Non-Equivalence Between Work Performed by Charge Against Gravity and The Electric Energy of the Same 'Charge Gas'

by

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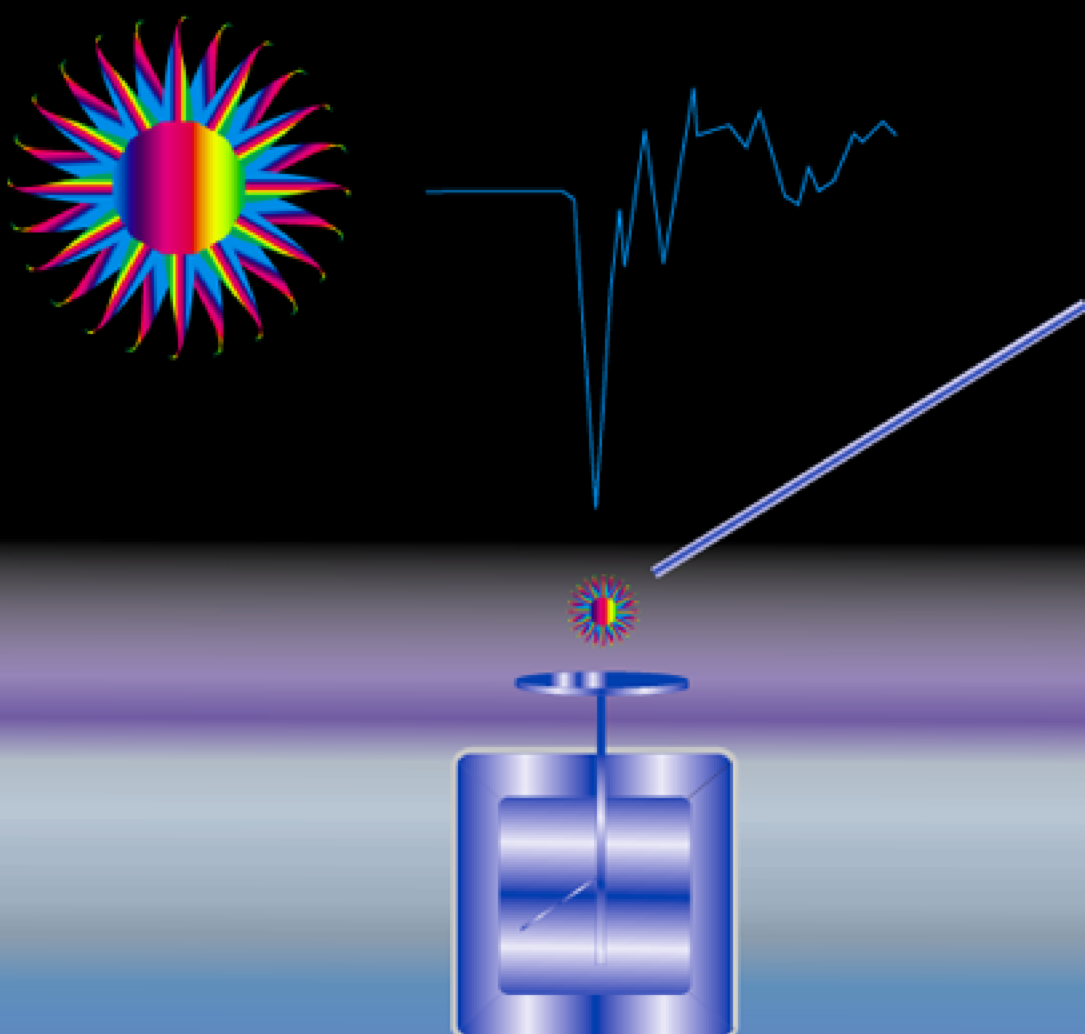

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NON-EQUIVALENCE BETWEEN WORK PERFORMED BY CHARGE AGAINST GRAVITY AND THE ELECTRIC ENERGY OF THE SAME 'CHARGE GAS' QUANTUM

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ABSTRACT

Basic experiments demonstrate that, for any set deflection angle of the electroscope leaf from the vertical under atmospheric conditions, the work performed against gravity by a 'charge gas' trapped in a conductor is *neither* predictable from current electrostatic or gravitational theory, *nor* equivalent to the electric energy calculated or measured oscilloscopically as being required to charge the said electroscope to the set and calibrated deflection. Furthermore, the results suggest that, quite independently from the mechanism of charge cancellation by recombination with ions of opposite polarity, electroscopic leakage rates depend upon the rate of regeneration of the kinetic energy of the trapped charges performing both electric and antigravitational work, as sourced upon hidden variable(s) in the local medium. We found therefore that, in order for the electric work of repulsion performed by charge against charge to be conserved, the work performed by charge against local gravity must be constantly supplied by regeneration of the kinetic energy of the trapped charges from the surrounding medium.

INTRODUCTION

The focus of this communication is the experimental determination of whether the electroscopic work performed by leaf deflection against gravity by a 'charge gas' quantum trapped in a conductor is equivalent to the electric energy of the same charge quantum, as also determined both theoretically and experimentally. Normally, an electroscope is employed to measure electric potential or fine ion currents whose flux neutralizes the trapped charge. Yet, an electrostatic potential difference between two points or charge levels is measured in ergs per esu, as the work done on unit charge when it is moved from one level to the other:

$$\Delta V = \Delta W/Q$$

Here W is the work performed by a quantum of charge Q transiting across a potential gradient. By definition then,

$$1\text{volt} = (1/300)\ \text{erg/esu}$$

Accordingly, for 1 Coulomb of charge to flow between two potential levels whose difference is 1 volt, an expenditure of 1 joule of energy or 10^7 ergs is necessary. But this work equation is a static one, only accounting for positional energy - ie for the energy expenditure in moving a charge from one level to another, and not for the energy constantly spent in keeping a charge at a particular level of potential, to 'shelve' it there, as it were. We wondered therefore whether the electroscope could also be employed to determine and relate the energy content of a potential difference, specifically in the form of work performed over time against gravity by the repulsion of charges trapped in a conductor. This may appear as a superfluous quest in light of the accepted tenet that, in principle, the electroscopic deflection should not abate, but go on indefinitely. If, for example, the vacuum were perfect around an electroscope, and no ions were available to target the leaf and supporting structure, and thus discharge the electroscope, nor was the electroscope exposed to ionizing radiation, then it is supposed that the degree of leaf deflection, and thus the electric field of the charge quantum, might go on unabated without 'charge leakage' or loss of potential. For as long as the charge is 'immobilized' in the electroscope, its potential should remain unchanged. That it does abate in 'atmospheric' or vacuum electroscopes is seen as an indication of the presence of ions of either polarity in either medium, which are responsible for leaking away the charge trapped in the leaf-stem system of the electroscope. It follows from this model (so-called ionization theory), that the variation in the time of electroscopic leakage is meaningless with respect to the work performed over time against gravity by the repulsion of charges trapped in a conductor. This may be a convenient way of ignoring the problem posed by the pendulum treatment of the electroscopic leaf deflection - since, in the absence of any ions, one should assume that the deflection should remain indefinitely and therefore behave as a pendulum in perpetual motion, with no decay of its amplitude. Such an implicit and underhanded recourse to perpetual motion by classical electrostatic theory would suggest that what we should investigate is precisely how the energy feeding the work performed against gravity by the repulsion of charge may be indefinitely replenished over time!

Even simple observation validates this reasoning: a rigid statue with an arm held out horizontally, ie parallel to the surface of the earth, will eventually develop cracks and most probably so at the joint of the arm with the body, at the hinge where the stress of weight is strongest (assuming a homogenous material for the statue), because for the hundreds or thousands of years that it held that arm out, many forces in its structure combined to spend energy to support that arm elevated against the action of gravity. Only mechanistic minds can afford to ignore the energy spent over time to perform work against gravity - by discarding the problem they do not need to pose it adequately or properly, let alone find its solution. Maybe one might be so bold as to suggest that they should try to become statues and hold out their arms horizontally for as long as they can - which should give them an intuitive measure of the energy constantly spent to perform work against gravity by a lifting action that preserves any quantity of positional energy. Hence, this energy that must be spent to conserve the potential energy of position - and its constant flux - can hardly be reduced to the formula for positional work involved in transferring charge from one potential level to another. Similarly, a bottle sitting on a table may have a fixed positional energy higher than that of a bottle sitting at ground level, but that does not detract from the fact that the same table is constantly performing work against gravity to keep that bottle from simply penetrating through it and falling to the ground.

Our method of investigation for purposes of the current communication involved three tempos: First off, we wanted to know whether the electric power measured to charge the electroscope to a specified potential, and measured while discharging the electroscope from the same potential, experimentally corresponded to one another and also whether the energy of the said input and output pulses corresponded to the electric energy calculated as being associated with a given difference in potential and the estimated charge of the electroscope. Secondly, we proceeded to relate these values to the variation in angular momentum (ie moment) observed for very different rates of charge leakage from 'atmospheric' or so-called 'background' electroscopes. Finally, based on our Aetherometric Theory of Synchronicity (AToS) [(1)], we propose a novel methodology to determine precisely the work over time performed against gravity by a charge gas trapped in a conductor, which is equivalent to the actual electric work of auto-repulsion performed by the same charge quantum when it is said to be 'immobilized' in an 'electrostatic' interaction.

METHODS & RESULTS

1. Estimate of the electric energy expenditure required to charge the electroscope to a set deflection. For these experiments we utilized a single gold-leaf electroscope calibrated as shown in Fig.1, with a negative or a positive source of potential connected to its stem, while the case was connected to the ground or to the common of the supply. Calibration with a positive source of voltage yields an identical curve to that shown in **Fig. 1**, obtained with a negative source. Based upon a determination of the area of the central structure of the electroscope, its capacitance is estimated as being C = 0.52 esu = 0.575 pF. The gold leaf had a length of ℓ=2.3 cm, an area of 1.84 cm^2, and weighed m=0.939*10^{-3} gm. The chosen potential for these experiments was 2.6 kV = 8.7 esu volts (or ergs/esu), corresponding to a deflection angle of θ = 70°. The total charge present in the electroscope can then be estimated as:

Q = C * V = 0.52 esu-capacitance*8.7 esu-volts = 4.5 esu = 1.5*10^{-9} coulomb

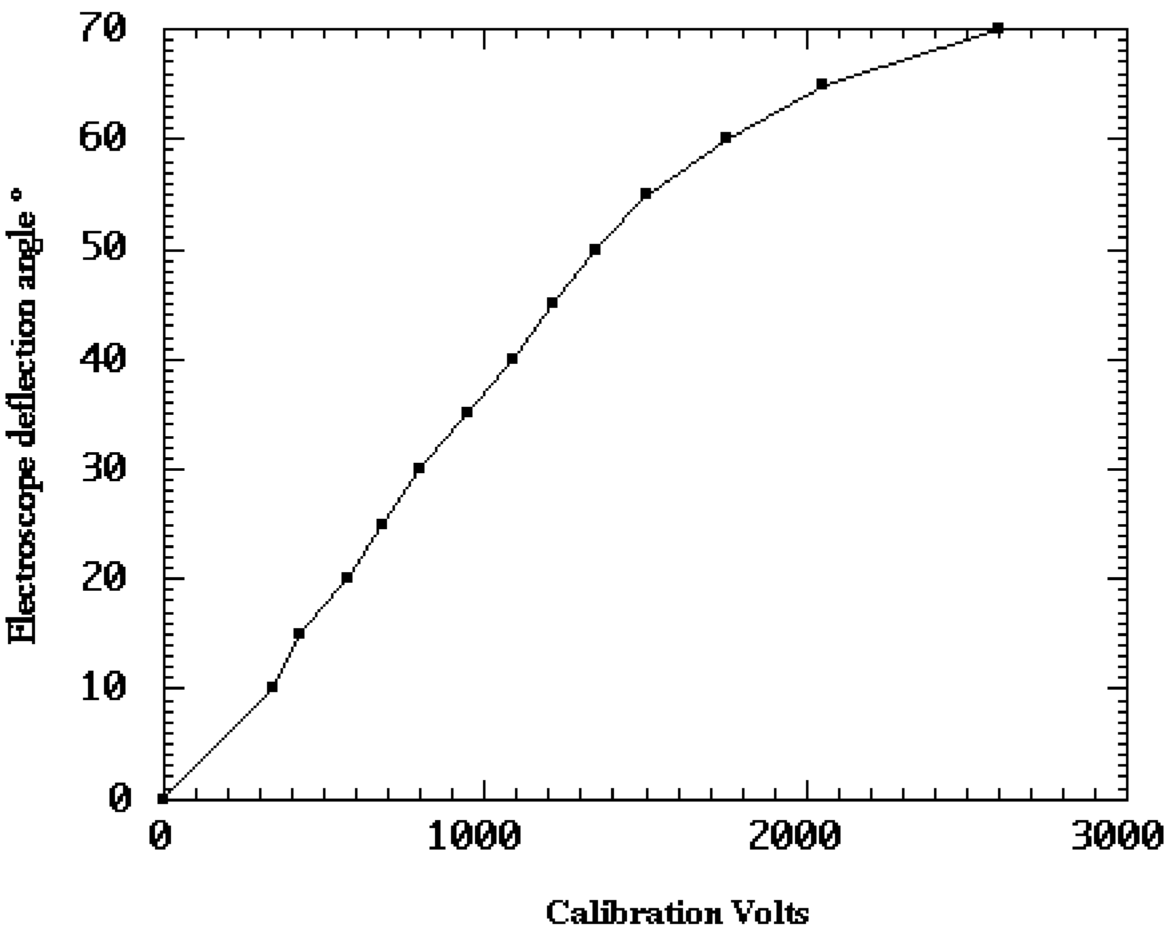

Fig. 1 - Calibration curve of the gold-leaf electroscope with a negative voltage supply.

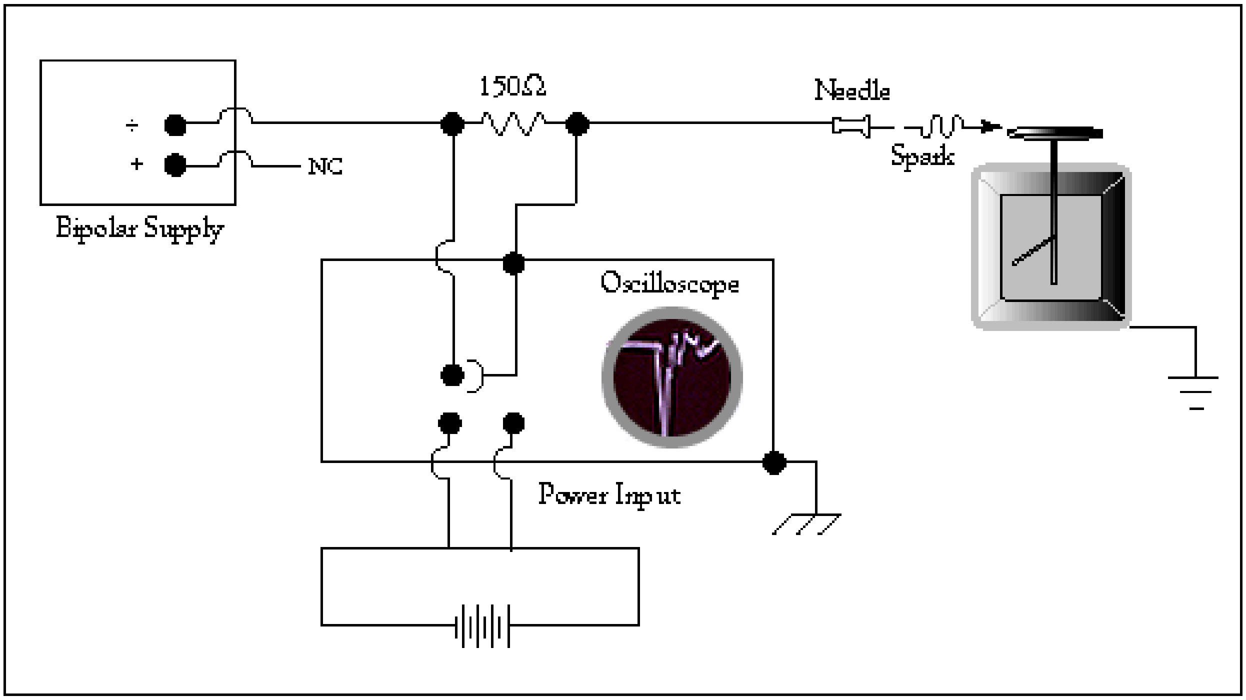

Fig. 2 - Experimental circuit employed to charge and monitor the electroscope.

By the traditional method, the expenditure of energy involved in mobilizing this charge quantum across a potential of 2.6kV, should be:

$$W = Q * V = (1.5*10^{-9} \text{ coulomb})(2600V) = 3.9 \text{ microjoules} = 39 \text{ ergs}$$

Hence, we should expect to measure at the input to, or output from, the electroscope, an energy quantum (in the form of a pulse) on the order of 3.9 microjoules.

2. Experimental determination of the electric energy spent to charge the same electroscope to the set deflection. To read the electric current input to the electroscope, as measured at the oscilloscope, we connect a 150 ohm carbon film resistor between the high and the low of one channel of the oscilloscope (Hameg 1007, dual trace analog/digital storage) on the DC mode, as shown above in Fig. 2. To minimize 60Hz AC interference, the oscilloscope is directly powered by a 310 VDC bank of lead-acid gel cells. The electroscope is at 0° after being discharged to the ground, at the start of the experiment. To minimize the spurious ringing frequencies associated with sparks, the output from a power supply set to -2.6kV is transferred to the electroscope via a needle point, as shown in Fig. 2. As the line fed power supply is grounded at the chassis to the mains ground, the electroscope case must be grounded also. The electroscope is charged by moving the charging needle point steadily towards the electroscope disc. A spark is heard at a definite distance and the electroscope suddenly becomes charged. The oscilloscope is set to pulse trigger mode, but the analog waveforms observed

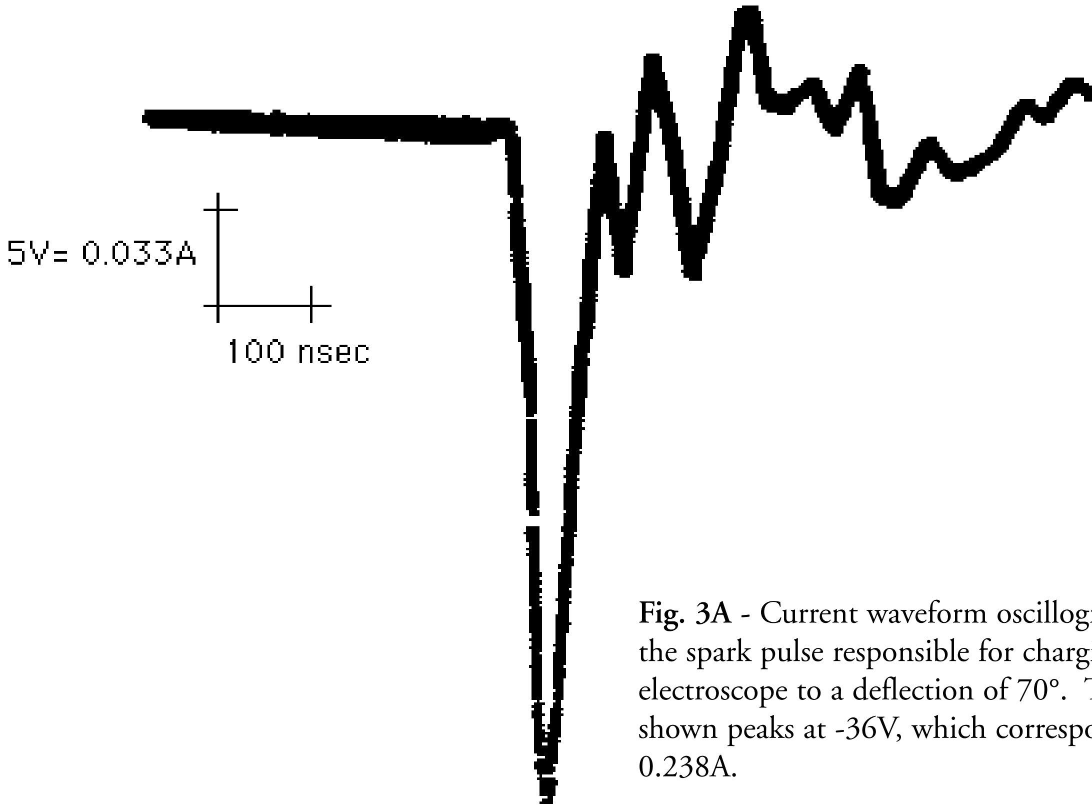

Fig. 3A - Current waveform oscillogram of the spark pulse responsible for charging the electroscope to a deflection of 70°. The pulse shown peaks at -36V, which corresponds to 0.238A.

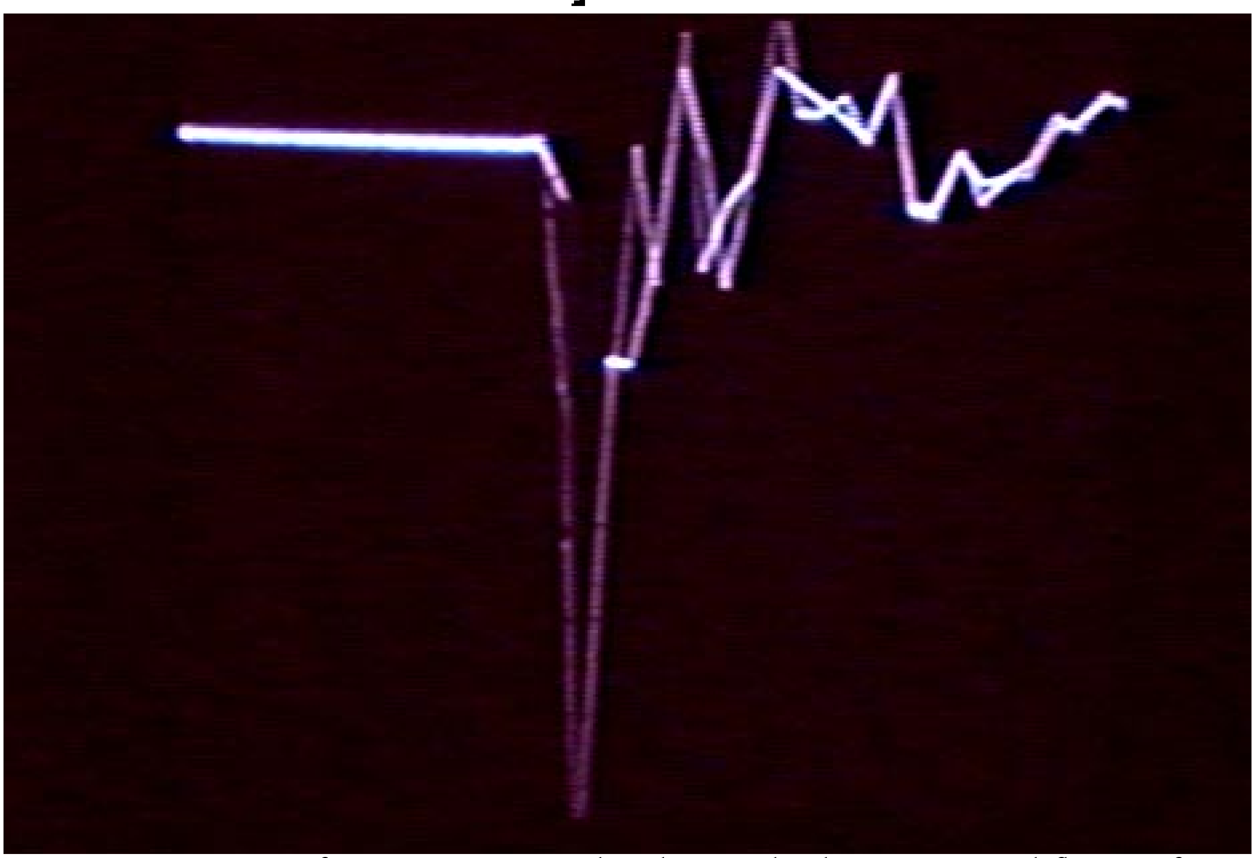

Fig. 3B - Juxtaposition of two input current pulses charging the electroscope to a deflection of 70°. X: 100nsec/div; Y: 5V/div are in all respects visually identical to those stored digitally. With each approach of the needle to the electroscope disc, a well defined pulse is registered. As exemplified by the storage oscillogram of **Fig.3A**, the observed pulses are always negative, quasi-triangular and have a base of ca. 100 nanoseconds. Their peak amplitude varies from 30 to 36V. This represents a typical peak current of 0.2/0.24 A. **Fig. 3B** illustrates the regularity of the charging pulses, showing the close match observed in the juxtaposition of two such captured events.

The charging voltage is -2.6 kV, and the final voltage of the charged electroscope is also -2.6kV, as indicated by the calibrated deflection angle of $\theta = 70°$. But this represents only the breakdown voltage and does not provide us with the sustaining voltage of the spark that allows 0.2/0.24 A of peak pulse current to transit from the needle to the electroscope in a fraction of a second. However, we have devised a novel method to ascertain experimentally the sustaining voltage of the spark over time; this involves a simple unipolar connection of one of the High channels of the floating chassis, battery-powered oscilloscope to the stem of the electroscope: the voltage readings are those of the sustaining spark voltage. For a series of experiments (n=10) with pulses charging the electroscope to the same deflection, the range of results for the sustaining voltage V_s lay between 167 and 186V for the same time period of 100 nanoseconds. This means that the cathode drop across the charging spark must be on the order of 2.4kV. Accordingly, the peak power input corresponding to the oscillogram of **Fig. 3A** is given by:

$$P_{in} = V_s * I_{in} = (180V*0.24A) = 43.2 \text{ watts}$$

But our interest centers elsewhere, on the electric energy spent to charge the electroscope, and this is given by-

$$E_E = P_{inAVG}\ t = (V_s * I_{in}/2)\ t = [(180V*0.24A)/2]\ (10^{-7} \text{ sec}) = 2.16*10^{-6} \text{ joules}$$

This represents sensibly half of the estimated electric energy corresponding to the work required to charge the electroscope to the set deflection:

$$(E_E / W)*100 = 55.4 \%$$

Given the methodology employed and the minute quanta of energy involved, our results are indeed very close to the expectation. They experimentally suggest then an electric energy content of the volt in our electroscope on the order of:

$$(2.16*10^{-6} \text{ joules})/(2600V) = 8.31*10^{-10} \text{ joules/volt} = \\ = 8.31*10^{-3} \text{ ergs/volt} = 2.49 \text{ ergs/esu volt}$$

close to, but lower than, the theoretical value of:

$$(3.9*10^{-6} \text{ joules})/(2600V) = 1.5*10^{-9} \text{ joules/volt} = \\ = 15*10^{-3} \text{ ergs/volt} = 4.5 \text{ ergs/esu volt}$$

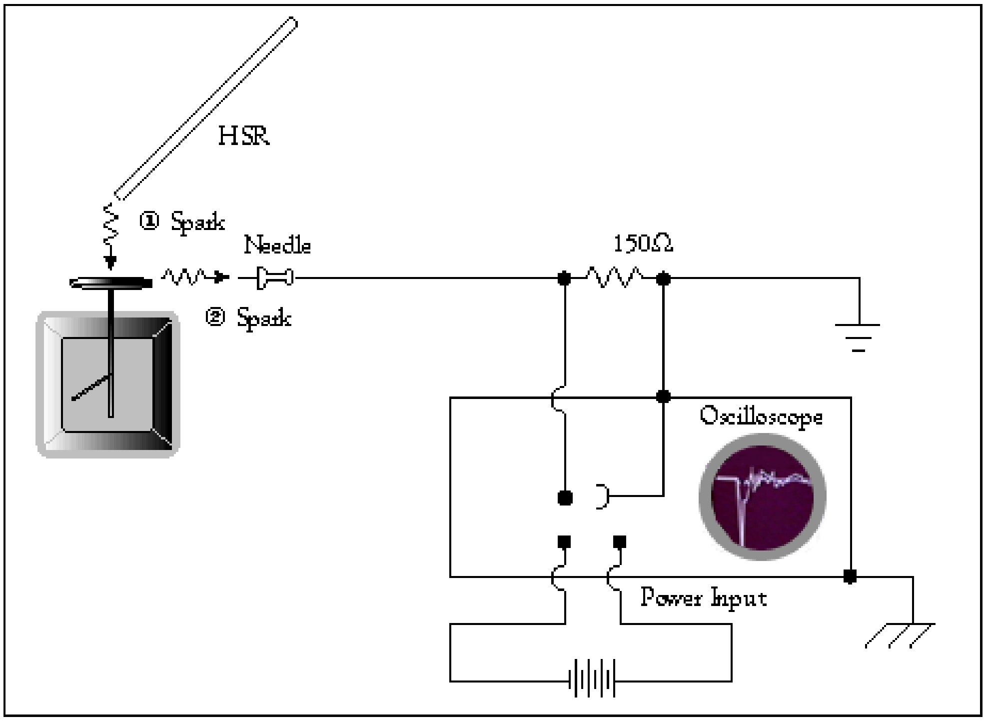

Fig. 4 - Experimental circuit employed to discharge and monitor the electroscope.

3. Experimental determination of the electric energy extracted by discharging the same electroscope from the set deflection. The circuit utilized for this determination is shown in Fig. 4, and it is in all respects the reciprocal of the circuit shown in Fig. 2. The electroscope may be charged to the same angle of deflection either by the method described in the previous section with reference to Fig. 2 or by an electrostatic source, as the results are exactly the same. The source utilized for purposes of obtaining the oscillogram of Fig. 5A, was a polyethylene rod charged by stroking the hair of one of the experimenters. The method employs a needle pick-up attached to the electroscope stem. Hence, on a first tempo, we charge the electroscope with a spark from the charged rod to the needle point, by drawing the rod close to, or passing it over, the needle once to achieve exactly the target deflection of 70° in the same electroscope. On a second tempo, we bring the other needle pick-up connected to channel 1 High of the oscilloscope close to or touching the electroscope disc. The electroscope case can be either floating or connected to ground. A typical result of the two operations is shown in the oscillogram of Fig. 5A. Exactly like the input pulse, including the same polarity, the output pulse from the charged electroscope is shown as having a base 100 nanoseconds long and an amplitude of 37V= 0.247A. It matches the input oscillograms of Fig. 3 in all the essential features and dimensions, and this is shown formally in Fig. 5B, where the output waveform of Fig. 3B is superimposed with an input waveform taken in succession. Direct measurement of the sustaining voltage of the spark *discharging* the electroscope gave a similar range of results to those reported above for sparks *charging* the electroscope, but a few indicated that the sustaining voltage V_s could exceed 300 volts, hence occurring at different distances between the electroscopic plate and the needle point. The results were directly repeatable, but consistently varied with atmospheric conditions from day to day (we shall present evidence for the variation of the sustaining voltage with varying atmospheric conditions in another report).

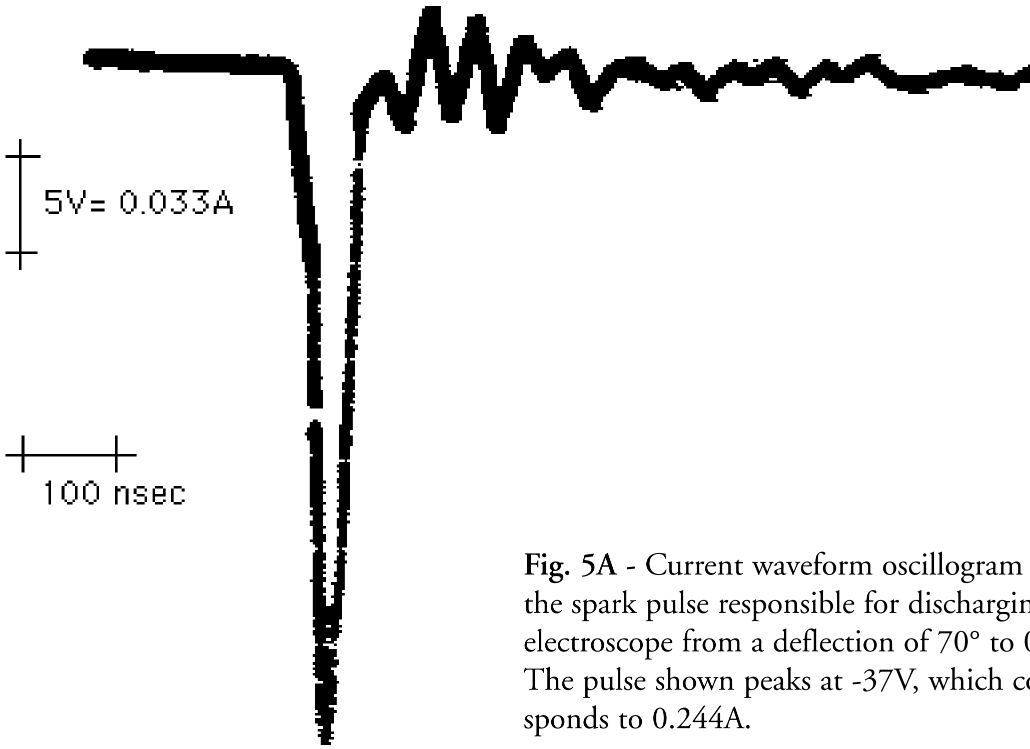

Fig. 5A - Current waveform oscillogram of the spark pulse responsible for discharging the electroscope from a deflection of 70° to 0°. The pulse shown peaks at -37V, which corresponds to 0.244A.

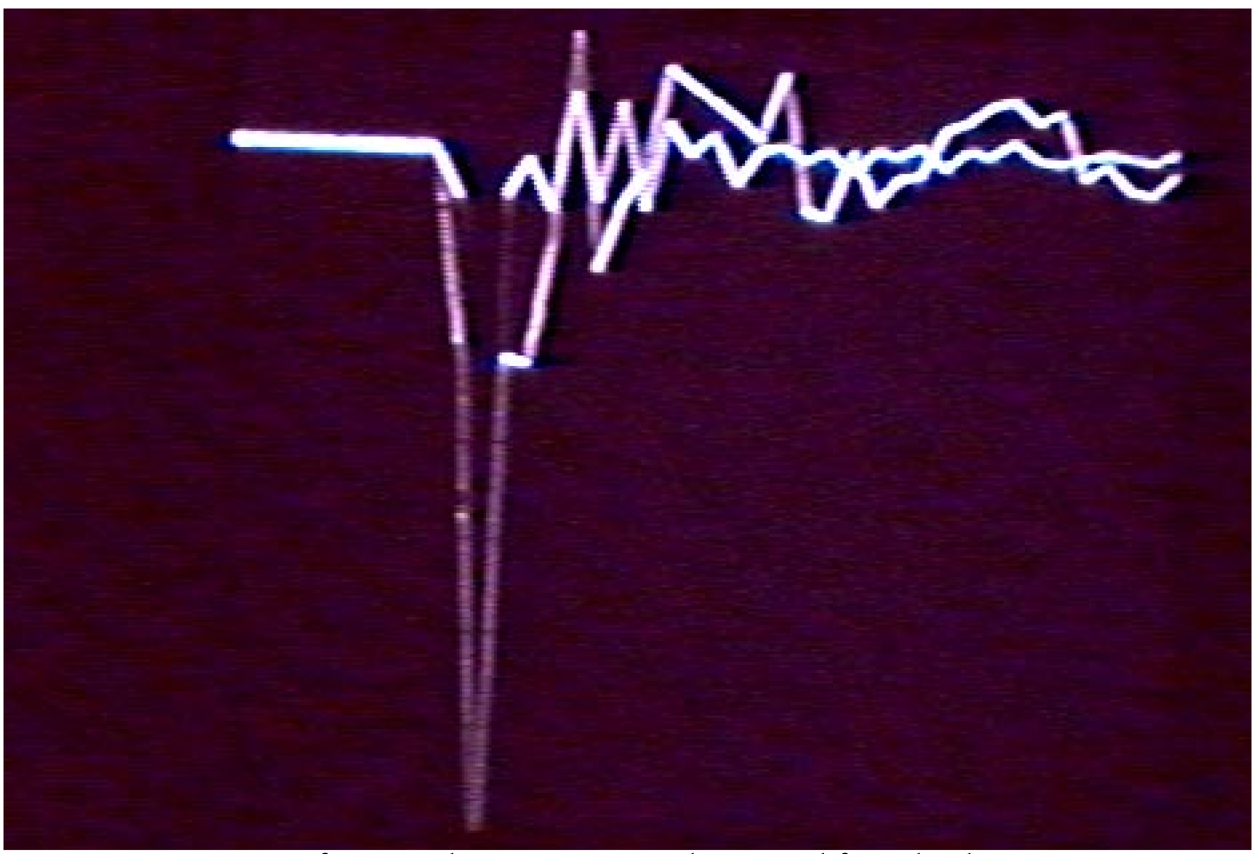

Fig. 5B - Juxtaposition of input and output current pulses, to and from the electroscope. Start or end-point deflection, respectively, for the output and input pulses, was 70°. The input pulse is that shown in Fig. 3A, and the output pulse, that shown in Fig. 5A.

Given the identity of the (sustaining) voltage and current profiles obtained for charging and discharging the electroscope, to and from a set deflection, under the same atmospheric conditions, the electric power associated with the output pulse from the electroscope is:

$$P_{out} = V_s*I_{out} \approx P_{in} = V_s*I_{in}$$

with the result that the electric energy extracted in pulsed form from the charged electroscope is sensibly the same as the electric energy input to it:

$$E_E = (V_s*I_{in}/2)\ t = (V_s*I_{out}/2)\ t = 2.16*10^{-6} \text{ joules}$$

4. **Positional work required to raise the electroscopic leaf against gravity**. The mass of the pure gold-leaf employed in our electroscope was weighed to be $0.939*10^{-3}$ grams. Based on Carnot's treatment of the pendulum, we have -

$$F = m\ g \sin\theta \approx mg\Theta \text{ (in radians)}$$

and thus the work or gravitational potential energy in ergs-

$$W_d = \int mg\Theta * \ell\ \partial\Theta = 0.5\ m\ g\ \Theta^2\ell$$

which gives a result close to Aspden's cosine formula that applies to large deflections against gravity (2):

$$W_d = mg\ell(1-\cos\theta) \approx 0.5\ m\ g\ \Theta^2\ell$$

For our gold-leaf electroscope, deflected to 70°, this gives 1.5908 ergs by Carnot's formula, and 1.4025 ergs by Aspden's formula (with ℓ=2.3 cm), ie in the range of 1.4 to $1.6*10^{-7}$joules (3).

5. **Experimental variation of the moment of antigravitic deflection over time and with atmospheric conditions.** As the electroscope loses charge over time, the angle of deflection from gravity decreases steadily. But the time T which background or control electroscopes may or may not take to cross any set of decreasing angles of deflection varies from day to day and hour to hour, sometimes even from second to second. However, all that an integration over time of the positional work required to deflect to a set of decreasing angles can provide us with, is a measure of the moment (ie in fact 2π times the angular momentum) of antigravitic deflection defined as follows:

$$A_{ag} = \int W_d(T)\,dT \text{ in joule*sec}$$

Fig. 6 shows two examples of the long-term variation in leakage rates treated as variation in antigravitic moment for the same negatively charged electroscopic leaf deflection under widely different atmospheric conditions, but at the same times of the day: curve 1 was obtained during a prolonged snow fall (BP: 763.0 mm Hg; RH:47.5%; room temperature: 23°C), while curve 2 was taken during a clear sunny day, with a bright blue sky (BP: 768.4 mm Hg; RH:55%; room temperature:

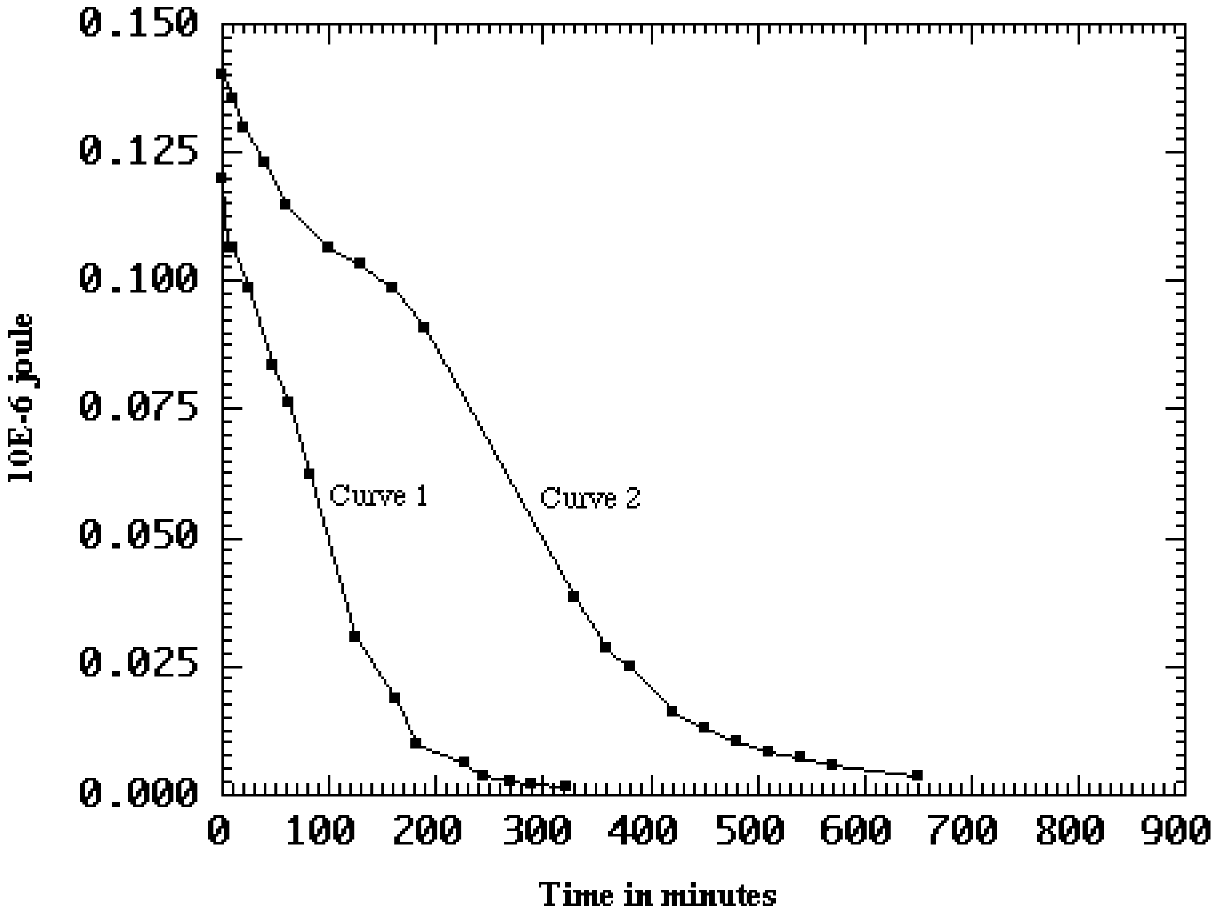

Fig. 6 - Variation of free leakage moment (joule-sec) as work-equivalent positional energy over time, for the same negatively charged electroscope under widely different atmospheric conditions. Initial electroscopic deflection: 70°.

21°C). It is apparent that 'charge leakage' is much accelerated in curve 1 when compared to curve 2, indicating the smaller angular momentum of the deflection in curve 1. The same discharge curve is also projected to end by 400 minutes, whereas curve 2, which was measured up until 640 minutes, is projected to end only by 740 minutes. Note that curve 1 begins from a set deflection of 65° because it falls 5° almost immediately upon charging to 70°. The variation of observed electroscopic work against gravity performed by the same charge quantum can become extreme under stressed atmospheric conditions. Indeed, when the humidity is very high, the pressure very low and the sky is clouded over or hazy, or a storm is approaching, the fall of the electroscope leaf may be over in a matter of seconds, if the electroscope was originally charged from a power supply (set for 2.6 kV). If charged by the electrostatic rod during such poor atmospheric conditions, the deflection imparted may never even reach an initial 70° angle; in fact, it may be as low as 20° or less.

Integration of the observed moments of antigravitic deflection for both curves gives, for curve 1,

$$A_{ag1} = \int W_d(T)\,dT = 0.693*10^{-3} \text{ joule-sec}$$

and for curve 2,

$$A_{ag2} = \int W_d(T)dT = 2.232*10^{-3} \text{ joule-sec}$$

with the latter being 3.2 times greater than the former, and thus reflecting the longer time of leakage. Excepting extremely adverse atmospheric conditions, the observed range of antigravitational moment in other indoor experiments obtained with the same negatively charged electroscope typically varied between 0.5 and 2.8 millijoule-sec, with the lower values corresponding to clouded or unsettled weather, and the upper values corresponding to steady sunny weather.

6. Determination of the variable energy spent by a charge gas trapped in a conductor to perform work against gravity. The difference in angular momentum between these two curves may well be due to charge cancellation by ions present in atmospheric air, but independently from the determination and actuality of such neutralizing currents, the fact remains that the energy spent by the same electroscope, charged to the same amount, to work against gravity must be different in one case as compared to the other. However, integrating the observed antigravitic moment does not give us a measure of this energy, since we are still missing the frequency constant for the flux of this energy. This is easily seen from a dimensional analysis of the problem. Positional energy is independent from the flux of time or the flux of energy - it is energy associated with relative position and the work it performs in a single shot when mechanically discharged. Integrating such positional energy over time yields a measure of angular momentum, as shown by dimensional analysis:

$$W_{dAVG}\, T = [0.5 \text{ m g } (\sin\theta)^2\, \ell]\, t \approx [mg\ell(1-\cos\theta)]\, t = [m\, l\, t^{-2}\ell]\, t = m\, l^2\, t^{-1}$$

Following the Pendulum Law enunciated and experimentally demonstrated by Reich [(4)] and experimentally confirmed by these authors, it is found that there is a direct conversion of mass into length that enables one to also establish as direct the relation between mass and gravitational energy. The full reasoning may be expressed as follows. Assume a functional conversion of mass into length:

$$m \longrightarrow \ell_m$$

Then show how any particular gravitational acceleration is a function of this length ℓ_m, by first defining a time constant which is length covariant; employing meters and seconds, we can write for this time constant:

$$t_m = [(1/\sqrt{\ell_m}) \text{ meter}^{0.5} \text{ sec}^{-1}]^{-1}$$

which therefore relates this covariant time to mass m in a system of mass units, by-

$$t_m =\!\int\!= [(1/\sqrt{m}) \text{ meter}^{0.5} \text{ sec}^{-1}]^{-1}$$

A frequency term is then given by:

$$f_m = (\ell_m)^{-0.5} \text{ meter}^{0.5} \text{ sec}^{-1} = t_m^{-1}$$

and thus we can write for any gravitational acceleration:

$$a = \Diamond\ (\ell_m\, f_m^2)$$

with such an acceleration at the surface of the earth being just an instance when, for any mass-carrying particle, element or molecule, the value of $\Diamond$ is π^2:

$$g = \pi^2\ \ell_m\, f_m^2 =\!\int\!= \pi^2\ m\ f_m^2$$

This immediately provides the base quantity for the minimum gravitational energy associated with any grain of inert matter as:

$$E_{Gn} = \ell_m^3\, f_m^2 =\!\int\!= m\ (\ell_m\, f_m)^2$$

and indeed lawful pendulums can be shown experimentally to obey this covariance between mass-equivalent wavelength (the pendulum wavelength) and gravitational frequency. The total unit energy associated therefore with any mass-carrying particle, element or molecule at the surface of the earth is:

$$\Diamond\ E_{Gn} = \pi^2\ \ell_m^3\, f_m^2 =\!\int\!= \pi^2\ m\ \ (\ell_m\, f_m)^2 = m\ \ g\ \ell_m =\!\int\!= m^2\ g$$

when eg the term $\ell(1\text{-}\cos\theta\ ) = \ell_m$ (with $\cos\theta = 0$), ie when the pendulum length corresponds to (or is resonant with) a given molecular or atomic mass unit. If we now integrate this positional or potential energy minimum for any fixed length ($d = n\ \ell_m$) of fall over any empirically ascertained time of fall, we obtain a measure of overall moment A_{ag}:

$$A_{ag} = m\ g\ d\ T = m\ g\ (n\ \ell_m)\ T = n\ \Diamond\ E_{Gn}\ T =\!\int\!=\ \ n\ \pi^2\ \ell_m^3\, f_m^2\ T =\!\int\!= n\ m^2\ g\ T$$

To resolve for the total energy flux replenishing the average moment provided by the integration of successive potential energy measurements over time, one needs to provide the rate at which this gravitational energy associated with the mass-energy of an inertial chunk of matter is replenished from the surrounding medium. Since the time and length dimensions are covariant, and the mass composition knowable in principle, the frequency we seek is precisely f_m, given that the empirical time T is itself measured in units of time t_m -

$$t_m = (\sqrt{\ell_m})\ \text{sec meter}^{-0.5}$$

that are the very reciprocal of f_m. Thus we have -

$$A_{ag}\, f_m = (m\ g\ d)\ T\ f_m = m\ \ g\ (n\ \ell_m)\ T\ f_m = n\ \Diamond\ E_{Gn}\ T\ f_m =\!\int\!=\ \ n\ \pi^2\ \ell_m^3\, f_m^3\ T$$

It follows that since our electroscopic leaf is composed of pure gold, this determination of the total gravitational energy flux of the deflecting leaf hinges upon the determination of the gravitational frequency f_{Au} of the gold atoms. This is easily accomplished, following Reich's Pendulum Law and our own verification and theoretical treatment. Reich never formally divulged the functional equivalence between mass and length. However, from careful analysis of the results of his pendulum experiments, one can enunciate the earth-shattering discovery of the equivalence between molecular mass and wavelength that will shake the still lingering XXth century edifice of Physics, and which has been hiding in plain sight:

$$\lambda_m = m\, N_A\, 10^{-2} \text{ in meters}$$

with the mass in grams, and where N_A is Avogadro's number. Then,

$$\lambda_{Au} = 1.969665 \text{ m}$$

and thus by the covariant function for any time t_m or its reciprocal, we have -

$$f_{Au} = (1.969665 \text{ m})^{-0.5} \text{ meter}^{0.5} \text{ sec}^{-1} = 0.7125 \text{ sec}^{-1}$$

Thus the total gravitational energy counteracted by the deflecting leaf under the conditions of curve 1 versus those of curve 2 in Fig. 6, is given by the product of the average moment by the characteristic gravitational frequency of the atoms composing the leaf:

$$E_{ag} = A_{ag}\, f_{Au} = f_{Au} \int W_d(T)\, dT$$

Since this is the total gravitational energy which the electrically repelling leaf must counteract for as long as it holds charge, it is also the measure of the total kinetic energy which the charge gas must deploy to counteract gravity, and thus the measure of the energy that the electric field of the charge spends in antigravitational work. For the two curves of Fig. 6, this gives therefore:

$$E_{ag1} = A_{ag1}\, f_{Au} = (0.693*10^{-3} \text{ joule-sec})\, f_{Au} = 0.494*10^{-3} \text{ joule}$$

$$E_{ag2} = A_{ag2}\, f_{Au} = (2.232*10^{-3} \text{ joule-sec})\, f_{Au} = 1.5904*10^{-3} \text{ joule}$$

This in turn permits us to ascertain the rate of kinetic energy flow (the power) into the charge gas trapped in the leaf, since we know the times of leakage:

$$P_{ag1} = A_{ag1}\, f_{Au}/T_1 = W_{dAVG1}\ f_{Au} = (0.693*10^{-3} \text{ joule-sec})\, f_{Au}]/(400'*60''/1') =$$
$$= 2.058*10^{-8} \text{ joules/sec} \approx 2*10^{-8} \text{ watts}$$

$$P_{ag2} = A_{ag2}\, f_{Au}/T_2 = W_{dAVG2}\ f_{Au} = 1.5904*10^{-3} \text{ joule}/(740'*60''/1') =$$
$$= 3.6*10^{-8} \text{ joules/sec} \approx 3.6*10^{-8} \text{ watts}$$

Employing - as the standard electric energy required to charge our electroscope to 70° deflection - the experimentally determined value of $E_E = P_{inAVG}\, t = (V_s * I_{in}/2)\, t = 2.16*10^{-6}$ joules, we may then state that the total kinetic energy electrically spent by the trapped charge gas in opposing the gravitational field energy, for the leakage event of curve 1, is 228 times greater than the input electric energy (the total electric energy of the trapped charge), and for the leakage event of curve 2, is 736 times greater than the same input electric energy. In the first instance, for the average deflection work, the trapped charge gas spent the equivalent of its electric energy in the first minute and 45 sec of the deflection work, and in the second instance, in the first minute of the deflection.

DISCUSSION & CONCLUSIONS

Our results demonstrate that the electric energy obtained by mobilizing a charge gas quantum in a conduction circuit closed by an atmospheric spark, is (1) the same whether the charge quantum is imparted to the electroscope to achieve a set deflection, or removed from the electroscope charged to the same deflection angle, and (2) of the same order of magnitude as the value predicted by current electrostatic theory. However, and without even having to analyze the actual fluxes of ions responsible (or not) for the leakage of charge from a grounded, encased and insulated electroscope kept under atmospheric STP conditions, we have found that the electric work performed against gravity by a charge gas trapped in a conductor is not only non-equivalent to the electric energy of that charge gas, but a variable that can greatly exceed it and which depends upon environmental conditions that, as of yet, are incompletely characterized, but do include temperature, pressure and humidity parameters.

Whatever the nature of this dependency, whether simple or complex, it is apparent that two paramount conclusions impose themselves:

(1) the pendular treatment of electroscopic deflection indicates that a charge gas trapped in a conductor and undergoing electric repulsion constantly deploys a kinetic energy that it spends as work opposing the local gravitational field energy (via that electric repulsion), and

(2) that somehow this kinetic energy is constantly replenished, at rates that vary dependent upon changing ambient parameters, so that, in general, its amount is much greater than the electric energy of the charge gas trapped in the conductor.

Since there is 'disproportionation' between the antigravitational work that a charge quantum can electrically perform and the electric energy of the same charge quantum, and since the former depends upon a constant flux of kinetic energy being affected to charge, one must conclude that the supply of kinetic energy to the trapped charge gas is provided by a local hidden variable, or complex of variables, that stands or stand for the function of the local medium. In other words, some form of energy in the local medium is replenishing the kinetic energy which charge spends in work performed against gravity by electric repulsion. So, it matters little, for now, whether there are ions around, or whether these are many or few - for as long as the rate of leakage is measured in minutes, or hours, or days, the work of deflection stands for a disproportional influx of energy from the local medium to charge trapped in a conductor in the form of continuously acquired kinetic energy which this charge spends in overcoming gravity. Obviously, if the concentration of ions in the ambient medium is very, very high, or if the electroscope is exposed to a medium reacting to ionizing radiation, the observed leakage rate will be fast because the trapped charge itself will be quickly neutralized - and thus the electroscope will discharge in a matter of seconds or fractions of a second. But none of this is inconsistent with the simple observation that, under conditions when apparently neutralizing ion fluxes are low and thus leakage rates for ambiental electroscopes are very slow, the work that the electroscope leaf performs in deflecting against gravity stands for a kinetic energy expenditure by the trapped charge gas which greatly exceeds the electric energy input to the said electroscope, and requires therefore explanation by the assumption that the trapped charges constantly absorb energy from the local medium, which they then proceed to spend, in the form of kinetic energy, to sustain the so-called electrostatic interaction.

This finding indeed demonstrates how the underhanded assumption of existing physics with regard to the indefinite leakage time of an electroscope in 'a perfect vacuum' reflects the bare fact that such an assumption betrays the possibility of perpetual motion, given that those charges trapped in a 'perfect' conductor in a 'perfect' vacuum, would require their kinetic energy to be perpetually replenished from the local medium for as long as their electric repulsion was being performed in the presence of a superimposed gravitational field, ie performed against the latter's energy. Furthermore, if the perfect vacuum were filled with high energy electromagnetic radiation, this very possibility of a non-leaking electroscope immersed in a 'perfect vacuum' would avow itself as perfect nonsense, given that such radiation would produce profuse ion-pairs that would cancel the charge and thus preclude the very process whereby the medium transfers energy to trapped charge - energy which charge then proceeds to electrically affect to itself and spend as its own kinetic energy.

That the process whereby charge performs work against gravity is mediated by electrostatic repulsion and requires therefore that this kinetic energy be affected to charge is easily shown by charging an identical gold leaf suspended from a silk thread with a charge quantum comparable to those under study, and verifying that, in the absence of air currents and substantial ion densities, the gold leaf stays vertical and does not perform any work against gravity. We suppose therefore that if the trapped charge gas is not actively spending its initial kinetic energy in sustaining a fixed electric repulsion, and furthermore, in doing so against gravity, then it does not radiate its kinetic energy back to the medium, or, more properly, its radiative emission to the medium is in balance with its radiative absorption from the medium. If the charge gas will leak from such a system, it can only do so by recombination of trapped charge with ions attracted to the free leaf.

Conversely, these findings also suggest what would happen to a pair of such gold leaves in a 'perfect' vacuum absent any gravitational field save that of the leaves themselves. Here too, some kinetic energy would have to be fed by the local medium to the trapped charge gas, as the electrostatic repulsion would at least have to overcome the minimum or base gravitational energy of attraction which we have calculated above as being inherent to any energy quantum that has inertial properties.

Such findings and considerations indicate that, once a charge gas is trapped in a conductor to perform work by repelling charge and, furthermore, to perform this work also as being against a local gravitational action, then the kinetic energy of the charges is rapidly spent by being continuously converted into radiative energy that is focused along the field connecting them to produce the observed repulsion. We propose that it is this radiative field which performs both the work of electric repulsion and the resulting antigravitational work. Such a radiative field is required to explain the so-called influence effects of electrostatic charge. And even though it is assumed that these fields, even in motion, cannot transfer energy, the authors have elsewhere devised a method to capture charge from the motion of such influence fields. Current electrostatic theory cannot provide an accurate description of the 'static' field effect of an 'immobilized' charge quantum, and specifically one that addresses the electrokinetic energy aspect of the interaction, since it assumes, without any good reason, that when electric charges repel, or attract, no kinetic energy is spent by them. What we have found is that for charge to be conserved while exerting mutual repulsion, kinetic energy must be constantly spent and acquired. Furthermore, it is the same kinetic energy expenditure which maintains an electrostatic potential in an open circuit. In a real sense, then, the simple electroscope is an energy converter or transformer, transforming energy absorbed from the medium into kinetic energy of charge, which is then spent in performing the work of electric repulsion as work also performed against gravity, by focused radiation of the spent kinetic energy.

In a private letter addressed to Dr. W. Reich [(5)], his mysterious assistant W. Washington remarks, in response to a previous query by Reich, that the best method to determine the dynamic energy content of the volt would be to ascertain the work performed by the electroscope leaves when deflecting under an applied calibrated potential. Washington writes that " 'volts' evidence themselves in an instance of the most obvious kind of energy, kinetic energy - in the deflection of the leaf of the electroscope". Washington obviously suggests that the energy content of the volt is a fixed relation with respect to the kinetic energy spent by charge in repelling charge. However, if it is true that, being an electric measure of charge velocity (as we have formally shown elsewhere [(6)]) the volt is always associated with charge q, and thus its unit 'content' of electric energy is simply the energy of one electron-volt, the kinetic energy content of the static volt is *not* a constant but a variable that depends upon both the charge capacitance (and thus the quality of insulation) of a given electroscope and the capacity of the local medium to replenish the kinetic energy radiated by charge to perform anti-gravitational and electrodynamic work. For curve 1 of Fig. 6, the total kinetic energy 'content' of the static volt in our electroscope was -

$$0.494*10^{-3}\ \text{joule}/2{,}600\text{V} = 1.9*10^{-7}\ \text{joule/volt}$$

and for curve 2,

$$1.5904*10^{-3}\ \text{joule}/2{,}600\text{V} = 6.1*10^{-7}\ \text{joule/volt}$$

The kinetic energy content of the volt could only reach a relative fixed value if and when one knew how much energy for a given electroscope must the medium replenish in order to sustain the same deflection indefinitely, in the complete absence of neutralizing ions. But that is precisely what our methodology allows us to determine directly, since the minimum kineto-regenerative power required is:

$$P_{k100\%} = (m\ \ g\ d)\ T\ \ f_m / T = [n \lozenge E_{Gn}\ (1-\cos\theta)]\ f_m \approx [mg\ell(1-\cos\theta)]\ f_m$$

which turns out to be on the order of

$$(1.5*10^{-7}\text{joules})\ (0.7125\ \text{sec}^{-1}) = 1.06875*10^{-7}\ \text{joule/sec, or watts}$$

This is a rate of replenishment of the kinetic energy of the deflecting leaf ~3 times greater than that observed experimentally in this work for the slowest of the leakage rates ($P_{ag2} = 3.6*10^{-8}$ joules/sec for curve 2, Fig. 6), and would suggest that the constant kinetic energy content of the volt in our electroscope required to sustain indefinitely the leaf deflection (in the absence of ambient ions), in the local gravitational field of the earth, would be on the order of -

$$3.23\ (6.1*10^{-7}\ \text{joule/volt}) = 2*10^{-6}\ \text{joule/volt}$$

These conclusions bring us to paraphrase the incisive words of Dr. H. Aspden - "The question warranting debate, as seen by this author, concerns the prospect that an energy form that is not part of the electrostatic potential [energy] can travel through [the electrostatic field] and, after the transit time, convert into electrostatic energy"[(7)], if by 'electrostatic energy' one effectively comes to mean the energy radiating from charge as it performs work by spending its kinetic energy through a radiative conversion. With such a proviso, this could have been written as a conclusion to the present study, as there is little doubt that what is meant by 'electrostatic potential' energy cannot account for the observed work of leaf deflection. Precisely the next question is: what in the medium supplies this kinetic energy that becomes converted into electric field energy, and how does it do so - that is, how does charge acquire its kinetic energy from the medium (what energy does it convert in order to do so?) and how does charge then lose that kinetic energy in the form of a radiative emission back to the medium? An answer to this query cannot be found in the present exposition. However, we believe we have found the appropriate methodology to address the problem and will present the answers to these questions in other communications.

REFERENCES

1. Correa, P & Correa, A (2000) "Aetherometry", vol.s 1-7, in preparation.

2. Private communication from Dr. Aspden to the authors.

3. Dr. Aspden has proposed in a private communication to the authors that the total work-equivalent energy of electroscopic repulsion is approximately one third electric and two-thirds gravitational energy, presumably converted into kinetic energy and heat. Following this model we should expect W_d to correspond to a value in the range of -

$$2(3.9*10^{-6}/3) = 2.4*10^{-6} \text{ joules}$$

to -

$$2(2.16*10^{-6}/3) = 1.44*10^{-6} \text{ joules}$$

Yet, the value of W_d experimentally determined is 10 times smaller than this.

4. Reich, W (1945) "The Orgonomic Pendulum Law" in "Contact with Space", Core Pilot Press, Rangeley, Maine, pp.101-110.

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7. Aspden, H (1995) "Retardation in the Coulomb potential", Phys Essays, 8:19.