The dipole paradox

Sunnyvale, Calif. Sept. 17, 1977

In the foregoing section, all capacitors, according to observations to date, reveal a self-potential which can be maintained despite a load. The larger the capacitance, the larger the load which can be sustained.

Even a vacuum capacitor theoretically should be included, although the material dielectric itself appears to contribute. The dielectric constant (K) acts as the determining factor (along - possibly - with density or mass K(m).

It follows that K is a function of the dipole population, and that the electrical output somehow depends upon the charge of the individual dipoles making up the dielectric material. Hence, one would look to the charge on dipoles as the root of the phenomenon.

If this is so, then dipoles must change their charge depending upon some ambient condition. If the dipoles in any (dielectric) medium are aligned (polarized), the charges are additive.

Let us consider a single dipole, the charge on which is not constant. An electrostatic dimensional change will accompany the change in charge. This is the basis of the piezoelectric relation.

The converse may be stated also, i.e., compression will increase the charge. However, compression cannot continue indefinitely so no long-term charging appears possible.

The question remains: What ambient condition could cause the sustaining of a dipole charge against the continuous withdrawal of that charge?

If it is assumed that an isolated dipole receives energy it must:

a) increase its potential difference or
b) reemit energy and remain in equilibrium with its ambient.

If the dipole potential difference is lowered (drained by associated circuit) below equilibrium, it must:

a) attempt to regain equilibrium potential,
b) stop re-emission (or reduce re-emission) until this is accomplished.

In short, it would appear that any electric dipole is in equilibrium with (something in) the ambient and that the equilibrium potential varies with the potential of the ambient. Diurnal and secular variations occur in the ambient.

The next and possibly the $64 question is "how and what ambient condition can cause the charging of a dipole?

40

261

Natural dipoles in matter

Sunnyvale, Calif. Sept. 17, 1977

Electric dipoles exist everywhere in nature. Atomic structure (electronic-protonic) and certainly molecular structure is fundamentally dipoles. The very rigidity of matter (solid) depends upon the presence of electric dipoles. Elasticity is the result of electric fields.

One could say therefore that solid matter is an assembly of electric dipoles rigidly held together, usually randomly polarized. Dielectric materials may, in certain cases, be polarized.

As an assembly of dipoles, all matter may be in equilibrium with some (unknown) factor in the ambient pressing energy. To remain in equilibrium, if that energy is absorbed, it must be re-emitted in equal amount. If electrical energy is withdrawn from the dipoles (by loading), the re-emitted energy will be lowered (lessened) temporarily by an amount equal to that withdrawn.

This thesis was developed in Sec. 183 "Re-emission of radiant energy by masses" Feb. 7, 1975.

In the present section, this hypothesis has been extended and detailed by providing a specific function to electric dipoles.

The observable fact that capacitors spontaneously generate a self-potential is startling. This is not an accepted function of capacitors. At first, one would be inclined to attribute any such self-potential as arising electrochemically within the capacitor dielectric material or possibly a contact-potential effect. All such effects would, to a controlling degree, be temperature related. Most such effects would increase (in voltage) as the temperature is raised.

But when the temperature is held rigorously constant, it becomes difficult (if not impossible) to attribute the observed results to this cause. Variations occur which are not temperature related.

No tests have yet been conducted with vacuum capacitors. The value of such a test is obvious. Vacuum capacitors are merely large dipoles. It is still not clear how the initial polarization is obtained. What determines the orientation of the poles. Is it possibly the gravitational vector?

In the early tests of Catalina granite, stones were picked up along the coastline. Most were oval-shaped flat stones which had been made smooth by the surf. Most appeared to be granitic.

Before being picked up, the upper sides were marked with red paint. When later tested at the laboratory the painted (marked) sides were found to be positive.

This correlation appeared to be about 90%, well above chance. It may have indicated that a vertical orientation was responsible for the polarization. The question may be asked:

1) Is the polarization a result of induction or conduction from the atmospheric electric gradient? Or

2) Could it result from the gravity field? See Sec 144. Record Book No 3.

The vertical polarization of Catalina stones was discussed in Sec. 171, Record Book No 3. dated Sept. 14, 1974.

The possibility of a gravity-induced polarization (and self-potential) should be further investigated. Could it explain the atmospheric electric field. See P. 37.

One experiment might be as follows:

1) Linear capacitors in vertical series.

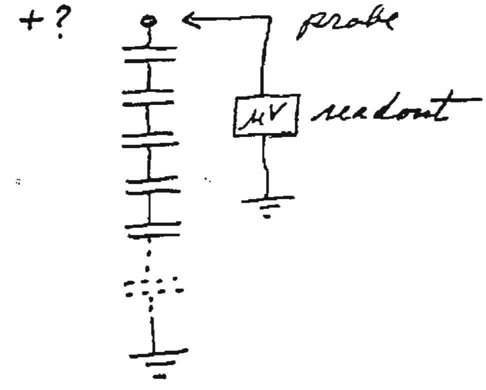


Fig. 1

2) A stack of flat, copper coated, plastic sheets.

9/22/77

A non-directional test may involve the use of a spherical capacitor, as

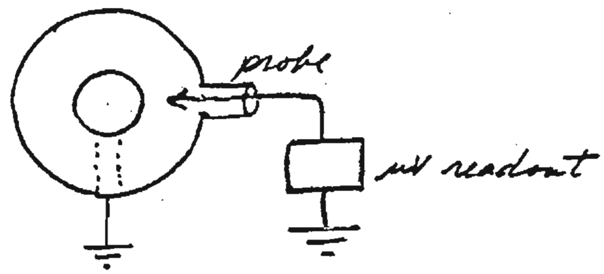


Fig. 2

Question: Will the inner sphere be charged spontaneously?

This brings to mind the studies of Prof. Fernando Sanford, Prof. Emeritus of Physics, Stanford Univ. published in "Terrestrial Electricity" - Stanford Univ. Press.

Prof. Sanford, using especially adapted quadrant electrometers reported a charge developed in apparatus similar to that shown in Fig. 2. He further reported observing variations in that charge, at times diurnal reversals. Prof. Sanford attributed the effect to a variable "charge" on the Earth, as a conducting sphere in space.

His reasoning was that the charge on the Earth varied (from hour to hour) but the charge on the inner sphere did not vary — hence, a potential difference developed.

This experiment must be repeated with sensitive and reliable instrumentation.

T. Townsend Brown
9/22/77

274 On the possibilities of observing "ether" density.

Sunnyvale, Ca. July 16, 1978

It is fascinating to speculate on the possibilities that ether flux and ether density may be involved in these observations. Also, is vectoring possible so as to observe a "flow" of ether (as was sought by Michelson, Miller & others)?

If the water/air observations recorded in the previous section are found to be valid, it lends considerable strength to further consideration of the "ether". It is to be noted that no (other) explanation of this entire self-potential phenomenon is (as yet) tenable.

The following thoughts are suggested:

1) The base parameter being observed in the various sensors is "ether density". Secular changes may correlate with variations in "C" which have been overlooked or discounted.

2) Geophysical enviroment (including heat) may be related to the ether density of the region (effects of ambient mass or temperature).

3) Individual differences (between sensors) are still enigmatic. Must ultimately be explained. May be due to some resonant effects.

T. Townsend Brown 7/16/78

279 The Nature of the Primary Radiation.

Sunnyvale, Ca. Aug. 26, 1978

As suggested in the previous section (278) there is reason to believe that the primary energy "flux" is oscillatory or wavelike. As such, it would be classified as a radiation.

The first candidate, of course, would be electromagnetic radiation. But since sensors are encased in shielded containers, grounded and, in some special tests, even underwater, most of the radio, heat and light frequencies must be excluded as causing the observed effects. VLF may, of course, penetrate ordinary shields. X rays and gamma rays, at the high end of the electromagnetic spectrum can also penetrate shielding.

Tests already conducted in the mineshaft at UC Berkeley seem to prove that whatever the primary is it is extremely penetrating, more penetrating than X rays or gamma rays. Even VLF radiation would be highly attenuated. The mineshaft observations revealed little, if any, attenuation under approx. 250 ft. of rock overburden.

At this point, it seems improbable that EM radiation (at any frequency) is responsible. However, critical tests should continue.

It is proposed in this section of the notebook to explore other possible "radiations"

Other possible candidates are

1) Gravitational waves — ranging in frequency from VLF up to optical frequencies and above. The possibilities of optical frequencies are intriguing.

This has been suggested a number of times in earlier sections of this notebook.

2) "K" waves from cosmic sources.

This appears to be a new concept. I have never seen any reference to it in the scientific literature.

"K" waves; i.e rapid variations in the dielectric constant (electric permittivity) of free space may, in fact, exist.

The propagation velocity may exceed that of light. Reasons are as follows:

The constraints which limit the speed of light are K (dielectric constant) and μ (magnetic permeability). The limitation results from the ability of successive regions of space to "store" energy. When a ray of light moves, it is progressively charging, storing and discharging regions in rapid succession. The analogy might be the falling of a row of dominoes. The rate of energy transfer depends on the step-wise storage capacity represented by K and μ.

I have at this moment no idea how a "K" wave may be generated. But the energetic processes of quasars and black holes may have many surprises.

Assuming for the present that "K" waves are generated in the cosmos, perhaps at the centers of galaxies, what might be their effects?

Since they would be oscillatory in nature, no net change would appear in the speed of light. But what would be the effect on a charged capacitor?

If the capacitor has a given charge, the momentary reduction in K (ambient and internal) would increase its terminal voltage. If K were increased, the voltage would drop. Hence, if K were oscillating or pulsing, the terminal voltage would engage in similar pulsations.

If the sensor circuit contained a rectifier these pulsations may cause a dc voltage which would add to the original charge.

Another observation which may be significant in this respect is the rapid fluctuations (during events) which occur in extremely high-capacitance capacitors. A capacitor sensor of several farads may sometimes be seen to vary several millivolts so rapidly that it is inconceivable on the basis of charging and discharging electrical energy.

This presents a real enigma.

An experiment to shed further light on the above can be set up as follows:

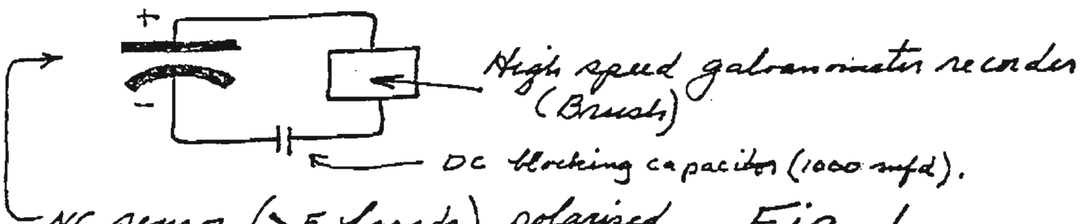


Fig. 1.

This experiment should be carried forward as soon as possible. It should also be done with a scope to test for pulses above 100 Hz (the limit of the Brush).

Every precaution must be taken to shield the sensor. Placing it within a pipe casing (even pressurized to 100 lbs/sq. in or above), placing it underwater or deep within the earth (as in a well casing) would be desirable.

It is noted that a water well (at present unused) is available at the Veterans Administration Hospital in Menlo Park, Ca. Plans should include the use of this well.

Other tests may be performed, using the set-up as in Fig. 1, in deep seawater at some facility such as the Navy Base at San Diego or the Marine Lab. at Key Biscayne, Fla.

Such tests were proposed in Sec. 271 of this notebook.

T. Townsend Brown
8/26/78

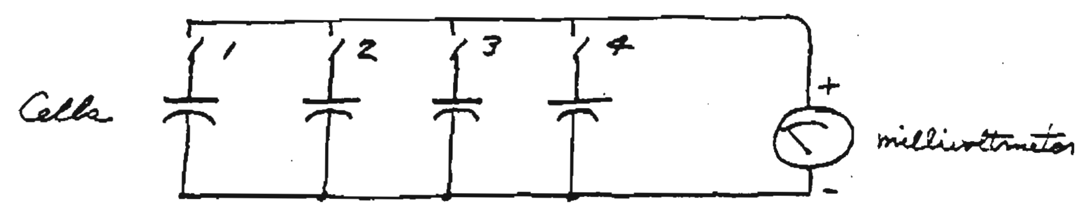
287 "Individual Differences in Sensors"

Sunnyvale, Ca. Nov. 19, 1978

It has long been noted that rock sensors are individually different, both as to output and phasing of the diurnal signals. Electrolytic capacitors likewise were found to be individually different. And now it is clear that nickel-cadmium cells all have their individual characteristics.

This points strongly to the hypothesis that the basic effect is a resonance phenomenon, presumably related to a molecular resonance within the dielectric material. Ref. Sec. 278 And if this is so, the absorption of primary radiation is related to the natural resonance of the dielectric (dimensions or composition).

A test was conducted as follows with 4 (seemingly) identical GE nickel-cadmium batteries (Size "D"):



Observation 1. All switches closed for two weeks.
Result: 0 millivolts total output.
" 2 All switches open, then separately closed.

	Sensor No 1	2	3	4
11/19 At 1358	0	0	0	0
1400	2	2	0	1
1440	12	13	0	7
1530	26	24	0	15

Readings in mV.

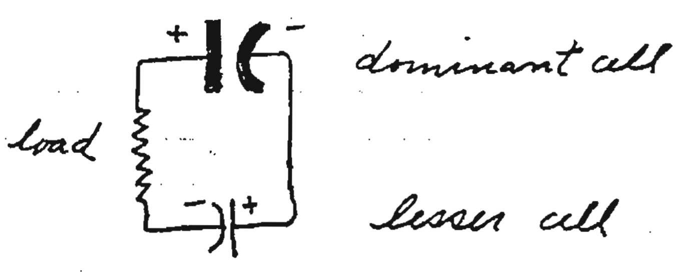
In studying the foregoing results, it is clear that Sensor No 3 is a "dud". It has shorted the others, so that in parallel the system was shorted and read zero millivolts. Further it indicated that Nos 1 + 2 are superior to No 4.

It then necessarily follows that in selecting sensors for output, individual tests and rating must be performed.

Dominant Cells:

An interesting characteristic has been discovered. There appears to be evidence that when cells are in series under a load, one cell (probably with the lowest resistance) dominates over the others in the series to the end that the others are largely depolarized and cease producing. It reminds me of dominating persons who actually cause others with whom they are connected to cease "trying". The total output, therefore, becomes little more than that of the dominant individual.

Graphically, the result looks like this:



In extreme cases, the lesser cell may suffer a polarity reversal, actually lowering the combined output or that of the dominant cell.

The foregoing effect takes place only when there is an excessive load for extended periods of time. Series circuits with short-term loads (minimum dwell time) will not be seriously affected. There will not be time to devitalize the lesser cells.

Ordinarily, series circuits that are unloaded tend to drift to peaks that are relatively stable, not subject to diurnal or secular variations. A small continuous load must be provided to "bleed" the stored energy so that down-trends become evident. In some cases, 100 K Ω is sufficient but loads of several megohms may be required if the cells (sensors) are small.

Cells in parallel do not suffer the effects of dominant cells — at least to the extent that polarity reversal does not occur. However, "like persons in a trade union" the superior cells cannot contribute a higher emf output than the inferior cells. A partial solution is to use individual series resistors as described in Sec. 281, Fig. 1. This permits the higher output cells to operate at their own (perhaps higher) natural voltage output without restraint.

While the tests performed (to reach the conclusions expressed above) were on capacitors, the same applies to rocks. Rocks in series should be matched as to output and resistance and then only with minimum load.

T. Townsend Brown
11/22/78

294 "Possible Diurnal Variations in the Modulus of Elasticity – Internal Fields".

Melbourne, Fla. Mar. 30, 1979

In the previous section (P. 107), I wrote of a possible explanation of the Saxl variations being in the suspension and not the masses. If internal electric fields change (as is evidenced by the petrovoltaic effect), there could be basic and diverse results.

Two such results come to mind immediately.

1) Change in <u>electrical resistance</u> of all materials, (so-called conductors – metals, semiconductors and insulators). It is quite reasonable to suspect that the resistance to electric flow may be affected by internal fields. Such fields, depending upon polarity, may impede or assist the flow of electrons, i.e. conductivity. Hence, the resistivity of materials may be found to change spontaneously, possibly bearing a relation to the energy flux (whatever it is) that gives rise to the petrovoltaic effect.

Evidence of such a change in wire conductors appeared in the classic experiments of Fernando Sanford. See Record Book No 3. Sec. 123

This phenomenon was explored and carried forward in tests (by us) using a resistance bridge employing wire resistors and carbon resistors (as bridge legs).

Variations in the balance did appear but the work was superseded by tests with rocks and capacitors. Tests of the diurnal change in resistance were temporarily suspended.

Nevertheless, a sensor – so-called "gravitocell" (Record book No 4. Sec. 202) was foreseen as based on variations in resistance.

2) Change in the modulus of elasticity of all materials including conductors (metals). Physical size and shape of a material body obviously depend on its internal electric fields. These fields may not be constant as presently believed but may be variously affected by the petro-voltaic effect.

The "contortions" of piezoelectric materials under varying charge is an example. Physical shape (and size) is affected by the internal field — as in barium titanate transducers. In short, the elasticity of barium titanate may also be (and probably is) affected. A $BaTO_3$ filament would reveal such a change in elasticity with charge.

If the filament is not charged, the question is — would there be a change in internal electric field brought on by petrovoltaic flux? And, as a result, would there be a change in the elasticity of the filament

296 "Sensors based on Changes of Resistance"

Melbourne, Fla. Apr. 1, 1979

In Sec 180, Notebook N°4, and in earlier sections, it was recorded that resistors appeared to generate an anomalous voltage (believed to be rf) which, in the experiments conducted at that time, could be rectified by a diode and stored in a capacitor. (Sec 180 - Fig. 1.)

I want to point out that the so-called "petrovoltaic effect", as suggested in Secs. 294 and 295, may be present in all semi-conductors, even in metallic conductors. This could have been the basis for the Fernando Sanford resistance variation experiments.

In certain cases, the apparent change in the resistance of susceptible materials may be traced to a self-potential developed within such materials which are being polarized by the passage of a current.

In other words, using a current to measure the resistance of a conductor could, itself, polarize the material of the conductor so that it would be susceptible to the petrovoltaic variations, such variations showing up as anomalous changes in the apparent resistance of the conductor. The copper wire of the Sanford experiments may have been so affected — producing resistance changes with time which have never been understood or explained to this day.

All this points up the belief that the petrovoltaic effect may not be limited to rocks or to capacitors but may be found in the behavior of resistors, i.e. as an anomalous change in resistance. It is, therefore, a far more fundamental effect than heretofore suspected.

One must realize that an intrinsic self-potential generated within a resistor would reveal itself as a change in resistance of the resistor. Rather than having constant resistance, as one would expect of high precision units, there would be variations which could not be eliminated or reduced. These would be, and no doubt have been, explained away as noise or the like.

Petrovoltaic output may, therefore, be present in every resistor carrying a current — the effect being masked as an anomalous change in resistance.

In the early tests at NRL and since, lead monoxide blocks were used along with approx. 100 KV DC. The experiments were essentially "resistance measuring". The diurnal patterns were revealed almost precisely as in the subsequent tests with rocks and capacitors. It would seem to confirm, therefore, that the phenomena are related — perhaps two aspects or manifestations of the same basic effect.

This leaves us with the promise of another form of petrovoltaic sensor. Now, it seems that the name "petro" is not appropriate as it was (originally) when only rocks revealed the effect. We may now have to come up with another (more appropriate) name to cover a more fundamental phenomenon in physics.

In the meantime, experiments should be conducted to confirm specifically the presence of the effect in resistive materials:

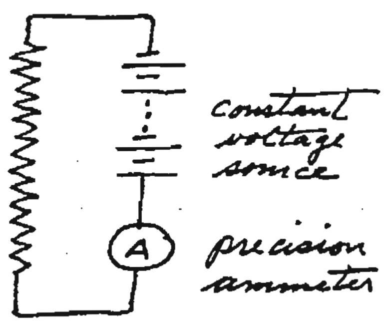


Fig. 1

Using a capacitor as resistive material

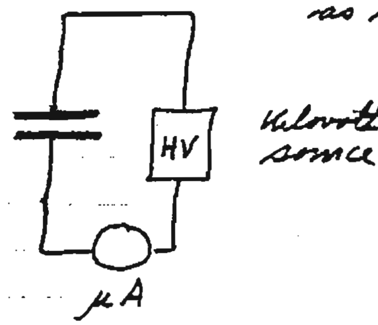


Fig. 2

The above tests must be performed in rigorously-shielded, constant-temp. conditions. Under such conditions, classical physics would predict only constant current.

Other circuits, using resistance bridges with differential materials, could increase the sensitivity of the tests.

T. Townsend Brown
4/1/79

Dipole "augmentation" Hypothesis

Melbourne, Fla   Apr. 2, 1979

Polarization of molecules in the form of charged dipoles appears to be the root of the petrovoltaic effect. Once polarized, the molecules of all matter appear to have the capability of increasing the polarization, i.e. actually increasing their energy content.

Such additional energy, it is believed, has a cosmic source. It is not derived from the matter itself, as shown by the anomalous diurnal and secular variations.

In general, and obviously as a basic effect in the electrical composition of matter, dipoles (once formed) appear to gain energy from an external source.

In certain dielectrics, dipoles exist thruout the body of the dielectric (as in Carnauba wax (electrets) or piezoelectric ceramics). Their voltages are additive when aligned. These materials readily show the petroelectric variations which are characteristic of the "augmentation" phenomenon. Hence, certain rocks and virtually all capacitors reveal the effect when once polarized. Additional energy is captured (somehow) which increases the polarization and provides the characteristic "cosmic signals".

The problem then appears to be the "method" by which the dipole charge is increased. No clear picture is available in contemporary theory. The following hypothesis is offered.

Basically, it is a "charge-separation" phenomenon. Many processes in nuclear physics provide charge separation. If neutrinos (from space) are responsible for the added energy, a kind of inverse beta decay may be involved. If optical frequency gravitational radiation provides the energy, the theory is quite complicated.

In any event, one can say with some degree of certainty that the positive side of the dipole must be caused to emit electrons which then are absorbed by the negative pole — against the field. Or conversely, the negative pole emits positive charges which are taken up by the positive pole. Doing work against the field adds energy to the dipole — increasing the potential.

An explanation may be that

1) Electrons are ejected by the nucleus. (Beta rays).
2) Synchrotron electron emission from certain inner shells.

This is a phenomenon in nucleonics and solid state physics requiring the assistance of qualified theorists.

T. Townsend Brown
4/2/79

298 The Phenomenon of Charge (energy) Acquisition by Electrically Polarized Materials

Melbourne, Fla. Apr. 2, 1979

In summary of the foregoing sections, it appears that the petrovoltaic effect in rocks and capacitors is related to the anomalous change in resistivity (as reported by Sanford). It is one and the same phenomenon in two different forms.

The petrovoltaic effect may be defined as the spontaneous increase in the polarization of any electrically isolated dipole or system of dipoles. The effect is observable in any capacitor (or capacitive material, rocks or the like) where some initial polarization exists.

The resistivity effect comes about by reason of the polarization of the conductor material caused by the current which, in turn, produces (what may be described as) a counter-emf in the material, resulting in an increase in the apparent resistivity.

In short, every conductor carrying a current contains polarized molecules which are aligned in the direction of the current. The alignment of dipoles then generates an emf along the conductor, adding energy to the system, so that the apparent resistance of the conductor is increased. See Fig. 1.

ials

In certain cases, where the material of the conductor is the dielectric of a capacitor, resistivity may be infinite, with the so-called "counter emf" cancelling the resistance "voltage drop". See Fig. 2.

Adapting the term "counter emf" to mean petrovoltaic "voltage", the designation is appropriate where resistivity is concerned. I think what I am trying to say is that a conductor (a long single strand of wire for example) carrying a current will generate a counter-emf thruout its length which will act to increase the apparent resistivity of the conductor.

It may turn out that this apparent increase in resistivity will be a direct function of the current being carried. It would seem logical that an increase in current would cause an increase in polarization and, hence, an increase in counter-emf and the resulting resistivity. This possibility should bear testing. Would this represent a departure from Ohm's law?

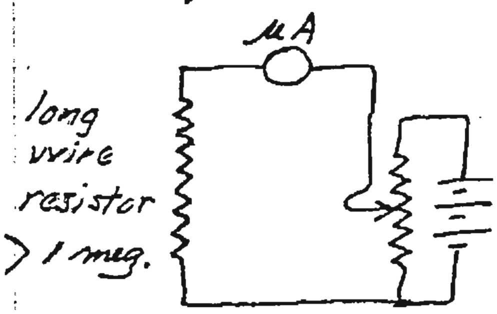


Fig. 1

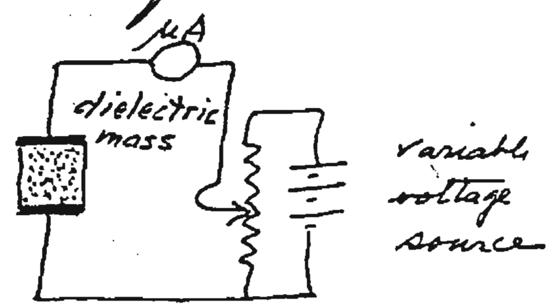


Fig. 2

In Fig. 1 a long (fine) wire is represented as the resistor. The wire may have high conductivity (as copper) or low conductivity (as a carbon filament). It would be, I think, reasonable to assume that the carbon would generate a higher counter-emf, hence increase its resistivity faster as the current is increased.

A curve of resistance vs current would be interesting to see. Increasing the (feeder) voltage with constant resistance would (or should) increase current proportionately (Ohm's Law). However, in this instance I suspect there would be a notable departure.

The resistor would begin to act as a capacitor. Measuring the resistance of a capacitor, under gradually increasing charging voltage, should reveal the same effect, with the capacitor gradually becoming an electromotance to the point where charging current would drop to zero (at infinite resistance, or the current may (and probably would) be found to reverse.

This would be in keeping with the petrovoltaic effect found in dielectric materials, but it would be rather surprising to find it also in (for example) a copper conductor, which heretofore has never been considered to be an electromotance.

T. Townsend Brown
4/3/79

300 "Anomalous Charge-Accretion in Dipoles"

Melbourne, Fla. Apr. 16, 1979

Continuing the thoughts expressed in Secs. 297 and 298, one may summarize the evidence to date as follows:

1) The entire phenomenon is far more basic (in physics) than anticipated.

2) It not only involves an anomalous self-potential in rocks and capacitors, it is manifested in the conductivity (or resistance) of (apparently) all conductors.

3) It may also be related to many physical "constants" such as elasticity, thermal conductivity and even dimension.

4) In general, all physical parameters which are governed by internal electrical cohesion between molecules which are electrically polarized.

All the phenomena which have been experienced so far appear to have a root in dipole behavior, more specifically in the anomalous variations in dipole charge. Far from being constant, as heretofore supposed, many (if not all) dipoles spontaneously vary in charge, such variations apparently representing the capture (accretion) of energy from an unknown ambient source!

Just how a dipole may "capture" energy and (hence) increase its charge is the $64 question. Obviously, some form of "charge separation" is taking place.

If the ambient energy is a neutrino flux, it has been suggested that a kind of reverse beta decay could be at work. If it is gravitational radiation of ultra-high frequency (perhaps even optical frequencies) electron displacement within the atomic structure could cause charge separation.

The (inner) electric field of the dipole may play a part in the charge separation, thus preventing re-combination. There are other possibilities which could account for the charge build-up and which should be investigated by competent theoretical physicists.

One thing appears certain — that an ambient energy source is at work, and that the source is not constant but engages in diurnal & secular variations and sudden "bursts". From all the evidence to date the source must be extra-terrestrial.

Any sensor may be "loaded" with a resistance so that Joule heating is produced. Obviously, the energy to create the current which causes the Joule heating must come from an external source.

T. Townsend Brown
4/16/79

301 # "Liquid Conductors as Sensors"

Melbourne, Fla. Apr. 20, 1979

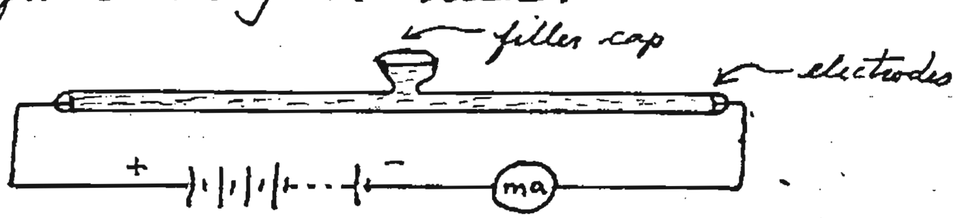
In Sec. 296, the use of conductors as sensors was discussed. This was based on the belief that current flowing in a conductor caused the material of the conductor to become polarized in the direction of the current, hence therefore, to develop a petrovoltaic emf which would be manifested as a change in resistance of the conductor.

This effect would, it seems, be observable in all conductors, solid and liquid. The question here is whether the ion-mobility in gaseous and liquid conductors might prevent the generation of an emf.

I don't think this can be answered until some tests are performed.

In the meantime, some attention may be given to the design of some experiments.

1) Glass tubing filled with various liquids may be tried.



Suggested liquids:

1) Dilute H_2SO_4,
2) CCl_4
3) Benzene
4) Thallium formate
5) Acetylene tetrabromide
6) Various oils

It would appear, based on the behavior of electrolytic capacitors as sensors, that an electrolyte can show the petrovoltaic effect. Nickel-cadmium cells and lead-acid cells are additional examples.

It would be interesting to learn if the K of the dielectric or semi-conducting liquid is a factor. Also the mass (density) of the liquid.

For example, (very) pure water with a dielectric constant (K) of 81 may be quite effective. Certain heavy liquids such as thallium formate would be interesting to test.

I would suspect that the polarization of liquids would exist only so long as a current is flowing. Cessation of the current would result in immediate depolarization. Hence, the effect (if it exists) would be observable only as a change in resistivity. Diurnal + secular variations may be revealed.

An interesting experiment would be to immerse finely-ground rock or sand (the grains of which are polarized) in a suitable liquid carrying a current, thereby to align all the grains so that the individual voltages are additive. In this way, solids and liquids could be advantageously combined to produce a permanently polarized material.

T. Townsend Brown
4/20/79

"Cosmological Gravitic Background Radiation"

Sunnyvale, Ca. June 10, 1979

This section deals with the possibility that the ~3°K (black body) electromagnetic radiation in the universe may not be the only vestigial evidence of the "big bang". It seems reasonable to believe that the extremely high temperatures and chaotic conditions which existed during the birth of the material universe could also produce a tremendous flux of gravitational radiation extending throughout the spectrum, analogous to the em radiation.

One might say that, perhaps, the gravitational "noise" of the big bang could have equalled or exceeded the electromagnetic noise –

If this hypothesis of gravitational noise is pursued, one might look for remnants existing today. Would it pervade all of space? Would it have cooled to a lower frequency? Would it have cooled to an equivalent of ~3°K, as em radiation is believed to have done.

Perhaps, what we have referred to in the previous sections as the primary radiation (from space) may be this residual radiation. It could constitute a flux (coming from all directions) in the ambient of the Earth.

One would expect such a flux, if it does exist, to be rigorously constant in intensity. The fact that the "primary" radiation we seem to have been observing is not constant but varies over wide limits, displaying diurnal cycles & sudden bursts.

This may indicate the possibility of several sources — only the steady base of which is black-body cosmological. Other sources may be of stellar or black hole origin. Glitches may come from super novae or the like.

Diurnal variations would appear to be caused (in some way) by the rotation of the Earth with respect to fixed cosmic sources — modulating those sources by axial or orbital motion or by interposing absorptive material.

It would be difficult theoretically to estimate the energy in the big bang residual (present today). If such an energy ambient does exist around the Earth, it could account for the energy output of our sensors. One may not have to depend solely upon the output of black holes or other stellar objects, although such objects may modulate the observed flux.

We must somehow determine the frequency response (resonance) of our various sensors, and, at the moment, I have no idea how this may be done.

T. Townsend Brown
6/10/79

306 Anomalous Electrical Signals in Electrochemical and other Semi-Conducting Systems.

Chapel Hill, N.C. June 23, 1979

In the original studies at the Naval Research Laboratory (and earlier), this phenomenon was entitled "Anomalous Behavior of Massive High-K Dielectrics." It appeared originally as a change in resistivity of certain dielectrics such as lead monoxide (PbO) in a paraffin or Bakelite binder. These were effects which were noted especially when high voltages (50 - 200 KV) were applied.

Later, a similar phenomenon was discovered in granitic and basaltic rocks and it became apparent that the effect arose because of the existence of a self-potential in materials of this kind and in dielectrics in general.

The self-potential, which varied over wide limits, produced the observable effect of a resistance change — in the same manner as a counter emf.

This development brought on the feeling that all dielectric materials shared the phenomenon and that it might well be expressed as a "charge accretion in electric dipoles".

Various (high capacitance) capacitors were examined, including oiled paper (Pyranol), mica (Cornell Dubilier), ceramic (barium titanate) and aluminium electrolytics. All were surprisingly effective in producing a self-potential. But, the most surprising finding was that the self-potential was not constant even at rigorously constant temperature.

All types of capacitors revealed wide ranging secular variations in voltage output. Many had persistent diurnal variations and sudden voltage "bursts" which appeared to have no local (terrestrial) explanation. The thinking inevitably turned to a possible cosmological origin — such as a neutrino flux or optical-frequency gravitational radiation.

The use of capacitors in observing such extraterrestrial factors apparently was a new idea — not indicated in the technical literature. The development of an emf, even when the capacitors were resistively loaded, indicated the absorption/conversion of energy. And this energy must have a source.

In comparing capacitors as to maximum output, it quickly became apparent that high capacitance ratings were important. Values of 250,000 mfds produced substantial voltages & currents. Capacitors in series produced additive voltages, up to 5 volts in certain tests. But such capacitors were (mostly) of the (aluminum) electrolytic type.

The investigation turned next to the use of other "capacitive means" such as rechargeable batteries.

It must be borne in mind that a rechargeable battery is, in fact, a capacitor of very high capacitance — estimated in the "super" farad range. Hence, such capacitors should be very effective in this application.

But, to be effective, the "battery" must be fully discharged — drained completely of any charge which had previously been applied. Once completely discharged (for a period of days), the battery becomes, in every sense, a super-farad capacitor, capable of responding to an (external) charging source.

The difficulty here is in understanding what is going on. The "discharged battery" is an electrochemical device. Energy could still come from its electrochemical activity — so that it would be difficult to prove (from a theoretical standpoint) that any gain in voltage was not of electrochemical origin.

However, such electrochemical activity is (in the main) temperature dependent, so that if the temperature is held constant, the electrical output should be constant.

When such "capacitors" are held at constant temperature, it is soon noted that secular and diurnal variations in output continue to occur. The total energy involved is relatively great (compared with non-electrochemical capacitors).

Hence, the use of electrochemical systems is an important, perhaps significant step, in the search for energy converters which make use of this phenomenon.

The theory is complicated, and certainly not understood at present. Just how an electrolytic film can acquire a potential gradient from an external (radiation) source is the crux of the problem. But the problem doesn't stop here. Any dielectric or semi-conductor appears to share the same effect. Even long wires which are carrying current show the effect as an anomalous change in resistance (possibly a counter emf). So that one may say that it "boils down" to the rather "heretic idea" that "any system of electric dipoles accrete charge spontaneously — possibly by absorbing/converting energy from some (apparently) cosmological source."

T. Townsend Brown
6/23/79

307 "High-output Electrets"

Chapel Hill, N.C. July 2, 1979

Carnuba wax electrets are easily made by melting the wax and allowing it to cool and solidify in the presence of a strong electrostatic field.

In the molten state, any dipoles which are present at that temperature (if any) are randomly oriented. If the wax is then slowly cooled in the presence of a high voltage field, the dipoles are aligned by the field. The alignment is preserved as the wax hardens.

Electrodes in the direction of the alignment pick up the charges so that the electret, now permanently electrified, displays a high voltage. But due to the extremely high resistivity, virtually no current may be drawn.

Electrets with low resistivity could, conceivably, produce usable current if the emf could be maintained.

It is suggested that experiments be performed using such semi-conducting (low resistance) dielectrics as the following, instead of wax.

Bismuth (metal) 119 Ω cm m.p. 270°C. d=9.8
Litharge (PbO) 128 Ω cm, m.p. 888°C d=9.5

Such materials may make good sensors.

T. Townsend Brown

Negative Resistance

Chapel Hill. N.C. Dec. 14, 1979

In carrying forward further studies of the circuit (Fig. 1, P.143), it was noted that the resistance of the capacitor shifted from positive to negative in the course of about 3 hours.

This means that the capacitor was generating a potential greater than that of the battery and that the current reversed direction. Strange as it seems, the electrical energy was flowing from the capacitor to the battery.

When one sets up a circuit to measure the resistance of the (oil) dielectric, i.e. dielectric loss, he expects positive values – usually measured in nanoamps. It is surprising, therefore, to find a situation where the current is reversed.

Of course, all petrovoltaic sensors generate an emf. All act as batteries when output alone is measured. But when measuring the resistance of the dielectric material itself, the losses usually make the values of resistance positive.

In the case of oil dielectrics (G.E. "Pyranol"), negative resistance is sometimes (not always) observed. It is seen to shift from positive to negative (sometimes) in a circadian pattern. It also appears to share the perithermal effect.

In the case of RC 20, some further surprises have occurred. As stated in Par. 1 above, this sensor (circuit as indicated in Fig. 1, P143, was placed in a large 4 litre beaker.

A series of tests (in air) followed. At first, there was (what was considered to be) normal conduction. Current flowed in the circuit indicating (positive) resistance in the Pyramid dielectric.

Gradually, this current decreased, finally crossing zero within a few hours. This indicated either that there was no dielectric loss (or absorption) or that a counter emf was being generated.

Then the current definitely reversed — indicating either negative resistance in the capacitor or that the capacitor was actually generating a voltage in excess of the battery voltage.

Strangely, this increase has now continued for several days — reaching as of today (Dec. 16) 86 mV greater than the battery voltage.

During the day, today, the record became quite disturbed, with a series of major glitches topping at above 130 mV., then returning to the steady state at approx. 86 mV.

The appearance of this series of large glitches dispels any thought that the battery (somehow) was failing. The cause of the glitches (as usual) remains a mystery. There appearance, however, suggests possible correlation with meteor showers, and this certainly must be investigated.

T. Townsend Brown
12/16/79

314

Effects of Ambient Mass

Chapel Hill, N.C. Dec. 23, 1979

The studies of the resistivity of the oil (Pyranol) in the G.E. capacitor - 10 μfd 600 (Working) V. as described in Sec. 310 to 313, have brought out some surprising results.

Using the simple circuit, as set forth below, studies of the Linden pulsations, perithermal action and other transient effects have been undertaken.

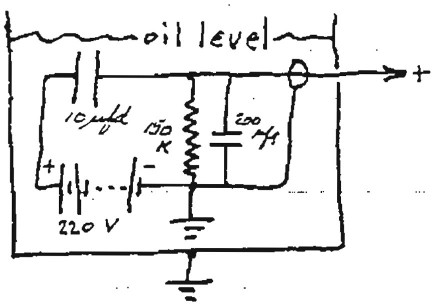


Fig. 1

1) In grounded alum. tank — no oil.
Pronounced Linden pulsations.
Strong glitch to neg. 0413 12/19/79

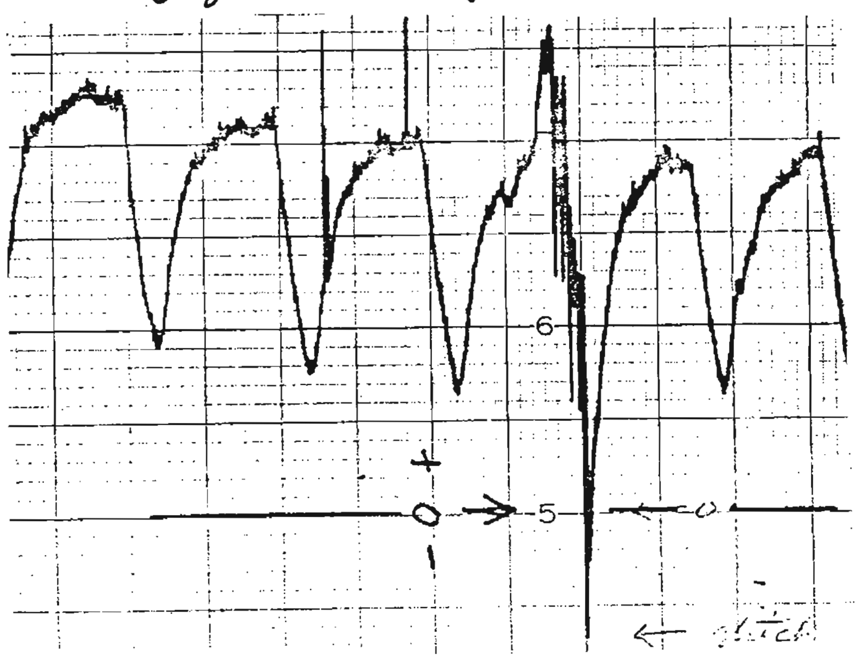


Fig. 2

Capacitor in air

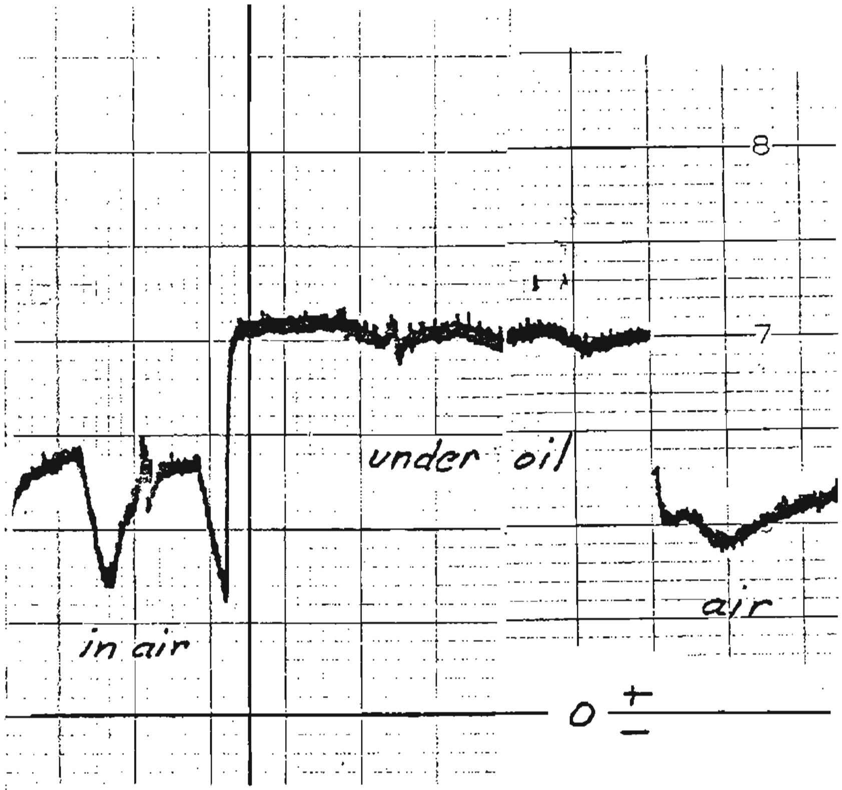


Fig. 3.

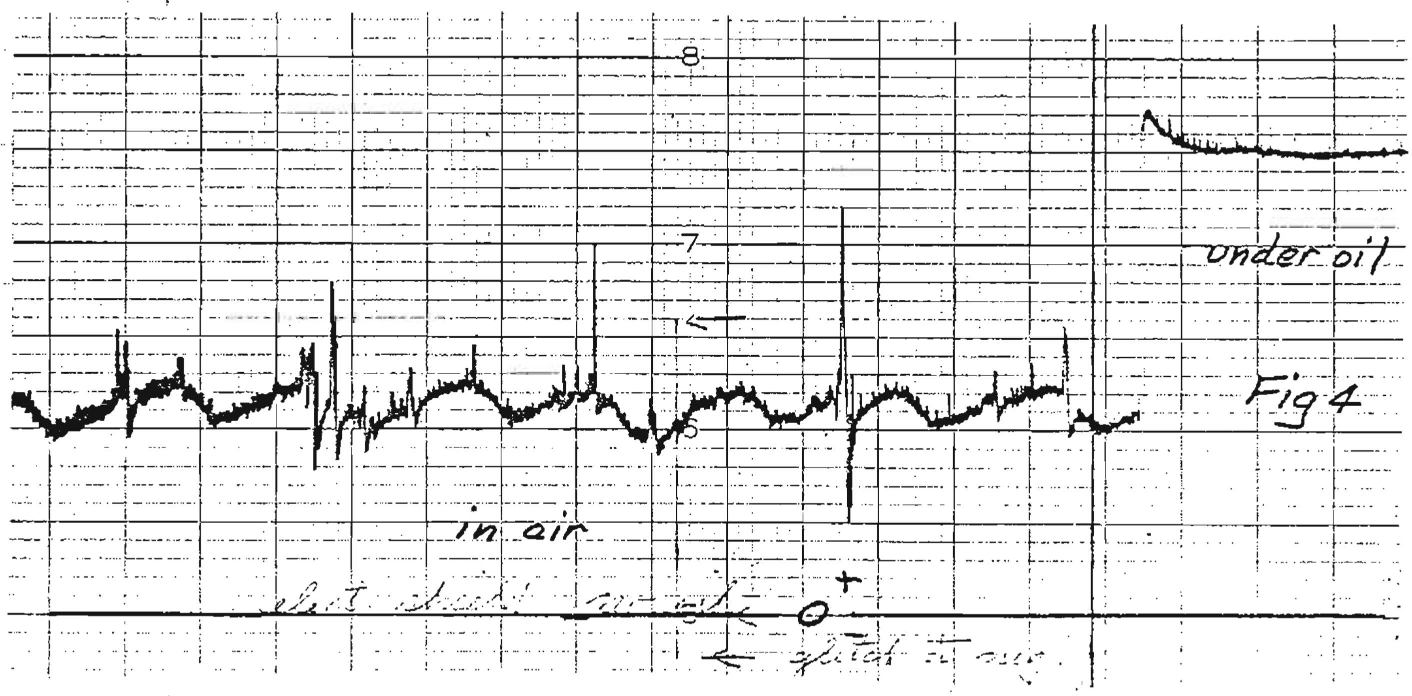


Fig 4

In Fig. 2, the sensor system (consisting of the Pyranol capacitor, 200 V battery and associated resistor + smoothing capacitor are bundled together in a grounded container but with no oil. A variation due to ambient temperature change is noted — 60% of the total resistance.

A negative glitch appeared at 0413 12/19/79 which carried across the zero — meaning neg. resistance of the Pyranol for a short period — then recovery back to positive.

In Fig. 3, the system was placed under (new) transformer oil. An increase in conductivity (lower resistance) occurred. This was confirmed again in Fig. 4.

Meaning of oil immersion.

The first thought one has in trying to explain this result is to attribute it to the conductivity of the oil, but this oil has such low conductivity (high resist.) that such explanation seems untenable. Shielding (in some way) seems more likely.

If the oil acts as a shield, affecting the intensity of incident radiation, the capacitor emf is increased thereby. Hence, the mass of the ambient medium (air, oil, etc.) may affect the capacitor emf — reducing the emf as the mass is increased.

In other words, the potential generated within a capacitor is affected (reduced) by the mass of the medium surrounding it.

Apparent conclusion:

In air (or vacuum) the counter emf believed to be generated (or converted from external radiation) is greatest. It is reduced as the mass of the (shielding) medium is increased. This seems reasonable.

A test of the above would be to surround the sensor with progressively heavier or more massive shielding, such as immersion in heavy dielectric liquids or within dry sand, lead monoxide powder or even (insulated) lead powder.

Negative glitches

It is surprising to note (as in Fig. 2), that the capacitor voltage actually exceeded the battery voltage for a short time. Current actually flowed in the reverse direction and the resistance of the Pyranol oil could be said to be "negative". The capacitor then became an electromotance, and produced a voltage.

This is a phenomenon which has been observed since the beginning. It is the basis of petrovoltaic effects, noted in rocks, certain resistors and capacitors (as above).

Thru the use of shielding (with materials of different density (mass) and/or dielectric constant (K), we may eventually be able to track down the nature of the radiation which comes in and supplies the energy.

Tests with shielding may provide the answer.

12/23/79 T. Townsend Brown