision as further evidence comes from alternate records. Summary: Based on the above, but still subject to confirmation, the possibilities are as follows: (1) There exists a basic change in electrical resistance to which all conductors are subject which has an extraterrestrial origin. (2) The magnitude of this change appears to be dependent only upon the mass or density of the conductor, the more dense or massive the greater the magnitude of the resistance change. (3) Platinum has roughly 10 times the variation to which (porous) carbon is subject. (4) Resistance bridges made of platinum vs carbon-composition resistor arms easily reveal this extra-terrestrial effect. (5) Other optimum combinations are gold-aluminum or tungsten-aluminum. (6) The electrostatic charge upon the conductor also influences its conductivity. (7) Electro-negativity lowers resistance or increases conductivity. (8) Electron density probably is responsible so that increase in (free) electron population increases conductivity. (9) The Earth, being an insulated sphere in space, is free to accept, maintain and/or vary its electrostatic charge. (10) Influenced to a great extent by solar wind, this charge may vary over wide limits. It appears probable that the earth is positively charged relative to the Sun (Sanford). (11) This may be due in part to the gravito-electric equilibrium whereby the gravitational potential of the sun induces an (equivalent) negative electric potential on the Sun. (12) If the Earth's orbital position (ambient) has (in my view) a higher gravitational potential, then the Earth would have a positive potential relative to the Sun. (13) Earth's position relative to the Sun (perigee and apogee) would vary the electrical potential of the Earth because of the corresponding change in gravitational potential. (14) At full moon, the moon would be more positive than the Earth for the same reason. At new moon more negative. (15) The moon, therefore, undergoes a cyclic electrical potential change in concurrence with its phases, sweeping from maximum positive to max neg and return, with the potential of the Earth remaining near the mean. (16) Actually, the above is an over-simplification. The earth-Moon system has a center of gravity (supposed to be approx 1000 miles beneath the surface of the Earth) about which both bodies rotate, (17) The moon may induce an opposite charge on the surface of the earth closest to it. As the earth revolves this surface charge may travel from E to W, producing a diurnal change in surface potential at any one location. (18) This diurnal pattern will change from day to day depending upon the phase of the moon. (19) At or shortly after full moon the observed pattern (Ohio 1937) is an increase in (resistor) conductivity, hence electric negativity. The low appears about 4 days after new moon. (20) This delay of approx 4 days in each instance may be caused by the capacitance lag of both the moon and the Earth. (21) It must be borne in mind that the electrical capacitance of the Earth is enormous --- estimated at about 1 farad. Such capacitance undoubtedly has a tendency to smooth out all electrostatic variations, as well as to introduce a time lag. (22) To date, the readings of all three resistance bridges in operation (Models A-14, 15 and 16) have shown a consistent drop. This means lowered negativity and lowered conductivity. (23) If bio-electric relations exist, this probably means lowered mitotic rate possibly leading to lowered psychic and physical well-being in humans, and hence, a lowered stock market. (24) Such a relation may indicate that the membranes between living cells, which act as electrical living cells, which act as electrical conductors between cells, perform their functions better when their electrical conductivity increases. A decrease in conductivity, on the other hand, would cause a loss of body energy. This would seem to be the logic of this "radiation" effect on human beings. (25) As to the relation of human affairs to the moon, full moon again seems to have an effect on human activity. Chronic illnesses, hospital attendance, mental institutions, police activity, all have known correlations. Even the words "lunatic" or "looney" seem to show that this effect has been known and recognized for a long time. (26) If resistor sensitivity to this phenomenal variation is, in fact, a function of the mass of the resistor material, there may be materials lighter than carbon in which the sensitivity may be minimum, possibly zero --- a material which is stable. However, such light materials (if metals) are chemically dangerous to handle, such as lithium, potassium, sodium or magnesium.
A better avenue of investigation would be electrolytes or liquids (semiconductors) of specific gravity les than one. (27) Leaky oil (transformer oil containing moisture) would be a possibility. It will be recalled that leaky oil was used in the electrometer (1937) where this effect was first observed for a full year. (28) Bridge arms of platinum vs leaky oil would appear to have maximum effect. Damp pine wood or balsa may be equally effective. (29) And this brings to mind the possibilities of low-density solutions wherein the conductivity is the result of ion mobility. (30) The question then is whether ion populated density also varies as free electron density is believed to vary. If it does not, then any ion-conductance arm (of a bridge) would be an excellent zero reference against which to measure the anomalous resistance change of all electron-conductance materials including all the metals. (31) Another interesting avenue of investigation is the relation of this phenomenal variation of resistance to superconductors --- specifically, to the transition Temperature T_c. It as already been observed that different isotopes of the same superconductor showed that T_c is proportional to $M^{1/2}$, where M is the isotopic mass! Could it be that T_c (of a given superconductor) varies with extra-terrestrial factors, possibly gravitational and/or electrostatic potential?

Are the investigators of superconductivity aware of an anomalous changes in T_c (cyclic or secular variations)? Surely, the resistance changes so apparent (in our results) at room temperature must extend into the low temperature region. One would naturally expect to find anomalous variations in the superconductivity transition temperature. (32) In all of the observations of this anomalous variation of resistance made to date. DC has been used. The resistance bridges have all been battery-powered. It must be bore in mind that AC bridges are equally effective if this is truly a resistance effect. The variations from null are similar to the straight DC system. (33) One important difference might be foreseen. If the incoming "cause" of the resistance change is alternating, rather than steady, the rectified null voltage as measured on our readouts would show it as DC. We would not be able to discern an AC "cause" of high frequency. (34) The inductance of our wire-wound resistors, together with the inter-winding capacitance could be resonant, so that Model A-14, A-15 and A-16 may all have different resonant frequencies, hence, different spectral sensitivities. (35) Evidence of differing readout characteristics has already been observed, especially between A-14 and A-15.

If all models (so far operated) were merely recording a scalar value such as a flux density, all would follow exactly the same pattern, This is not the case. Disregarding a vector effect (alignment of the wire-wound resistors) or azimuth sensitivity, the readings of the three instruments are not strictly parallel. All, so far, have had a significant downward trend, which obviously is not localized within each instrument, but is shared by all. Individual differences persist however. So that it has been convenient to assume that each is operating on a different "channel" or spectrum band, depending on some factor or combination of factors within each instrument. The only factors which are different and distinguish one sensor from another are voltages and resistance. Both may be involved. Hence we have come to classify the sensors as follows: Model A-14 --- 50 V x 600,000 ohms = 3×10^7 .

Model A-15 --- $300 V \times 1,200,000 \text{ ohms} = 3.6 \times 10^8$.

Model A-16 --- 6 V x 10,000 ohms = 6×10^4 . But it is still quite puzzling why distinct channels exist. Is it a resonant effect somehow in tune with incoming natural frequencies? But frequencies in what? Studies should be made, using signal generators both in the audio and RF bands, to determine if these models are resonant.

This determination, it seems to me, is vital to the future of the research in this field. We must find out why the several models, each one quite positive in is reading, are slightly different from one another. One thought is that they each respond t a different energy level --- but again, energy level in what? If resonance is not involved, it is extremely difficult to understand how energy levels could be present. Obviously, the problem is not simple. We seem to have a "bear by the tail". Assuming for the moment that resonance is involved, the following thought occur to me: (1) Resonant frequency must depend upon voltage and/or resistance, as f || V ohm. (2) Based upon the idea of resistor inductance and its relation to frequency, the higher the voltohms, the lower the frequency, A voltohm-to-frequency scale might be as follows: LF: 10¹⁰ voltohms 10⁶ 10⁶ HF: 10² 0

*10*²

VF: 10⁴ *With frequency increasing as VOhm drops.*

120. Affecting the Reading of Model A Sensors by Altering the Electrostatic Potential.

Nov. 11, 1973. In the previous sections, it was suggested that the reading of these sensors would be related to the electrostatic potential of the Earth. It is believed that the resistance of the more massive wire (arm of the bridge) decreases as the potential of the Earth increase. Or, in the other words, wire conductivity is directly related to electro-negativity. The reasoning behind this is that free-electron density increases conductivity. A laboratory test of this premise is easily performed, as:



Negative output of power supply should increase reading, positive output decrease it. This method may be used to calibrate all sensors.

121. Electron Mobility and the Role of Phonons.

Nov. 13, 1973. The thinking expressed in earlier sections of this record book that electrical conductivity is primarily a function of electron density is only partly true. Other factors affect the migration of electrons (electron mobility) beside density. One of the flow-controlling factors is the density and energy of the phonons which are present. Phonons have distinct energy levels which are related to their momentum. Collision with electrons may transfer this momentum to the electron thereby increasing the electron's mobility, hence charge transfer. The

energy of the phonon may be expressed as E = hw, a momentum g and velocity V. The observed behavior, so far, of Model A-16 (6 V x 10,000 ohms) indicated a step phenomenon. The voltage balance of the bridge, near null, at approx 0.009 V goes by steps. The voltage value of these steps is yet to be determined. This could be evidence of a quantized behavior of the phonons. Another interesting behavior pattern of A-16 is the jump --- and groups of jumps. Each jump approx 0.001 V. Groups of jumps occurred near noon Nov. 14 and again in the early evening about sunset. The nature of these jumps indicates that they are not random electrostatic discharges near the equipment (frictional electricity from the wool carpet, etc.) but are definitely related to the quantum voltage levels in the resistor (sensor). The action looks like a chargetransfer avalanche. Initiated by a factor, as yet unidentified, the conductivity suddenly jumps (increases) approx 1/10 of the full (recorder) scale, then decays back to its former level. No new jump occurs until the voltage returns to its previous starting level. A change in the starting level (or return level) sometimes precludes further jumps. These jumps are sometimes quite rare, sometimes very frequent, sometimes singly and sometimes in a long series --- not necessarily at regular intervals. We will watch the A-16 recorder for further characteristics. It is noted that A-14 also engages in jumping, sometimes randomly, sometimes in groups, but always quite irregular in timing. There is no (as yet) correlation between the jumps of A-14 and A-16. No concurrent jumps so far have been observed. This seems to eliminate the possibility of scales flux as a cause, seeming to point up the possibility of distinct spectral bands or channels. However, the underlying flux density does seem to affect all three sensors in the same way. All the sensors have shown a consistent drift downward (increasing conductivity) in the last three weeks.

122. Momentary Losses of Electrical Conductivity.

Nov. 15, 1973. The jumps of Model A-16 are not apparently caused by increases in conductivity (as at first believed --- p. 151) but are "jumps" in resistivity. Rather than being produced by a avalanche of charge carriers (electrons) they must be produced by a sudden lessening of charge carriers; that is, a sudden lessening of charge carriers; the observed case, it is spectral band +4, which is 6 V x 10,000 ohms --- Model A-16). The inhibiting factor must be of very short duration --- possibly a millisecond or less. The recording galvanometer presently in use (Monsanto Model 531-A) is much too slow to respond to the full magnitude of the resistance "glitch". At first thought, it was believed these "glitches" might be ionization bursts from cosmic ray showers, but ionization bursts produc