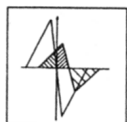


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INSTITUTE FOR FUNDAMENTAL PHYSICS
GIRAZI AUSTRIA

DEUTSCHE PHYSIK



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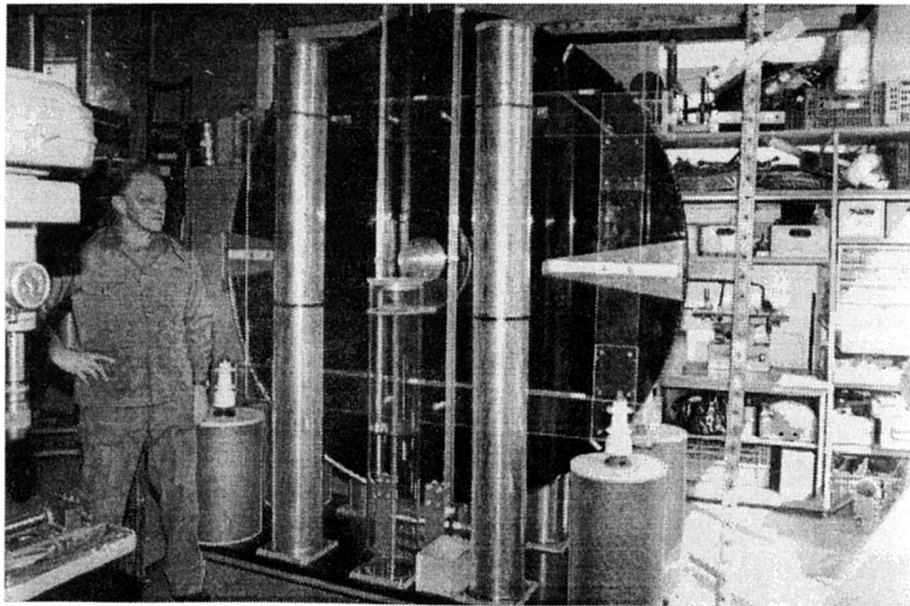
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EDITORIAL

With this issue DEUTSCHE PHYSIK arrives at its first anniversary. The journal has 80 subscribers and it could surmount the financial disaster with the first two issues sent to 1000 leading physical and scientific libraries of the world of which the harvest was only one subscription (ETH - Zürich). Let me note that the National Bulgarian Library in Sofia to which I GRANTED the journal, wrote me that it cannot keep the journal, as there is no place where to put it.

In the four issues of Vol. 1 of DEUTSCHE PHYSIK many important experiments are presented which demonstrate the invalidity of almost all fundamental physical laws and principles. On the other hand the papers published in these issues show that the present space-time concepts of humanity are definitely wrong and that the most simple, childish and "aboriginal" concepts are the true ones. Finally issues 2, 3 and 4 show that the fundamental equation in electromagnetism, the so-called Lorentz equation, is wrong and that right is the equation which I have called the Newton-Lorentz equation.

But the most important experiment reported in Vol.1 remains undoubtedly the self-accelerating generator VENETIN COLIU, presented in No. 1, p. 40. The research work of my Italian friends Manuele Cavalli and Bruno Vianello and my own experimentations have increased substantially the efficiency of the machine. When short-circuiting the gene-



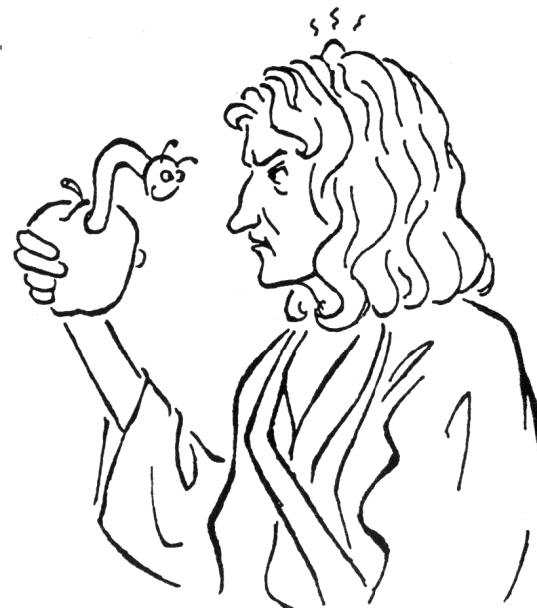
My friend L. Cathomen, the mechanic of the TESTATIKA machines, with the last and biggest one which has a diameter more than 2 m and will deliver 30 kW free energy.

rator's coil of the first VENETIN COLIU model (shown on p. 53 of No. 1), the input power decreased with only 5%. At the fourth model (shown on p. 3 of No. 2) this decrease was 30%. Now I have constructed a fifth model where the input power decrease is 50%. The fifth model will be presented in Vol. 2, No. 1 with many photographs, graphs and oscillograms demonstrating the retardation of the current induced in the coils with respect to the tension, what is the reason for the appearance of the anti-Lenz effect.

The schematic diagram of this retardation, as my most important discovery, is published on the cover of the journal, although every child after taking a coil with a big inductance (as this one shown on the back cover of TWT-VII), a bar magnet and a multi-meter can reveal the anti-Lenz effect. The child has only to choose two ranges of the voltmeter and the amperemeter where the deviations of the pointer are almost the same when pushing and pulling the magnet into the coil. Then the child will easily notice that the deviation of the "voltage-pointer" will be synchronous with the motion of his hand holding the magnet, while the "ampere-pointer" will move with a certain retardation, so that the coil will maintain a pole opposite to the pole of the approaching magnet not only during the "push-motion" but also during a certain part of the "pull-motion", thus SUPPORTING the pull-motion of the magnet which has INDUCED the current.

After reading No. 1 of Vol. 2 the reader will clearly see how near am I at the construction of VENETIN COLIU with a closed energetic circle. I need only some money.

Thus if the subscribers to Vol. 1 will in short time send their subscriptions for Vol. 2, in a short time humanity will have a perpetuum mobile.



Drawing by
Prof. J. P. Wesley

ON THE NEWTON-LORENTZ EQUATION

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First I give further experimental evidence on the invalidity of the Ampere formula describing the interaction forces between two current elements. Then I show why the scalar magnetic intensity was not until now experimentally revealed with the magnets constructed during nearly two centuries, and why Genadi Nicolaev was successful in observing it with a toroidal coil.

И празднество не дай душе моей.

1. INTRODUCTION

I showed in Ref. 1 that the fundamental equation in electromagnetism, which I have called the Newton-Lorentz equation, has the following form

$$\mathbf{f}/q = -\text{grad}\phi - (1/c)\partial\mathbf{A}/\partial t + (\mathbf{v}/c)\times\text{rot}\mathbf{A} - (\mathbf{v}/c)\text{div}\mathbf{A}, \quad (1)$$

where $\mathbf{f} = m\mathbf{u}$ is the kinetic force and $\mathbf{u}$ the acceleration acquired by a particle with mass m and electric charge q crossing with a velocity $\mathbf{v}$ a space point where the electric and magnetic potentials generated by the surrounding system of electric charges are ϕ and $\mathbf{A}$.

I called $\mathbf{B} = \text{rot}\mathbf{A}$ vector magnetic intensity (the adjective "vector" can be omitted) and $S = \text{div}\mathbf{A}$ scalar magnetic intensity.

By using the equation of potential connection⁽²⁾

$$\text{div}\mathbf{A} = - (1/c)\partial\phi/\partial t, \quad (2)$$

we can present the Newton-Lorentz equation in the following form

$$\mathbf{f}/q = (\mathbf{v}/c^2)\partial\phi/\partial t - \text{grad}\phi - (1/c)\partial\mathbf{A}/\partial t + (\mathbf{v}/c)\times\text{rot}\mathbf{A}. \quad (3)$$

Without the last term on the right, equation (1) is called the Lorentz equation and conventional physics considers the latter as the fundamental equation in electromagnetism. I showed in Ref. 1 and Ref. 3 that the Lorentz equation is wrong and that the Newton-Lorentz equation is the right one.

For the kinetic force which a current element $I d\mathbf{r}$ acquires under the action of another current element $I' d\mathbf{r}'$, the Newton-Lorentz equation (1) reduces to Whittaker's formula (as called by me)

$$d\mathbf{f} = (II'/c^2 r^3) \{ (\mathbf{r} \cdot d\mathbf{r}) d\mathbf{r}' + (\mathbf{r} \cdot d\mathbf{r}') d\mathbf{r} - (d\mathbf{r} \cdot d\mathbf{r}') \mathbf{r} \}, \quad (4)$$

where $\mathbf{r}$ is the vector distance from $d\mathbf{r}'$ to $d\mathbf{r}$.

Without the middle term, which I call the "Whittaker's term", (4) gives the kinetic force acquired by $I d\mathbf{r}$ under the action of $I' d\mathbf{r}'$ when proceeding from the Lorentz equation and is called Grassmann's formula

$$d\mathbf{f}_G = (II'/c^2 r^3) \{ (\mathbf{r} \cdot d\mathbf{r}) d\mathbf{r}' - (d\mathbf{r} \cdot d\mathbf{r}') \mathbf{r} \} = (II'/c^2 r^3) d\mathbf{r} \times (d\mathbf{r}' \times \mathbf{r}). \quad (5)$$

For the same force Ampere has proposed the following formula

$$d\mathbf{f}_A = (II'/c^2 r^5) \{ 3(\mathbf{r} \cdot d\mathbf{r})(\mathbf{r} \cdot d\mathbf{r}') - 2(d\mathbf{r} \cdot d\mathbf{r}') \mathbf{r}^2 \}. \quad (6)$$

According to Grassmann's formula, the force with which other currents act on a current element must be perpendicular to the latter. I pointed out in Ref. 1 at numerous experiments which showed that there are magnetic forces acting longitudinally to the current elements. Thus Grassmann's formula, and consequently the Lorentz equation must be definitely rejected as WRONG.

According to Ampere's formula, the forces with which two current elements act one on another must be equal and oppositely directed. Thus Ampere's formula preserves the momentum and angular momentum conservation law. My rotating Ampere bridge (the RAB-machine)⁽¹⁾ and my autonomous rotating Ampere bridge (the ARAB-machine)⁽³⁾ violate the angular momentum conservation law. Thus Ampere's formula must be rejected as wrong.

In Sect. 2 I shall discuss another experiment which rejects Ampere's formula.

Then in Sect. 3 I shall discuss the problem why the scalar magnetic intensity was not revealed until now by the experimenters, and in Sect. 4 I shall point out at the identity between the Whittaker's term in equation (4) and the first, or scalar magnetic term, in equation (3).

2. DEMONSTRATION OF THE INVALIDITY OF AMPERE'S FORMULA

Lyness⁽⁴⁾ has shown that the force with which a closed current loop acts on a current element is the same when calculating it by the help of Grassmann's and Ampere's formulas. Thus, as according to Grassmann's formula the force with which a closed current loop acts on a current element must be perpendicular to the latter, then the same must be true also according to Ampere's formula.

Let us consider the experiments shown in figs. 14 and 16 of Ref. 1. On the wire BC a closed current loop (loops) acts. Thus the forces acting on the wire BC must be perpendicular to the latter, and consequently a longitudinal motion cannot be observed. However Genadi Nicolaev has observed that on the wire BC in figs. 14 and 16, as well as on the electrons flying from the cathode to the anode in fig. 17, longitudinal forces act. Thus Ampere's formula cannot be true.

3. WHY UNTIL NOW THE SCALAR MAGNETIC INTENSITY HAS NOT BEEN REVEALED

All magnets used by humanity, as a rule, have a solenoidal form. The magnetic potential produced by a long cylindrical solenoid with radius R in whose wires a current I flows has the following form⁽⁵⁾ (in cylindrical coordinates)

$$\begin{aligned} A_\rho &= 0, & A_z &= 0, & A_\phi &= 2\pi I \rho / c, & \text{for } R > \rho, \\ A_\phi &= 2\pi I R^2 / \rho c, & & & & \text{for } R < \rho, \end{aligned} \quad (7)$$

where n is the number of the windings on a unit of length of the solenoid.

Thus for the scalar magnetic intensity we obtain, writing the divergence in cylindrical coordinates,

$$S = \text{div} \mathbf{A} = (1/\rho) \partial(\rho A_\rho)/\partial \rho + (1/\rho) \partial A_\phi/\partial \phi + \partial A_z/\partial z = 0, \quad (8)$$

and we conclude that in all cylindrical magnetic fields the scalar magnetic intensity must be zero or near to zero and consequently no one could observe it accidentally in some experiment.

Genadi Nicolaev⁽¹⁾ has observed the magnetic action on a current flowing along the axis of a toroidal magnet. It is well known that the vector magnetic intensity is different from zero only in the toroid and it is equal to zero outside of the toroid. Thus no one has expected a magnetic action on a current flowing outside of the toroid. But as I showed in Ref. 1, p. 26, exactly along the axis of a toroidal magnet the scalar magnetic intensity is different from zero and for this reason G. Nicolaev could observe magnetic action on currents flowing along the toroidal axis.

Now I shall consider more attentively (than in Ref. 1, p. 26) the scalar magnetic potential generated along the axis of a toroidal magnet and certain very interesting aspects of the scalar quantity S will come to light.

The calculation of the force acting on a current element along the axis of the toroid was done by considering this current element as a flying electron with a charge $-q_e$, what is the same if we shall assume that a positive charge q_e flies in the opposite direction, i.e., towards the positive end of the x-axis (see fig. 17 in Ref. 1).

I showed in Ref. 1 that a current element Idr of the wire KL (see also fig. 14 in Ref. 1) acts on a positive charge q_e flying from left to right and crossing the line LKK'L' with a velocity $\mathbf{v}$, according to the Newton-Lorentz equation, with the following force parallel to the x-axis

$$\mathbf{f} = -q_e \mathbf{v} \text{div} \mathbf{A} / c. \quad (9)$$

As at this point the magnetic potential is

$$\mathbf{A} = \text{Idr} / cr = \text{Idr} \hat{\mathbf{y}} / cr, \quad (10)$$

we obtain, by putting (10) into (9) and taking into account that $\mathbf{r}/r = -\hat{\mathbf{y}}$,

$$\mathbf{f} = - (q_e / c^2) \mathbf{v} \text{Idr} \{ \hat{\mathbf{y}} \cdot \text{grad}(1/r) \} = q_e \mathbf{v} \text{Idr} (\hat{\mathbf{y}} \cdot \mathbf{r}) / c^2 r^3 = -q_e \mathbf{v} \text{Idr} / c^2 r^2, \quad (11)$$

and taking into account that $\mathbf{v}$ points to the right, we conclude that the force $\mathbf{f}$ points to the left.

On the other hand a current element $\text{Idr}' = -\text{Idr}' \hat{\mathbf{y}}$ of the wire K'L', which generates at the same point the magnetic potential

$$\mathbf{A}' = \text{Idr}' / cr = -\text{Idr}' \hat{\mathbf{y}} / cr, \quad (12)$$

will act with the force

$$\mathbf{f}' = + (q_e / c^2) \mathbf{v} \text{Idr}' \{ \hat{\mathbf{y}} \cdot \text{grad}(1/r) \} = -q_e \mathbf{v} \text{Idr}' (\hat{\mathbf{y}} \cdot \mathbf{r}) / c^2 r^3 = -q_e \mathbf{v} \text{Idr}' / c^2 r^3, \quad (13)$$

having taken into account that now $\mathbf{r}/r = \hat{\mathbf{y}}$.

If we shall consider the action of both current elements Idr of the wire KL and Idr' of the wire K'L' together, we shall have for the net potential

$$\mathbf{A}_{\text{net}} = \mathbf{A} + \mathbf{A}' = 0. \quad (14)$$

Thus the net magnetic potential is zero but the divergence of this net potential is not zero.

The reader may think that there is some mystification, but there is NO mystification. I hope that my friend, Prof. U. Bartocci, will finally recognize the physical reality of the scalar magnetic intensity.

4. THE ELECTRIC AND MAGNETIC ASPECTS OF THE SCALAR MAGNETIC INTENSITY

The equation of potential connection (2) shows that the scalar magnetic intensity S can be considered as magnetic, i.e., depending on $\mathbf{A}$, as well as electric, i.e., depending on Φ , phenomenon. However, more logic and more convenient seems the following classification: The forces acting on charges at rest are to be called electric forces, and the forces acting on charges in motion are to be called magnetic forces. Thus $-\text{grad} \Phi$ and $-(1/c) \partial \mathbf{A} / \partial t$ must be considered as electric forces, while $(\mathbf{v}/c) \times \text{rot} \mathbf{A}$ and $-(\mathbf{v}/c) \text{div} \mathbf{A} = (\mathbf{v}/c^2) \partial \Phi / \partial t$ must be considered as magnetic forces. In the future we shall call $-\text{grad} \Phi$ Coulomb electric intensity, $-(1/c) \partial \mathbf{A} / \partial t$ transformer electric intensity, $-(\mathbf{v}/c) \text{div} \mathbf{A} = (\mathbf{v}/c^2) \partial \Phi / \partial t$ Whittaker electric intensity, and $(\mathbf{v}/c) \times \text{rot} \mathbf{A}$ motional electric intensity.

Now I shall show that the calculation of the Whittaker electric intensity when proceeding from its form in equation (3) always leads to the form in which this electric intensity is presented in equation (4). Indeed the Whittaker term in equation (4) has the form, if considering the force with which a charge q' moving with a velocity $\mathbf{v}'$ acts on a charge q moving with a velocity $\mathbf{v}$,

$$d\mathbf{f}_W = qq' (\mathbf{r} \cdot \mathbf{v}') \mathbf{v} / c^2 r^3, \quad (15)$$

while when proceeding from the scalar magnetic term in equation (3) we shall have

$$d\mathbf{f}_W = (q\mathbf{v}/c^2) \partial \Phi / \partial t = (qq' \mathbf{v}/c^2) \partial (1/r) / \partial t = qq' \mathbf{v} (\mathbf{r} \cdot \mathbf{v}') / c^2 r^3. \quad (16)$$

Indeed, as the vector distance $\mathbf{r}$ points from q' to q (we consider the action of q' on q), then

$$\partial (1/\sqrt{\mathbf{r} \cdot \mathbf{r}}) / \partial t = -\mathbf{r} \cdot (\partial \mathbf{r} / \partial t) / r^3 = \mathbf{r} \cdot \mathbf{v}' / r^3. \quad (17)$$

Of course, we shall come to the same result if considering the Whittaker electric intensity in the form $-(\mathbf{v}/c) \text{div} \mathbf{A}$, in which it is given in equation (1).

We see that when we work with free charges, then all aspects of the Newton-Lorentz equation (1) and of the equation of potential connection (2) do not raise problems.

However when we work with current elements in current conducting wires, because of the availability of positive charges in the metal lattice which balance the electric action of the flowing in the wires electrons, we have always $\Phi = 0$. In such cases, obviously, we have to calculate the Whittaker electric intensity taking it always in the form given in equation (1).

Let me add in the end that during our meeting in Saint Petersburg in September 1991 Genadi Nicolaev told me that the scalar magnetic intensity gives rise to "longitudinal electromagnetic waves". He demonstrated to me and a couple of other people a video where one could see experiments with such longitudinal electromagnetic waves. I begged Nicolaev to submit a paper on his experiments and he promised to do this but until now such a paper has not arrived. Let us hope that in the next issue of DEUTSCHE PHYSIK all of us will be happy to read Nicolaev's paper.

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ELECTROMAGNETIC INDUCTION WITHOUT MAGNETIC FIELD

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It is shown by the help of a very simple experiment that the electric intensity induced in a wire at rest when a near standing magnet moves does not depend on the magnetic intensity generated by the magnet at the location of the wire but on something else.

Let us have (fig. 1) two magnets in parallel to the y-axis with their opposite poles pointing up and a wire along the z-axis. Thus the wire is perpendicular to the xy-plane in which the magnets lie and the central points of the latter are at equal distances from the frame's origin. In fig. 2 there are shown the magnets and the wire when looking from the negative end of the y-axis.

The wire is pretty long, so that at its end points the magnetic fields generated by any of the magnets are sufficiently weak. The end points of the wire are connected by a galvanometer or, as in my case, by a sensitive micro-voltmeter. It is easy to see from fig. 1 that the magnetic field at all points of the z-axis is null, as there the magnetic intensity generated by one of the magnets is exactly equal and opposite to the magnetic intensity generated by the other magnet.

Now if moving both magnets with the same velocity towards one another or apart one from another, the magnetic intensity at every point of the wire will remain null. Nevertheless the voltmeter indicates that along the wire an electric intensity will be induced. This experiment was carried out first by W. J. Hooper⁽¹⁾ in 1969 but his explanation of the effect does not satisfy me. Now I shall try to enter more deeper into the problem.

Let us consider the experiment in more detail. First let us take the left magnet away and remain only with the magnet on the right. If the magnet will remain at rest and the wire, whose length we denote by L, will be moved towards the magnet with a velocity $\mathbf{v}$, the tension appearing because of the so-called motional induction will be

$$U = \int \mathbf{v} \times \mathbf{B} d\mathbf{l} = \int v B d\mathbf{l} \quad (\mathbf{B} \text{ and } \mathbf{v} \text{ are orthogonal}), \quad (1)$$

where $\mathbf{B}$ is the magnetic intensity at the line element $d\mathbf{l}$ of the wire.

If now we shall keep the wire at rest and we shall move the magnet towards the wire, according to the principle of relativity, the induced tension must be the same, as it really is.

At the motion of the magnet the magnetic intensity along the points of the z-axis will, obviously, increase. I found by calculation that if the center of the magnet is at a distance x from the frame's origin, the tension induced in the wire will be

$$U = B_{\max} e^{-kx} v \int_{-L/2}^{L/2} \cos\{\arctan(z/x)\} dz, \quad (2)$$

where $B_{\max}$ is the maximal magnetic intensity when x is equal to the radius of the magnet, and k a constant with dimension m^{-1} . People interested in the way on which formula (2) was obtained can contact me. This problem is a secondary problem, as now we are interested only in the qualitative character of the experiment.

In fig. 3 I plotted the tension calculated according to formula (2), for $B_{\max} = 7.5$ mT, $L = 0.32$ m, $v = 0.1$ m/sec and $k = 41$ m^{-1} , as a function of the distance x of the magnets from the wire. The indicated points are the measured tensions. The uncertainty at the reading of the tensions was 3 μV (that is 10% of the maximal value of the measured tension).

If now we take away the right magnet and we put the left magnet with its south ^{pole} pointing down, then by approaching it to the wire exactly the same tension will be induced, as now we shall have $-B$ instead of B and $-v$ instead of v .

When we shall put both magnets with their opposite poles pointing up, and we shall move both magnets towards the wire the induced tension will be doubled. Well. But now the magnetic intensity along all points of the wire is zero. Thus we have to conclude that it is not the magnetic intensity which determines the induced tension for the case of motion of the magnet. Neither B is determining the induced tension nor, moreover, dB/dt . And we come to the conclusion that some other quantity is responsible for the induced tension...

In fig. 2 there are plotted not the magnetic field lines, as imagined by Faraday & Co., but the lines of Crane's⁽²⁾ Space Quantum Flux, SQF (in German: Raumquantenströmungen, RQS). According to Crane's definition, when looking at the north pole of a magnet, the SQF lines flow counter-clockwise about the magnet and when looking at the south pole - clockwise. We see in fig. 2 that for our two magnets the SQF generated by every of the magnets do not annihilate one another, as this was the case with the magnetic intensity lines in fig. 1, but sum up to a two times greater flux, what is in correlation with the double tension appearing in the wire at the combined motion of the magnets.

The polarity of the induced tension is also easily explainable. First let us consider the case when the magnets move towards the wire. As far as the space quantum fluxes and the appearing forces are not balanced (thus when stationary fluxes around the free electrons have not been built up), the SQF generated by the magnets push the free electrons to the lower end of the wire, at $z < 0$, and produce there an overpressure of electrons; on the higher end of the wire, at $z > 0$, there is a scarcity on electrons and for this reason the voltmeter measured a positive tension pointing from down to up. When, on the other hand, the magnets will be moved apart, the stationary space quantum fluxes at the location of the wire will be reduced, the pressure on the electrons downwards will decrease, and there will appear scarcity on electrons at the lower end

of the wire and abundance on electrons at the higher end. In this case the voltmeter will measure a positive tension pointing from up to down.

Thus the magnetic flux $\Phi = BS$, where S is a surface pervaded by the magnetic intensity B , is only a calculation quantity; it has nothing in common with the physical reality. A physical reality have only the space quantum fluxes introduced by Crane.

I think I can now understand the words which S. Marinov told me by the way in the lobby of the SAFE-congress⁽³⁾ in Einsiedeln in 1989:

"There are no intensity fields, there are only potentials!"

According to the concepts of O. Crane, this sentence can be reformulated as follows:

"There are no magnetic fields, there are only magnetic space quantum fluxes!"

.....

According to the concepts of conventional physics, the field of the magnetic intensity is something material. The disciples of Faraday and Maxwell accept that the space around a magnet is not empty and that the lines of the magnetic intensity are an objectively existing reality. These lines, as all of us know, can be visualized by the help of iron cuttings, strewn over a sheet of paper, under which a magnet is placed. If the magnet points with one of its poles to the sheet, the cuttings arrange themselves in radial lines that are exactly the projections of the magnetic intensity lines in the plane of the sheet.

However recently Hristo Ditchev⁽⁴⁾ has shown that if instead of a sheet of paper we shall strew very fine iron cuttings (as a matter of fact, iron powder) over the surface of water in a flat cup placed over the magnet's pole, the iron elements arrange themselves not in radial lines but in concentric circles.

I repeated Ditchev's experiment. In fig. 5 the geometry of the experiment is presented. The magnet could be moved micrometrically in vertical direction, so that the position (shown in the figure) for the best picture of the concentric circles could be found. With a Hall sond I measured also the magnetic intensity at the surface of the magnet ($B = 166$ mT) and at the water surface ($B = 20$ mT). Let me note here that with the Hall sond I also established that the magnetic intensity along the z -axis in figs. 1 and 2 was zero.

To obtain a better picture of the concentric circles, water must be clean and cold (clean and cold water has a greater surface tension). And the cuttings must be very fine (powder), as the attractive magnetic forces acting on the larger cuttings are so big that they overwhelm the surface tension, and such large cuttings fall on the bottom of the water cup.

The iron powder is to be strewn with the fingers from a distance of some 20 cm over the water cup. After taking the magnet away, the picture with the concentric circles was conserved for 15 hours, although during this time water was many times shaken.

The concentric circles, however, do not visualize the lines of the magnetic intensity.

According to S. Marinov⁽⁵⁾ the concentric circles on the water surface visualize the lines of the constant magnetic potential **A** which is considered by conventional physics as a mathematical entity without any physical substance.

According to O. Crane⁽¹⁾ the concentric circles appear undoubtedly because of the action of the space quantum fluxes.

In figs. 6 and 7 two photographs of my repetition of Ditchev's experiment are given.

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FIGURE CAPTIONS

- Fig. 1. Two parallel magnets lying in the xy-plane and a wire lying along the z-axis when looked from the positive end of the z-axis.
- Fig. 2. Two parallel magnets lying in the xy-plane and a wire lying along the z-axis when looked from the negative end of the y-axis.
- Fig. 3. The theoretical plot (calculated according to formula (2)) and the experimental values of the tension induced in the z-axis wire when moving both magnets along the x-axis to (or away from) the wire, at different distances between the wire and the edges of the magnets.
- Fig. 4. Photograph of my repetition of Hooper's experiment.
- Fig. 5. Drawing of my repetition of Ditchev's experiment.
- Fig. 6. Front photograph of my repetition of Ditchev's experiment.
- Fig. 7. Top photograph of my repetition of Ditchev's experiment.

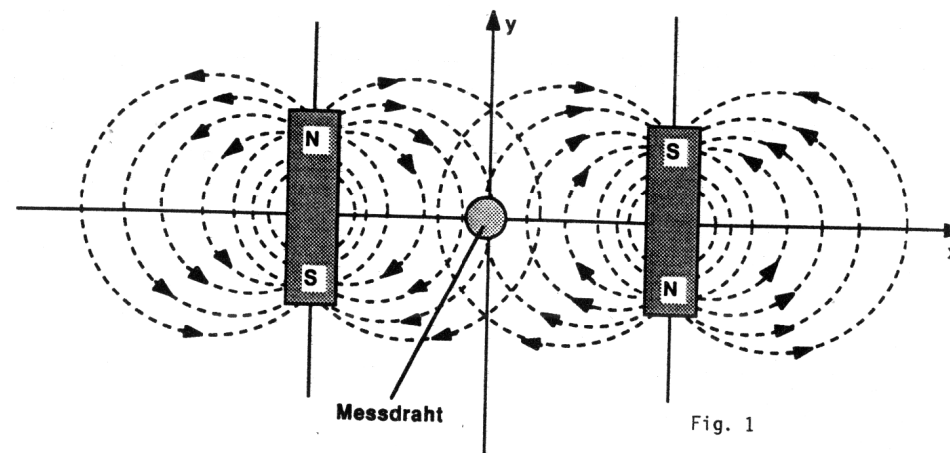


Fig. 1

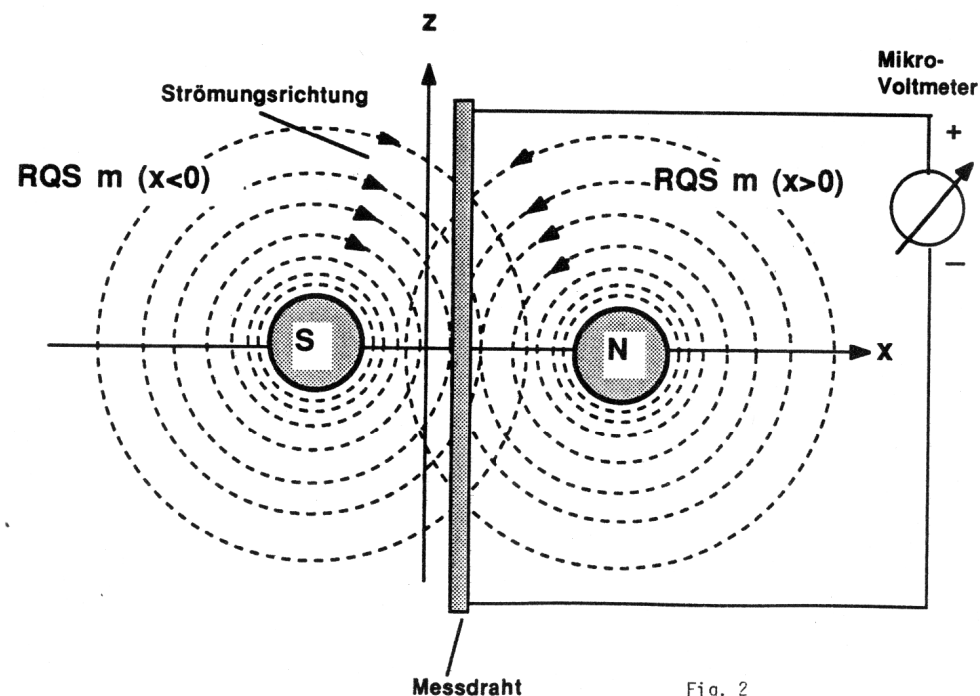


Fig. 2

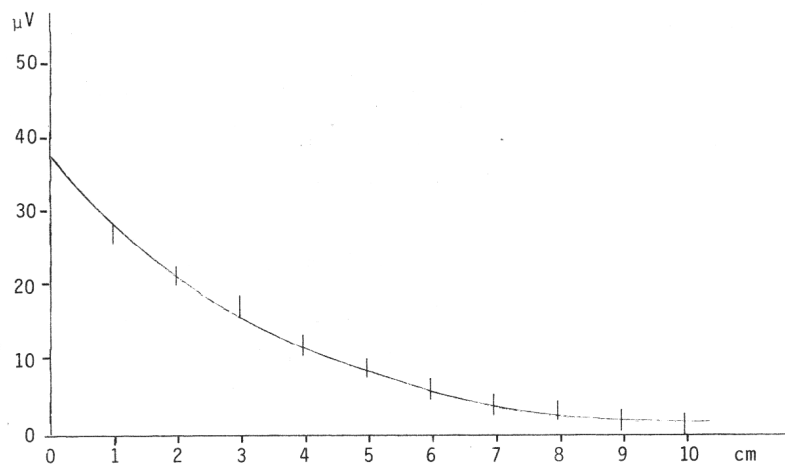


Fig. 3

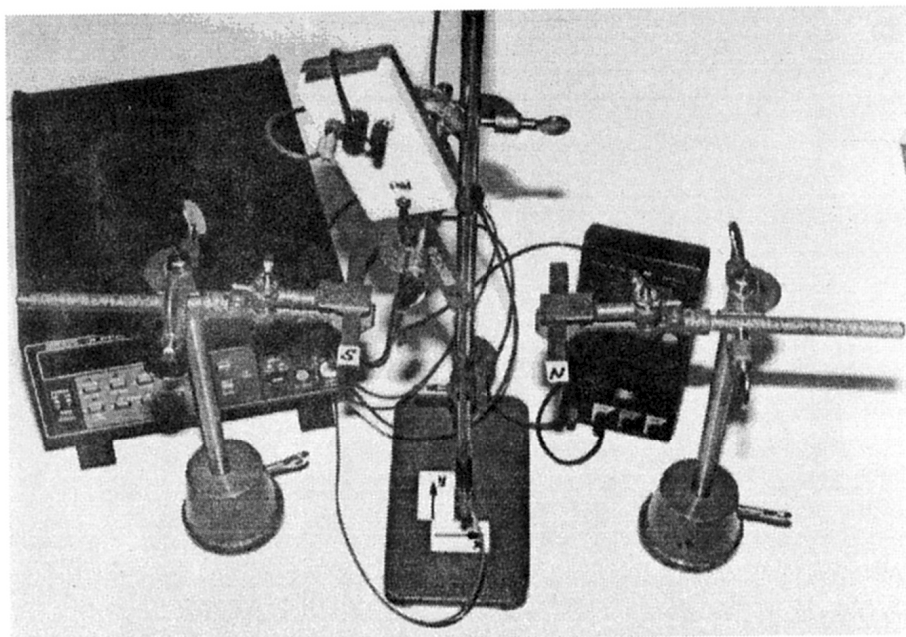


Fig. 4

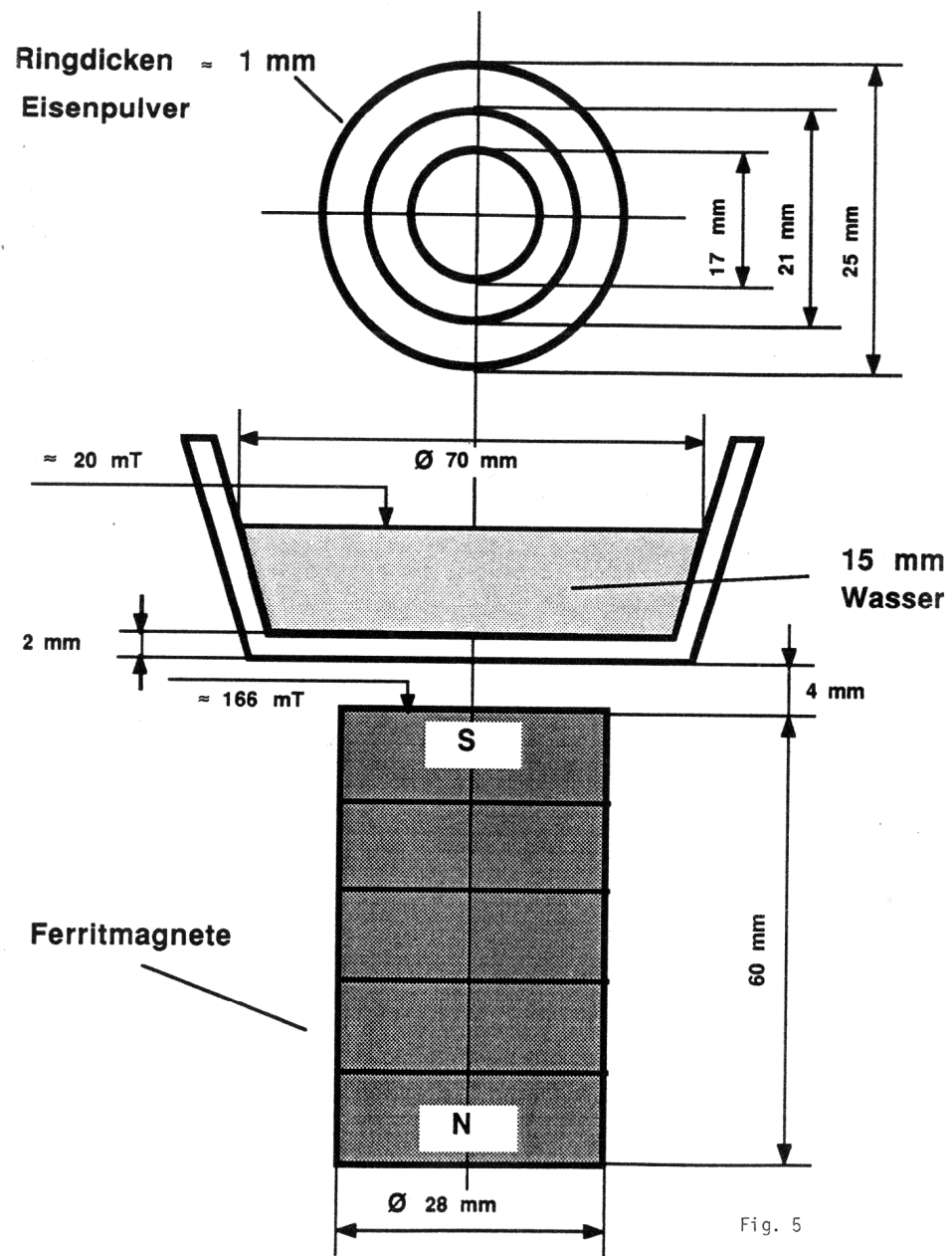


Fig. 5



Fig. 6

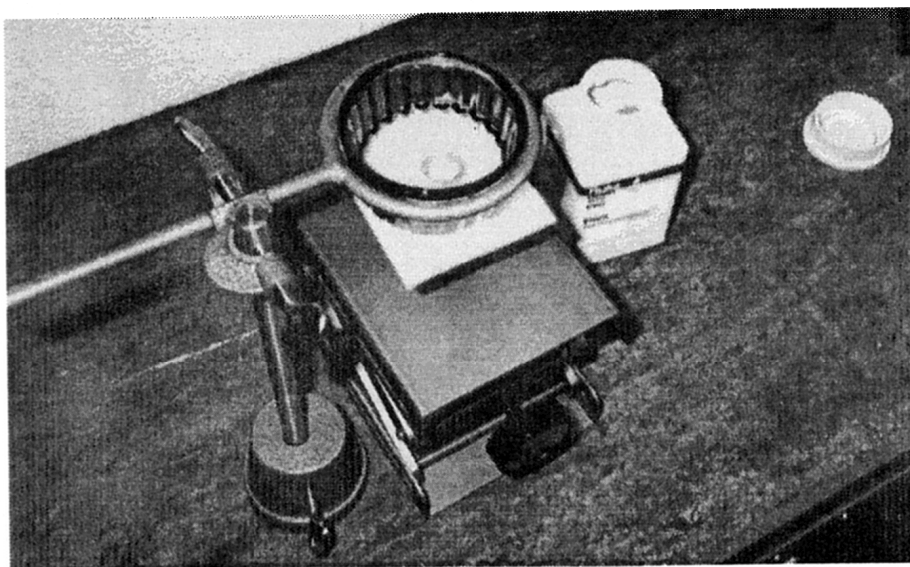


Fig. 7

EDITOR'S COMMENTS

The experiment carried out by Christian Monstein is very instructive: the tension induced in a wire at rest, when a near standing magnet moves, does not depend on the magnetic intensity $B = \text{rot}A$ generated by the magnet at the location of the wire. The explanation which I give (indicated also by Monstein) is the following: The induced electric intensity depends on the time derivative of the magnetic potential at the location of the wire

$$E_{\text{mot-tr}} = - \partial A / \partial t, \quad (1)$$

and I call it induced motional-transformer electric intensity. This formula follows from the well-known Lorentz (or in my terminology Newton-Lorentz) equation. As I have shown on p. 116 of DEUTSCHE PHYSIK, 1(1), if the magnet moves with a translational velocity v , we obtain from formula (1)

$$E_{\text{mot-tr}} = (v \cdot \text{grad})A. \quad (2)$$

Meanwhile, if the magnet will stay at rest and the wire will be moved with the velocity v , the induced electric intensity will be ^{the} motional electric intensity (see Monstein's formula (1))

$$E_{\text{mot}} = v \times \text{rot}A. \quad (3)$$

Formulas (2) and (3) are completely different.

If the poles of the magnet are pretty far from the wire (as is the case in Monstein's experiment), the intensities calculated by formulas (2) and (3) are quite the same. For this reason by moving once the wire and once the magnet, Monstein has measured equal induced tensions. However for a configuraion as shown in fig. 1 on p. 117 of DEUTSCHE PHYSIK 1(1), where the poles of the magnet coincide with the wire, there is a motional induction, while the motional-transformer induction is zero.

The problem about the motional and motional transformer induction was solved by me many years ago and I announced it in two advertisements, paying 4000 £ to NEW SCIENTIST and 1000 £ to NATURE in 1986. If people still do not Understand it, the reason is only one: these people have not read these advertisements.

Monstein discusses the problem which quantity has a physical reality: the magnetic intensity or the magnetic potential. The problem is senseless, as $B = \text{rot}A$. Thus if A has a physical reality, B must also have a physical reality, and vice versa.

All physical quantities with which we operate in physics exist only in our heads. But if we have found the most convenient quantities in their most convenient relations, by making calculations in our heads, on a piece of paper, or with a computer, we can predict the effects in the physical world. Until the day in which our predictions are confirmed by the experiment, the chosen physical quantities and the relations binding them are considered as right.

When a conventional physicist calculates the induced electric tension at the motion

of the magnet according to formula (3) and not according to formula (2), he is simply WRONG. That's all.

Thus formula (2) in Monstein's paper which he has calculated proceeding from my formula (3) is true for the motional induction. To find the formula for the induced tension at the motional-transformer induction Monstein must proceed from my formula (2).

Monstein tries to explain the effect in his experiment by the space quantum fluxes of O. Crane. I am acquainted with the concepts of Dr. Crane, but for me it is not clear WHAT Dr. Crane does understand under "space quantum flux". If the magnetic potential A is called by Dr. Crane "space quantum flux", then his concepts are right. But why introduce a new name for a quantity which has a well established in the physics world name?

If O. Crane understands under the name "space quantum flux" another physical quantity, he must present its analytical expression through the axiomatically introduced physical quantities (electric charge, velocity, distance). Finally Dr. Crane must present the formulas with which he will calculate the effects in Monstein's experiment and in all other electromagnetic experiments carried out by humanity in the last 200 years. I calculate all these effects by the help of the Newton-Lorentz equation.

Let me note that the verbal explanation given by Monstein at the end of p. 11 is confusing and says nothing. The right explanation is childishly simple. Let at the beginning of the motion the z-component of the magnetic intensity at certain point of the wire be $A_z' = -3 \text{ T}$ (the component points to the negative z-axis and thus must be negative). After moving for a time $\Delta t = 1 \text{ sec}$ the right magnet towards the wire along a distance $\Delta x = 1 \text{ m}$, let the z-component of the magnetic intensity at the same point be $A_z'' = -4 \text{ T}$. The induced electric intensity will be, according to formula (1)

$$(E_{\text{mot-tr}})_z = -\Delta A_z / \Delta t = -(-4 - (-3)) / 1 = 1 \text{ V/m} \quad (4)$$

or according to formula (2)

$$(E_{\text{mot-tr}})_z = (\mathbf{v} \cdot \text{grad}) A_z = v_x (\Delta A_z / \Delta x) = (-1) \{-4 - (-3)\} / 1 = 1 \text{ V/m.} \quad (5)$$

Let me note at the end that there is no conventional physicist who can find by calculation the above induced electric intensity of 1 V/m. Go to any physics professor of the world, put on the table 100 \$ and say to the professor: "If you can calculate the induced electric intensity working in the frame in which the magnet moves and not jumping to the frame in which the wire moves, take the money." I assure you there is no professor all over the world who can present to you a calculation and win the money.

For the conventional physicists the electromagnetic potentials are not real physical quantities, and by the help of the famous "gauge transformations" they can be pulled out and twisted like rahat-locums. Unfortunately, the potentials are not rahat-locums but the pillars on which the whole body of electromagnetism stays firmly in our heads.

THE EARTH'S MAGNETIC FIELD AND ITS EFFECT ON THE ANIMAL NERVOUS SYSTEM

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INTRODUCTION

The Earth's magnetic field has long been suspected of having an effect on all animal life. The migration of birds, fishes, other animals and insects has been investigated by many researchers, generally using magnets or deGaussing coils in an attempt to "disorientate" the creatures. All have failed to produce conclusive results.

Humans, too, exhibit the ability to orientate themselves but the art seems to be confined to so-called "uncivilized" peoples such as the Aborigines and Polynesians. There is evidence, too, that the "Ancients" walked in straight tracks, apparently guided by some unseen "force." However, a small number of "civilized" people still possess the ability to detect magnetic anomalies, such as those caused by geological faults. Such people are called "dowsers" and it has been shown by many researchers that they are detecting these magnetic anomalies (which, of course, are also detectable by magnetometers) by the muscular reaction in their limbs. Moreover, the geological faults seem to be coincident with "ley-

the author in
nd a magneto-
meter.

In the course of these experiments, i.e., finding the correlation between magnetic changes and muscular reaction, the author found that this effect could not be reproduced by deGaussing the subject. This led to the suspicion that the Earth's field was not a simple stationary one, as would be the case if the Earth was a large "bar magnet," as first described by Sir William Gilbert in 1600.

The present author eventually concluded that the Earth must have a more complex magnetic field, probably containing another component, factor, or

vector. This other factor would be capable of affecting the nervous system but not be detectable by a magnetometer. It was decided to investigate further the Earth's magnetic field in order to discover whether such a "biomagnetic" component existed and, if so, to evaluate its nature.

Having concluded that another "component" of the Earth's magnetic field might exist, there was need for speculation as to its nature. It had to be a moving or changing field. This was essential because only moving or changing fields are able to induce electric potentials into a conductor which, it was assumed, could be the long nerves of the animal nervous system. Secondly, it was obviously not an "A.C." component ... of any frequency. Had it been so, it would have been detected long ago, because detectors covering the whole spectrum of electromagnetic "waves" have been in use for decades. There remained only one possibility, namely, that the magnetic field was moving steadily in one direction over the surface of the Earth.

The most plausible explanation was to consider that the Earth may well be a "bar magnet" but, when it is rotating at one revolution every 24 hours, the field does not rotate with it but remains stationary in space. This would produce the effect of a moving field relative to the Earth's surface.

This belief was reinforced by a curious observation. Many people, including Doctors in the field of aviation medicine, had reported that "jet lag" was more pronounced when travelling from West to East than from East to West. If physical changes in the body were dependent upon a moving magnetic field, this difference would be accounted for by the body (in the airplane) moving either with or against the relative moving magnetic field. Finally, the age-old mystery of how all animals orientate themselves would be solved completely if they are being subjected to a moving magnetic field which was capable of inducing e.m.f.'s into their long nerves, such as in limbs, wings, or fins. The problem was to design a piece of apparatus which would detect a moving field. The author has designed such an apparatus and the missing "component," i.e., the moving field, has been proved to exist.

THEORETICAL REQUIREMENTS

It was decided to build an electro-inductive generator, using a coil rotating in a magnetic field, the latter being the Earth's magnetic field instead of

the usual "permanent magnet," or "electromagnetic field." The induced voltage would be picked up in the usual way, in this case by a commutator, and the electrical output could then be examined in the usual way, namely, by a voltmeter or a cathode-ray oscilloscope. From these results, the exact nature of the Earth's magnetic field could be determined. It should be emphasized that the results would be more qualitative than quantitative, simply because the author had neither the expertise nor the equipment to do otherwise!

In a normal "permanent magnet" generator, using a single coil, the resultant e.m.f. would have a sinusoidal form, being "A.C." if slip rings were used to collect the output, but if, as shown in Fig. 1, a commutator is used, the output will be "rectified" and appear as in Fig. 2.

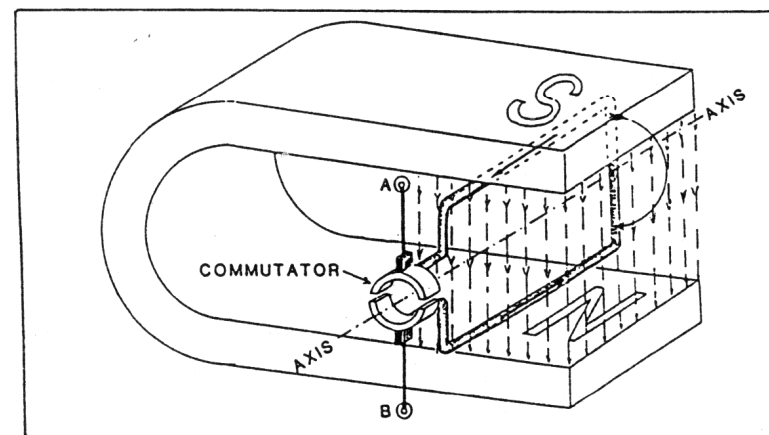


Fig. 1 Simple Permanent Magnet Generator

If now the coil is rotated in the Earth's magnetic field so that the lines of force are at right-angles to the axis of rotation of the coil, the result should be exactly the same, provided that the field is stationary with respect to the axis of the coil. The actual output will depend upon the speed of rotation (i.e., the peripheral speed of the "active" sides of the coil), the number of turns of the coil (i.e., the total length of the active conductor), and

the field strength. Naturally, this would not be a very efficient generator, as it contains no iron and the field-strength of the Earth's magnetic field is extremely weak compared with a modern permanent magnet.

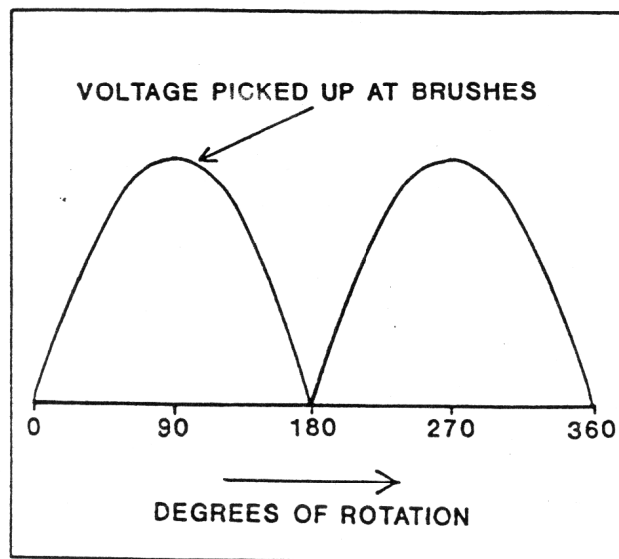


Fig. 2 Output of a single-coil, Stationary-field, Generator

The above is true for a simple coil, the e.m.f.'s induced into the two active sides of the coil being in opposite directions (because they are cutting the lines of force in opposite directions), but, being in "series," they add up. If the field is stationary, the e.m.f.'s are equal for both sides of a symmetrical coil, but, even if they weren't, it would be impossible to say how much each side was contributing to the total.

Now imagine that the Earth's field is moving relative to the whole generator, say at velocity V_e . The peripheral velocity of the sides of the coil will be the same for both, say V_c . Under these conditions, the relative velocity of the top half of the coil, moving towards the moving field, will be $V_e + V_c$, but the relative velocity of the bottom half of the coil will be $V_e - V_c$, because it is moving in the same direction as the moving field.

Unfortunately, because the two sides are connected together, in series, it would be impossible to say which side is contributing a larger or smaller amount; the output would simply be that due to the sum of the two (unknown) e.m.f.'s.

This apparent impasse gave the solution as to how to construct the generator. Instead of using a single coil, it was decided to split it into two, "half coils." Theoretically, it would be nice if the "non-active" sides of the coils passed right through the axis, or shaft, so that they did not cut the lines of force at all. But this is obviously impossible and so they would have to be made to fit as close to the shaft as possible and, because of their small radius, they would have a small peripheral speed and the induced e.m.f.'s (which would subtract from the main e.m.f.'s induced into the outer sides of the coil) would be negligible. In any case, this small factor would be even further reduced because it would be very nearly cancelled in the opposite "half-coil." Fig. 3 shows the theoretical arrangement of the "half-coil generator." The output of each half-coil is collected by two sets of commutators, the brushes of the top half being designated BLUE and the bottom half RED.

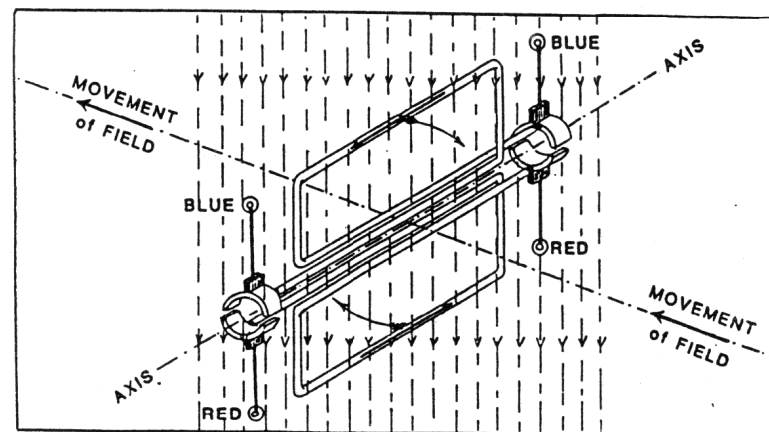


Fig. 3 Theoretical Arrangement of "Half-coil Generator"

If, as was suspected, the Earth's magnetic field was stationary in space and was therefore moving relative to the Earth's rotational speed, the velocity at the place where the experiment was to be conducted (Lodsworth, in Sussex, which is latitude 51' North)

would be approximately 293 m/s. The radius of the active sides of the coils was planned to be approximately 150 mm and it was hoped to rotate the coils at a very high speed, say 5,600 rpm. This would have given quite large differences between $V_e + V_c$ and $V_e - V_c$, but in the event such high speeds proved impracticable and the best that could be achieved was about 2,000 rpm., giving a peripheral speed of 30.5 m/s. Thus, $V_e + V_c$ became $293 + 30.5 = 323.5$ m/s, and $V_e - V_c$ became $293 - 30.5 = 262.5$ m/s.

The ratio of these two velocities, $323.5/262.5$, is 1.2325. Since the voltage induced into the coils is proportional to their respective velocities, it was predicted that the ratio of the voltages of the Blue and Red outputs would also be 1.2325.

PRACTICAL APPARATUS

In practice, for better mechanical balance, it was decided to use six "half-coils," spaced at 60° around the shaft. Each coil was wound on a Perspex former, approximately 300 x 140 mm, with a winding space of 6 x 6 mm, which allowed 1,225 turns of No. 37 S.S. enam. wire to be wound on. The effective radius of the outer, "active," side was 146 mm and the inner, supposedly "inactive," side was radius 16 mm.

There were six segments on each commutator, the start and finish of each coil being connected to a segment at each end of the shaft. Thus, the appropriate Blue and Red brushes would pick up the e.m.f.'s for only 60° of the coil's travel.

The brushes were mounted on rotatable discs so that the whole brush unit could be set at any angle between vertical and horizontal. Thus, if the brushes were vertical, they would be collecting the e.m.f.'s from coils which were cutting lines of force 30° on either side of the vertical (the condition for maximum output on a conventional, stationary field, generator) but, if the brushes were horizontal, they would be collecting from coils which were moving parallel to the lines of force. In a conventional generator, this would give zero output. This is important to remember when the half-coil generator was used with the Earth's field in the condition of horizontal brushes.

The whole machine, complete with its driving unit, became known as the "Half-coil Generator" and is shown in Fig. 4.

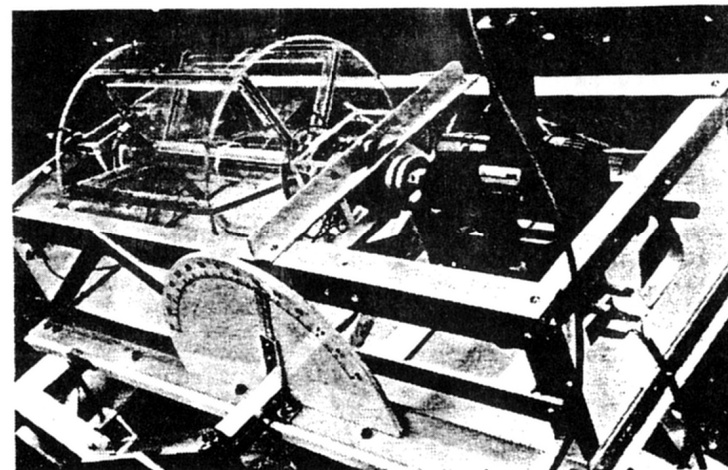


Fig. 4 The "Half-coil Generator"

It was mounted on a tilting frame so that it could be lined up at any angle. For example, when the shaft was at 23° to the horizontal, the active sides of the coil were cutting the lines of force at right-angles, because, at the latitude of 51° N, the "angle of dip" happens to be 67°.

The motive power was provided by a "Black & Decker" drill unit. Having a series-commutator motor, its speed could be controlled by a Thyristor Control Unit. Although rated at 3,000 rpm, this of course referred to "no load" conditions. In practice, the maximum speed attainable was about 2,000 rpm.

The biggest mechanical problem was that of balance. Although great care had been taken to balance the individual coils, the whole rotor was found to be completely out-of-balance. This was traced to the Perspex cylinder which encased the coil assembly being of different thicknesses around its circumference. As purchased, it varied by over 20% from one side to the other. This imbalance was partially corrected by adding weights, in the manner that car wheels are balanced. Had it not been for this engineering imperfection, it would have been possible to have run the machine at far greater speeds, but the ultimate speed of 2,000 rpm proved quite adequate to confirm the theory of the moving geomagnetic field.

RESULTS

The preliminary runs made with the "Half-coil Generator" were made with its axis pointing (magnetic) North. A series of readings (voltage) were taken with varying degrees of "tilt." Fig. 5 shows a typical set of figures, in graph form. It clearly shows that the maximum output is obtained when the coils are cutting the Earth's lines of force at right-angles, and the minimum (zero) output occurs when the coil sides are moving parallel with the lines of force, namely at 67°. But this would have happened for any stationary field generator. The important feature of these graphs is that the outputs of the Blue and Red coils are significantly different.

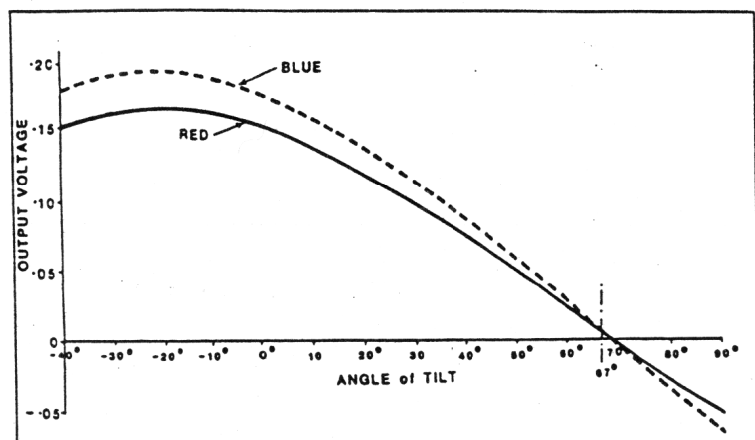


Fig. 5 Output of "Half-coil Generator" for Different Angles of "tilt."

In the first experiments, a low-impedance Volt-meter was used. It was 1,000 ohms ... practically the same as the internal impedance of each coil, and was therefore, taking the maximum power from the generator. This gave rise to "armature reaction" and consequent misleading measurements. Since the object was to measure potential, and not power, the meter was changed to a very high impedance one and all subsequent measurements (including those in Fig. 5) were made using this instrument. At the speed of 30.5 m/s

(measured by an interrupted light and a frequency meter), a typical reading for the Blue and Red outputs was 0.122 and 0.100 volts, respectively. This gives a voltage ratio of 1.22, which is very near to the predicted figure for the (relative) velocity ratio of 1.2325.

At first, it was thought that the discrepancy might be due to the unbalanced mechanical construction, or that it was due to ignoring the supposedly "inactive" sides of the coils, which were near to but not exactly along the axis of the shaft. But an experiment made later, using an artificially created moving field, suggested that the velocity of the field might not be exactly as that calculated. It appeared that the velocity of the field was slightly lower than the speed of rotation of the Earth at this latitude. The author had no means of knowing the exact radius of the Earth at the particular latitude. It is possible that the Half-coil Generator might, if made accurately enough, be used as an instrument for such measurements.

Finally, mention must be made of one of the experiments which proved, beyond any possible doubt, that we are dealing with a moving geomagnetic field. It was when the brushes were moved to a horizontal position. In a conventional generator, and with a stationary field, horizontal brushes would give zero output, since the active sides of the coil would be moving parallel to the lines of force. In the Half-coil Generator, far from being zero, the output was almost double that produced from the vertical-brush position. The voltages (which were 0.122 and 0.100 volts, respectively, for the vertical position) became 0.252 and 0.250 volts for Blue and Red coils, respectively, when the brushes were turned to the horizontal position. Note also that the voltage ratio has now become almost 1.0, which one would expect from this configuration, provided that it is sweeping a moving geomagnetic field.

CONCLUSIONS

1. The Earth's magnetic field is moving over the surface of the Earth but is not travelling around exactly in synchronization with the Earth's rotation. It must therefore be almost stationary in space (although this requires more accurate measurements to determine it exactly) and therefore creates a moving magnetic field relative to the Earth's surface and all creatures on it. This relative velocity will be greatest at the Equator and diminish towards the Poles. A

magnetic field of 50μT moving at a velocity of 293 m/s would generate an electric field vector of 15 mV/m.

2. It has been shown by many workers (including the author, who conducted many experiments with human subjects, and using a magnetometer, over magnetic anomalies like "ley-lines"), that the animal nervous system reacts to changing magnetic fields. It is reasonable to assume that e.m.f.'s induced into long nerves (e.g., in the limbs) give rise to muscular changes. Such long nerves are found in all living creatures, either in the form of limbs, wings, fins, or even internally. Moreover, being always in "pairs," they provide the ideal receptors for "stereo-location" of anomalies and hence orientation.
3. The animal body is able to sense sudden changes, or gradients, in the ambient magnetic field. It accounts for the reaction experienced by "dowsers" which enables them to detect magnetic anomalies, such as are occasioned by geological faults or buried objects which are stationary perturbations in an otherwise uniform moving magnetic field.

EDITORIAL NOTE. The rest of p. 280 and pages 281 - 285, dedicated predominantly to biological aspects, are omitted.

Bruce de Palma was unable to tell me in which book was Brooker's paper published.

EDITOR'S COMMENTS

The paper of Charles Brooker was sent to me by Bruce de Palma. After having read it, I "jumped to the ceiling": Such a simple way for doing an electromagnetic analogue to the mechanical pendulum experiment of Foucault and to the optical à la Sagnac experiment of Michelson-Gale-Pearson! How could my friend Francisco Müller not arrive at this simple experimental solution!

At the end of these comments I shall refer to the kind of electromagnetic experiments already carried out by Fr. Müller in order to measure the Earth's rotational velocity. But first I should like to give certain clarifications of Brooker's experiment, as far as I have understood it.

Brooker assumes that the magnetic field moves while his town Lodsworth with his house are at rest. Of course exactly the opposite is true: his apparatus and his house move with the Earth, and the "magnetic field", if we can speak at all about a "magnetic field", moves together with the apparatus (the "magnetic field" can be considered in a frame which is attached to absolute space, as well as in a frame which is fixed to the laboratory). As a matter of fact, all material objects which take part in the play - Brooker's apparatus and the whole system of electric charges fixed to our Earth which generate the magnetic potential A and the respective "magnetic intensity field" $B = \text{rot}A$ - move together. Because of the rotational symmetry of the Earth's magnetic field, the vectors A and B of this field measured in absolute space and in the moving laboratory are equal (see on this topic the end of these comments).

To find the electric intensity induced in the wires of Brooker's motor, we have to use the relative Newton-Lorentz equation (see DEUTSCHE PHYSIK, 1(1), p. 116) which I write without the Whittaker term

$$E_{\text{glob}} = -\text{grad}\phi - \partial A/\partial t + \mathbf{v} \times \text{rot}A + \epsilon_0 \mu_0 \mathbf{v} \cdot \mathbf{V} \text{grad}\phi + \mathbf{V} \times \text{rot}A + (\mathbf{V} \cdot \text{grad})A, \quad (1)$$

where ϕ and A are the electric and magnetic potentials generated by the Earth, $\mathbf{v}$ is the laboratory velocity of the motor's wires, and $\mathbf{V}$ is the absolute velocity of the laboratory. As there is $\phi = 0$, $\partial A/\partial t = 0$, equation (1) reduces to the following one

$$E_{\text{glob}} = (\mathbf{v} + \mathbf{V}) \times \text{rot}A + (\mathbf{V} \cdot \text{grad})A. \quad (2)$$

For simplicity let us assume that the experiment of Brooker is done on the equator. In a cylindrical frame of reference (the same results will be obtained also in a spherical frame of reference), with the Earth's axis as cylindrical axis, the magnetic potential generated by the Earth's magnetism will have the following components on the equator

$$A_\rho = 0, \quad A_\phi = A(\rho), \quad A_z = 0. \quad (3)$$

Thus we shall have for $B = \text{rot}A$ in cylindrical coordinates (see, for example, my CLASSICAL PHYSICS, vol. 1, p. 234)

$$\text{rot}A = \left(\frac{1}{\rho} \frac{\partial A_z}{\partial \phi} - \frac{\partial A_\phi}{\partial z} \right) \hat{\rho} + \left(\frac{\partial A_\rho}{\partial z} - \frac{\partial A_z}{\partial \rho} \right) \hat{\phi} + \left(\frac{1}{\rho} \frac{\partial (\rho A_\phi)}{\partial \rho} - \frac{1}{\rho} \frac{\partial A_\rho}{\partial \phi} \right) \hat{z} = \left(\frac{\partial A_\phi}{\partial \rho} + \frac{A_\phi}{\rho} \right) \hat{z} = B \hat{z}, \quad (4)$$

and for $(\mathbf{V} \cdot \text{grad})\mathbf{A}$, with $V_\rho = 0$, $V_\phi = V$, $V_z = 0$,

$$(\mathbf{V} \cdot \text{grad})\mathbf{A} = \left(V_\rho \frac{\partial}{\partial \rho} + \frac{V_\phi}{\rho} \frac{\partial}{\partial \phi} + V_z \frac{\partial}{\partial z} \right) (\mathbf{A}_\rho + \mathbf{A}_\phi + \mathbf{A}_z) = 0. \quad (5)$$

Thus for the induced electric intensity we obtain

$$\mathbf{E}_{\text{glob}} = (\mathbf{v} + \mathbf{V}) \times \mathbf{B}. \quad (6)$$

Brooker has verified this formula in an ingenious experiment which, however, is not so simple theoretically, as it looks at a first glance.

Let me note first that the lines of the magnetic intensity in Brooker's fig. 1 are drawn wrongly: their direction must be the opposite one. Then let me note that in Brooker's fig. 3 instead of the line "movement of field", one has to draw an oppositely directed line and write "movement of the laboratory".

And now let us enter into the essence of Brooker's experiment. With the aim to have a more clear picture of what Brooker has done, we assumed, for simplicity's sake, that the experiment has been carried out on the equator. The intensity of the Earth's magnetic field on the equator is horizontal pointing from south to north (at the south geographical pole there is the north Earth's magnetic pole).

In my fig. 1 (cf. it with Brooker's fig. 3) I have drawn Brooker's "half-coil generator" at the middle with its axis pointing in the vertical direction. The lines of the magnetic intensity at the equator point from the reader if looking from the south geographical pole.

At rotation of Brooker's motor, its left coil comes to the reader. When the coil's plane is in the plane of the meridian, the velocity of the peripheral wires of the left coil is $V+v$, where V is the laboratory velocity and v is the velocity of the peripheral wires in the laboratory.

At this rotation of Brooker's motor, its right coil goes away from the reader. When the coil's plane is in the plane of the meridian, the velocity of the peripheral wires of the right coil is $V-v$.

Let the coil has N turns ($N=1,225$ in Brooker's motor) and let the length of the coil be d ($= 30$ cm). The average tension induced in the left coil for half a rotation (i.e., the average tension appearing at the blue brushes) will be, if taking into account formula (6) for the electric intensity induced in the peripheral wires, and the same formula, at $\mathbf{v} = 0$, for the electric intensity induced in the axial wires, assuming, for N big enough, $N \approx N+1$,

$$U_{\text{blue}} = dN \left| (\mathbf{v} + \mathbf{V}) \times \mathbf{B} - \mathbf{V} \times \mathbf{B} \right| = (2dNB/T) \int_0^{T/2} v \sin(2\pi t/T) dt = (2/\pi) dNBv. \quad (7)$$

Exactly the same average tension $U_{\text{red}} = (2/\pi) dNBv$ will be induced in the right coil and will appear at the red brushes. Thus for their ratio we obtain $U_{\text{blue}}/U_{\text{red}} = 1$. According to Brooker's concepts, one must have $U_{\text{blue}} \sim V+v = 293 + 30.5 = 323.5$ m/sec and $U_{\text{red}} \sim V-v = 293 - 30.5 = 262.5$ m/sec, so that for their ratio we should have

$$U_{\text{blue}}/U_{\text{red}} = (V+v)/(V-v) = 1.2324. \quad (8)$$

According to formula (7), we shall have for the induced tension, taking into account that $B = 5 \times 10^{-5}$ T,

$$U_{\text{blue}} = U_{\text{red}} = (2/\pi) dNBv = 0.351 \text{ V}, \quad (9)$$

while according to Brooker's concepts we should have

$$U_{\text{blue}} = dNB(V+v) = 5.944 \text{ V}, \quad U_{\text{red}} = dNB(V-v) = 4.823 \text{ V}. \quad (10)$$

Brooker has measured the following tensions (see his p. 274)

$$U_{\text{blue}} = 0.122 \text{ V}, \quad U_{\text{red}} = 0.100 \text{ V}. \quad (11)$$

I do not see a theoretical way to come to Brooker's conclusions. Thus, according to me, the Earth's absolute velocity of rotation cannot be measured with Brooker's experiment.

Reading Brooker's article I had the impression that, although not being a well-trained physicist, he is an able man and the experiment is made diligently. I consider his measured data as reliable. Thus to understand WHY has he observed the reported tensions, I have either to receive a more detailed description or to examine the experiment by myself. My further analysis of Brooker's experiment will follow only one scope: to explain clearly to the readers of DEUTSCHE PHYSIK WHAT Brooker has done.

Thus, according to Brooker, the tensions induced in the left and right coils, which are taken respectively by the blue and red brushes, must be $U_{\text{blue}} \sim V+v$, $U_{\text{red}} \sim V-v$. If accepting Brooker's hypothesis, but we take into account formula (7), one has to write $U_{\text{blue}} \sim V + (2/\pi)v$, $U_{\text{red}} \sim V - (2/\pi)v$ for two coils which cover 180° each. As Brooker had not two but six coils, each of which has covered 60° , we have to write instead of (7)

$$U_{\text{blue}} = (6dNB/T) \int_{T/6}^{T/3} v \sin(2\pi t/T) dt = (3/\pi) dNBv. \quad (12)$$

Now we shall have $U_{\text{blue}} \sim V + (3/\pi)v = 293 + 29.1 = 322.1$ m/sec, $U_{\text{red}} \sim V - (3/\pi)v = 293 - 29.1 = 263.9$ m/sec, and for the ratio of the tensions instead of (8) we shall have

$$U_{\text{blue}}/U_{\text{red}} = (V + 3v/\pi)/(V - 3v/\pi) = 1.2205. \quad (13)$$

Exactly this was the ratio measured by Brooker (see formula (11)). As there was a discrepancy between the ratio calculated by Brooker (1.232) and the measured ratio (1.220), Brooker has searched (see his p. 279) for certain "external" explanations of the discrepancy. Meanwhile when using formula (12) the measured result matches completely with the calculated one. This is an interesting coincidence, as it remains for me highly puzzling HOW has one to arrive at Brooker's formulas. According to my concepts, for Brooker's motor with six coils the induced tensions must be $U_{\text{blue}} \sim 3v/\pi$, $U_{\text{red}} \sim 3v/\pi$.

Brooker writes that first he has tried to measure the tensions with a low-impedance

voltmeter, but this has led to "misleading measurements". Then he has taken a very high impedance voltmeter without precisizing which was its construction. Maybe it was a voltmeter with a capacitive entrance and Brooker has measured not the induced in the coils tension but time variations of the induced tension. The answer can be given only by analysing Brooker's experiment in detail.

On the right side of my fig. 1 I showed Brooker's motor when its axis is tilted at 90° in the plane of the meridian and thus is put horizontal. It is obvious that now at rotation of the motor no tension will be induced in the coils. For Brooker's latitude the angle of tilt when no tension was induced in the coils was 67° , and the angle of tilt when Brooker has measured maximum induced tension was 23° (see Brooker's fig. 5).

On the left side of my fig. 1 I showed Brooker's motor when the brushes are displaced at 90° from the plane of the meridian to the equatorial plane. At the second position of the brushes Brooker has measured a tension twice as big as at their first position and equal for both coils. This is another puzzle for me. According to my concepts, at the second position of the brushes the average tension in any of the coils must be zero.

As, however, Brooker probably has measured no tensions but variations of the tension, I should like to point to the following: When the brushes are in the first (north-south) position, the velocity of the peripheral wires in the left coil changes from V to $V+v$ and again to V , i.e., the variation is equal to v , meanwhile when the brushes are in the second (east-west) position, the velocity of the peripheral wires of the left coil changes from $V-v$ to $V+v$, i.e., with $2v$. But the tension which Brooker has measured at the second position of the blue brushes was $U_{\text{blue}} \sim 2(V+v)$; the same was also the tension which Brooker has measured at the second position on the red brushes, $U_{\text{red}} \sim 2(V+v)$.

In conclusion I should like to emphasize once more that Brooker's experiment seems to be pretty enigmatic. If some of the readers of DEUTSCHE PHYSIK will find the explanation WHY has Brooker measured all these tensions, I shall gladly publish it.

But before to begin to think seriously on the explanation of Brooker's experiment, this experiment is to be "modeled" in the laboratory. For this aim (see fig. 2) two concentric cylindrical rings must be built by flat magnets (of the kind of the cylindrical magnetic rings built by Fr. Müller - see TWT-II, fig. 28 on p. 252), so that the inner surface of the outward ring and the outside surface of the inward ring have opposite magnetism. Then Brooker's half-coil generator is to be placed in the space between both magnetic rings. When the motor will be put in action, so that the peripheral velocity of its wires will be v , and in rotation with a velocity V about the center of the magnetic rings, one must measure tensions similar to Brooker's in the Earth's magnetic field. According to my concepts, however, the tensions taken from the blue and red brushes will be always the same: when the motor is at rest and when revolves with the velocity V about the center, as well as when the cylindrical ring magnets are at rest or rotate about the center.

Now I shall rewrite some lines of the letter of Francisco Müller to me of the 15 April 1984, published in TWT-II, p. 239, so that the reader can become aware of the way on which Müller hopes that an electromagnetic measurement of the Earth's rotational velocity is possible (see TWT-II, p. 247):

Let us consider the situation of an airplane cutting the magnetic lines of the Earth in its flight, say, from East to West. Elementary physics textbooks usually contain this problem and they ask the student to calculate the potential difference induced across the wings if the speed of flight is given and the strength of the B field. O.K. The problem is really to measure this potential difference. If you come with an electrometer and connect it from one wing tip to another, you will NOT find anything. Fig. 3 shows the vertical component of the geomagnetic field. Across the wing the $\mathbf{v} \times \mathbf{B}$ force causes the separation of charges as shown. But this separation implies an extra field $\mathbf{E} = -\mathbf{v} \times \mathbf{B}$. So any other object coming with the airplane will not "feel" any effect. Therefore, NOTHING MORE HAPPENS BECAUSE IT HAS ALREADY HAPPENED (i.e., the charges have already separated in two groups). But the charges separation is a sufficient proof that the $\mathbf{v} \times \mathbf{B}$ force exists. How could we detect such charges?

With a rotating antenna. I came to this idea around 1974. Then I read in Smythe's "Electrostatics" that the device has already been patented to measure the speed of an airplane from within. Suppose in fig. 4 that P is charged positively and Q negatively. If you now rotate the antenna, when Q takes the position of P it must change from $(-)$ to $(+)$ and, likewise, P goes from $(+)$ to $(-)$. This means that the charges must actually move from one sphere to the other. Hence if you break the wire PQ in the middle and insert there an infinite impedance electrometer amplifier, you can detect a feeble alternating current. Its intensity is proportional to the angular velocity of rotation and to the speed of translation.

All this seems to be accepted by conventional science. But suppose now that the airplane, or the rotating dipolar antenna, are just sitting in the airport or in your home and that they are oriented from North to South, so that when coming with the Earth's rotation they "cut" the perpendicular component of the geomagnetic field. Should we expect a charge separation then? Of course we should. In other words, we have exactly the same situation as in Faraday's unipolar inductor and Kennard's rotating capacitor. We already know that when rotation about an axisymmetric magnetic field is involved, we DO NOT need relative rotation between the conductor and the magnetic field source. Yet, conventional physics will not accept this. I sent an article to the American Journal of Physics in 1973 making the point that in addition to the induced electric intensity E produced by the airplane's flight relative to the Earth's surface there is another amount due to the tangential speed of the Earth's rotation, and that this latter would exist even when the airplane was standing by in the airport. It was rejected, as usual.

You have to see the sort of incoherent reasons given by the two reviewers. One of them even mentioned the component of the magnetic field due to the Sun. The other said that I was "oblivious of the Lorentz transformation". Obviously none of them have ever heard about Faraday's unipolar inductor, much less about Kennard's experiment.

(About a page is omitted. Citation continues from the bottom of p. 248).

Thus an absolute rotation can be detected by electromagnetic means. I have tried to do this for the Earth's rotation using the dipolar rotating antenna of fig. 4. But this experiment is doomed to fail due to the exceedingly higher intensity of the ordinary electrostatic vertical gradient in the atmosphere (about 150 volts/meter!). The expected induced electric intensity due to the Earth's rotation is only about 14 milivolts/meter at Miami's latitude. This cannot compete with the atmospheric one.

I have been unable to rotate the antenna without introducing too much noise into the amplifier's input, which necessarily has to be very sensitive. (I have used the Burr-Brown electrometers, purchased in 1974 for \$ 60.00 each. The engineers advised me to use two such devices, so that the system could have a "floating ground".)

Another possibility instead of rotating the antenna is to oscillate the turntable where the whole system is contained. Then the antenna should show an A.C. of the same frequency as that of the oscillations. This has the inconvenience that such oscillations could never be too fast, in detriment of the $\mathbf{v} \times \mathbf{B}$ intensity.

I should like to add only the following: Instead to oscillate the turntable where the whole system is contained, one can rotate the antenna with the amplifier, putting the sliding rings after the amplifier. In such a case all problems with the "sliding contacts" are removed.

And now I shall show why in a laboratory fixed to absolute space and in a laboratory fixed to the rotating Earth the Earth's magnetism will act with the same force on a magnetic needle.

At the present time the character of the electric currents which generate the magnetism of the Earth is not clear. Thus for these currents the following three suppositions are possible:

1) Conduction currents generated by charges moving along closed conduction lines which remain electrically neutral; such currents may exist only in the inner Earth's strata where there are liquid metals.

2) Molecular (atomic) currents generated by the magnetic moments of the molecules or atoms which are aligned along a preferred direction (parallel or quasi-parallel to the Earth's rotational axis); such currents may exist only in solid ferromagnetic masses.

3) Convection currents generated by free electric charges; these currents will appear because of the rotation of the Earth.

Let us analyse all these three possibilities, assuming for clarity that the Earth's center is at rest in absolute space.

1) Conduction currents. According to my concepts (see TWT-II, p. 100), the energy velocity of the current conducting electrons in a metal wire is c or near to c . Thus if a circular current wire is rotated with a velocity much less than c (and any piece of metal can be rotated only with a velocity much less than c), this motion changes nothing in the magnetic potential generated by the circular wire. Consequently the magnetic potential A and the magnetic intensity B measured in a laboratory at rest in absolute space and at rest with respect to the Earth must be equal. In any case, the rotation of a cylindrical magnet (and the Earth can be considered as a cylindrical magnet) changes nothing in the magnetic intensity field generated by it.

2) Molecular currents. The same what is true for the conduction currents is true also for the molecular (atomic) currents.

3) Convection currents. As the Earth rotates from west to east and its south magnetic pole is at the north geographical pole, we have to conclude that the positive convection currents must flow from east to west. Thus, if Earth's magnetism is generated by electric charges fixed to the rotating Earth, the Earth must be charged negatively, as it really is. I shall consider this hypothesis in detail in the next issue of D.P.

Thus all these three kinds of electric currents will generate a magnetic intensity which will act on a magnetic needle at rest in absolute space or co-rotating with the Earth exactly with the same force.

This can be established by the help of the following experiment:

Let us consider a plane which first stays at the airport and then flies from east to west with a velocity equal to the absolute velocity of the Earth's surface under it. This plane, obviously, will remain at rest in absolute space during the whole flight. A magnetic compass on the board of the plane will indicate for both cases (staying at the airport and resting in absolute space) exactly the same deviation.

According to the concepts of today's physics based on the principle of relativity, for which the magnetic intensity is not some physically existing reality but depends on ^{the} motion of the observer, these observations exclude the possibility that Earth's magnetism is generated by convection currents, as according to today's physics the inverse Rowland experiment must give the same result as the direct Rowland experiment, while the comoving Rowland experiment must give a null result.

The notions direct, inverse and comoving Rowland experiments are introduced by me (see TWT-VII, p. 325) and here I give the necessary short information on them, so that the reader can "project" them on the Earth's magnetism.

For information: The Rowland experiment (or direct Rowland experiment), carried out by Rowland in 1876, is the deviation of a magnetic needle when a charged disk standing near to it is set in rotation. The inverse Rowland experiment, carried out by me in

1990, is the absence of deviation of a magnetic needle when rotating it around a charged disk. To these two experiments we have to add the comoving Rowland experiment which is not carried out until the present time; this is the deviation of a magnetic needle when it rotates together with a charged disk. The effect in the comoving Rowland experiment will be exactly the same as for the direct Rowland experiment.

I repeat once more, the idiotic theory of relativity predicts for the inverse Rowland experiment the same effect as for the direct Rowland experiment, and null effect for the comoving Rowland experiment.

ADDENDUM. After having written these comments, I obtained from Bruce de Palma the comments of Francisco Müller on Brooker's experiment. Müller's comments are, as anything written by Müller's pen, excellent. However, as Müller defends exactly the same viewpoint as me, I do not publish them, because the reader might become annoyed.

I wish only to point to some detail which the acquiline Müller's eye has seen:

Müller perceived that the ratio between the maximal output voltages taken from the blue and red brushes in Brooker's fig. 5 is 1.17, meanwhile Brooker gives this ratio as 1.22. Then Müller has seen that on the vertical axis of Brooker's fig. 5 the distance between 0.10 and 0.15 V is 1.14 times larger than the distance between 0.15 and 0.20 V. Müller asks further with full right, why the experimental points on the plot in fig. 5 are not indicated.

After making calculations similar to mine presented in my formulas (10) and (11), Müller concludes:

My first reaction to these quantitative anomalies was to think that Brooker is just measuring spurious B field intensities coming from adjacent apparatus. For example, the drive motor, having electromagnets and ferromagnetic components, might distort the Earth field in such a way that the blue-pick up is always elevated respect to the red one. Perhaps also the frame could interfere, shielding the field in some areas and enhancing it in others. Since Brooker gives no detailed map of the B field geomagnetic intensities at ALL relevant points of the apparatus, there is room for this criticism.

Of course he can counter argue that if the general shape of the plots in fig. 5 follows a sinusoidal pattern, regardless of the displacement between the two curves, this can happen only if the B field source is a pure geomagnetic dip intensity. OK. But can he prove beyond doubt that the displacement is not due to spurious apparatus interferences?

A way to test this, experimentally, would be to repeat the measurements by reversing the direction of rotation. Then the blue pick-up would work against the geomagnetic field and the red pick-up in favour of it. So the ratio blue/red should revert to its inverse: $1/1.2325 = 0.81$. If this were not the case, then it would be evident that the ratio has nothing to do with the geomagnetic effect, coming from the serious artefacts suggested above.

Müller's comments begin with the words with which I should like to end my comments:

This paper is either:

1. A fake.
2. A spurious measurement of artefacts misinterpreted by its author.
3. Or one of the most important electrodynamic experiments of the century.

I vote quite firmly for the second alternative.

The reader perhaps will ask, why then I publish Brooker's paper in DEUTSCHE PHYSIK and dedicate to it so much time and attention.

The answer is: Because this is the most straight way to the scientific truth.

POSTSCRIPT. I wish to note that on p. 281 which was between the omitted pages there is a very important statement of Brooker of a pure physical character (I repeat, the omitted pages treat predominantly the biological aspects of the induced in the limbs of the animals motional tensions). This statement shows that Brooker is well aware of the substantial aspects of the tensions induced in the wires of the motor's coils. Thus I am wondering why, after having such a clear viewpoint to the treated matter, Brooker has come to the conclusion that in his rotating coils net tensions depending on the laboratory velocity of the coils will remain. Here is Brooker's reasoning:

Another thing that worried the author's critics was that, prompted by the idea of the wires in the Half-coil Generator, they thought automatically that every wire being cut with a moving field would have a potential induced into it. This is perfectly true ... it would, and does. So why couldn't they utilize it, or even measure it? Only by introducing another wire, to bring it back to the measuring instrument or load, could it be done. The very act of completing that "return wire" will make a coil and this, however it is shaped or convoluted, will always create a second part of the circuit whose potentials will be exactly equal and opposite and so cancel out the measured result. A pity but, if this was not so, one could generate limitless power ... for nothing!

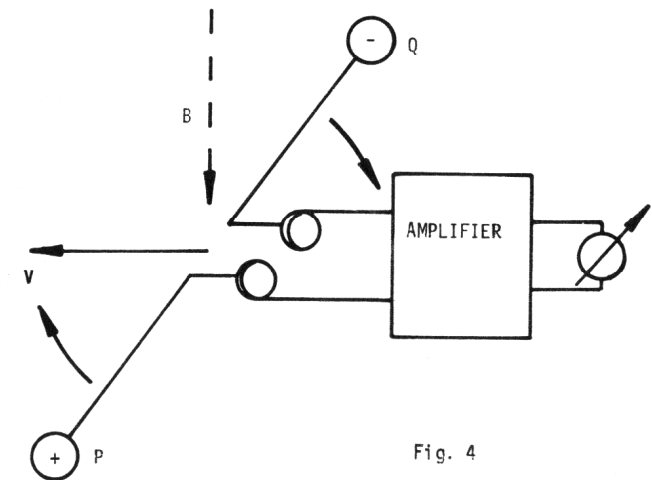
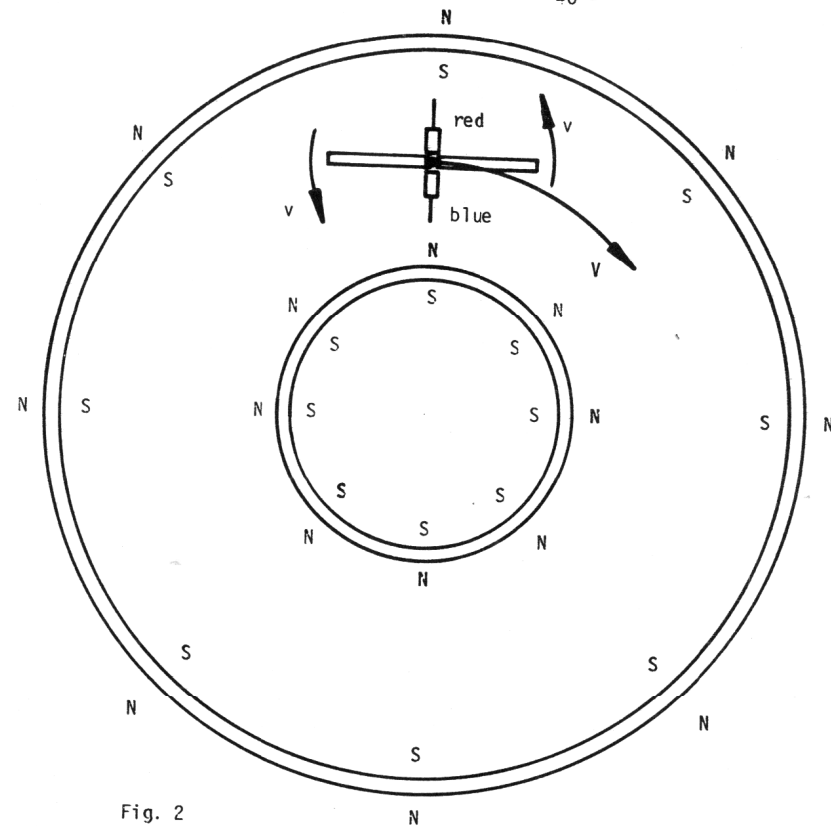
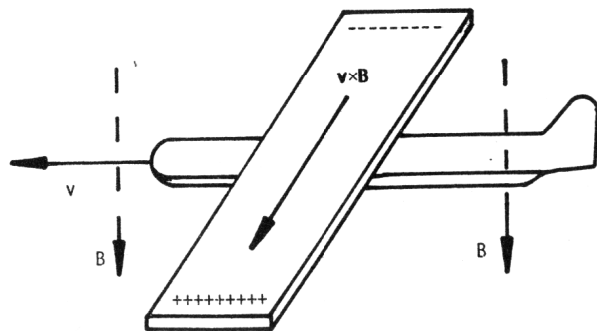
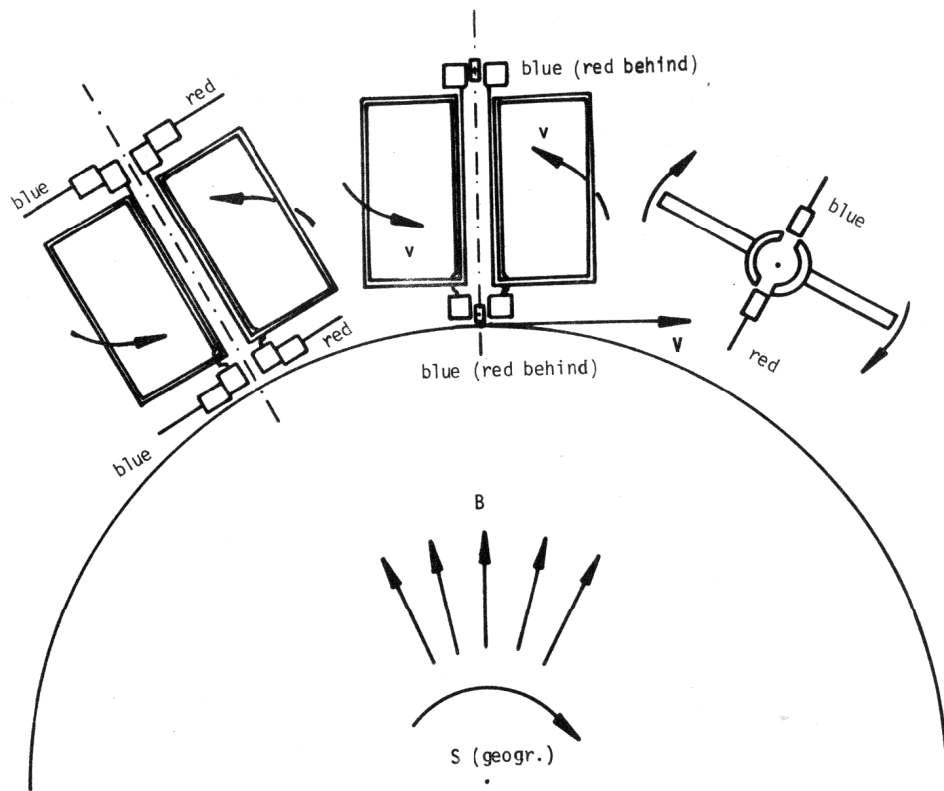
FIGURE CAPTIONS

Fig. 1. Brooker's experiment done on the equator.

Fig. 2. Brooker's experiment done in a double magnetic shell.

Fig. 3. A plane crossing at its motion (own motion and motion due to the Earth's rotation) the Earth's magnetic field.

Fig. 4. Apparatus for measuring absolute motion with respect to the Earth's magnetic field.



ELECTROMAGNETIC INDUCTION OF SPACE SUBSTRATUM

by
Paramahansa Tewari

In order to fully comprehend the working of Space Power Generators that operate at over-unity efficiencies and thereby defy the existing Law of Conservation of Charge and Law of Conservation of Energy, I had carried out a number of crucial tests. The enclosed article describes one such test that pin-points the substantiality of Space (Absolute Vacuum). In due course I shall be writing some more articles also that are based on the experiments carried out for the development of Space Power Generators.

INTRODUCTION

A cylindrical electromagnet, rotated on its axis, develops dc voltage between the axis and the periphery though there is no relative motion between the magnetic field in the core parallel to the axis and the iron conductor of the core. Refer to Fig. 1. Faraday had discovered¹ this effect by rotating together a permanent magnet and copper disc integral with it. Bruce DePalma² while carrying out the experiments on rotation of magnets independently discovered this phenomenon and named it "N-Effect". Development of N-generator by DePalma, Homopolar generator by Adam Trombly³ and Space Power Generator (SPG) by the writer operating at "over-unity" efficiencies and in violation of the "Law of Conservation of Energy" in its existing form is based on this new system of co-rotating assembly of magnet and disc conductor, in which the magnetic field and the conductor have zero relative motion. It gets evident that there are more basic aspects to Faraday's law of electromagnetic induction that what has been so far recognised.

In Fig. 2 a conductor C is placed transverse to a magnetic field B from a magnet M. Electromotive force (emf) is generated in C if it is moved as shown in the figure. Also if C is kept at rest and M is moved, emf is generated in C. In an other case, if current is changed in a nearby conductor C', the changing magnetic flux of C' will induce an emf in C. In the above cases, there is either relative motion between C and B, and B thus cuts the conductor or there is a change in the magnetic field B' of the nearby circuit conductor C' and the changing field B' interacts with C to produce emf. In SPG also the magnetic field is in

contact with the rotating iron core conductor and emf is produced without relative motion between the conductor and the magnetic field. The common feature in all the above cases is that for the generation of emf in a conductor, interaction with the conductor of either steady magnetic field of changing magnetic field is essential.

An experiment with rotating electromagnet described below has, however, shown that emf can be induced within a rotating conductor even when it has no direct interaction with steady of changing magnetic field. With this experiment, a conclusive proof is had that the absolute vacuum (space) is the fundamental substratum of reality that can undergo magnetic induction and transmit the emf induced in it to the conductor rotating relative to it.

EXPERIMENT

Refer to Fig. 1. The magnetic circuit of a rotating electromagnet completes its path through static iron limbs on either side and the base. In the four slots cut in the cylindrical iron core, provision is made for non-magnetic stainless steel (ss) rods that are welded near the centre of the core and connected with the non-magnetic ss ring surrounding the core. The magnetic field produced by the dc current in the coil, which is integral with the core and rotates with it, does not pass through either the four slots or the rods mounted within the slots. When the assembly is rotated, the magnetic field remains fully confined to the core, air gaps on either side of the core and the base. Measurements show however that the ss ring develops the same dc voltage as the cylindrical core's surface on its periphery. (Although the ss ring and the rods are neither in contact with the periphery of the core nor have magnetic field in them.) Even when four thin slots are cut in the ss ring making rods independent, the same voltage is induced in the ring. It is inferred that the zone in which voltage is induced in the rods is within the slots and since the magnetic field in the core surrounding the slots is a steady field due to dc current in the electromagnet's coil, electromagnetic induction as conventionally understood cannot induce emf in the rods. The space surrounding the rods in the slots has to be a real medium that has to somehow generate emf in itself so

as to transmit the same to the rods.

"STATIC" AND "DYNAMIC" SPACE SUBSTRATUM

The effect of generation of emf in the above experiment can be explained by introducing "static" and "dynamic" aspects of space substratum as discussed elsewhere in writer's works.⁴ The interatomic space within the iron core along with the "space vortices" that constitute the atoms of the iron core, the ss ring and the rods form one system of dynamic space that rotates relative to the static space. Within the iron core, however, the rotating space is super-imposed on the stationary space, and, therefore, the magnetic field there is common to both the rotating as well as the stationary spaces. As the space of the rotating iron due to rotation shifts along with its magnetic field, it leaves behind within the slots static space with magnetic field falling to zero there. This causes induction effect in the static space of the slots. The ss rods moving through the stationary space within the slots pick up the emf induced there and are thus raised to the same potential as the periphery of the core. If the space medium within the slots around the ss rods is considered an "emptiness", in the absence of any magnetic field there, no electro-magnetic induction is possible and hence the ss ring cannot develop emf with steady magnetic field in the core contrary to experimental evidence.

CONCLUSION

The following conclusion are drawn from the above experiment.

A rotating electromagnet carried with it during rotation the magnetic field in interatomic space of the core produced due to the coil integrally mounted on the core of the electromagnet. (As the source of the magnetic field [coil] rotates, the field also rotates with the source.)

The steady magnetic field in the iron core in its transverse motion of rotation produces emf in the neighbouring space (within the slots) due to the electromagnetic induction of space caused when the magnetic field in the core shifts relative to the stationary space substratum in the slots.

The radial flow of load current in the electromagnet's iron core and the magnetic field in the core transverse to this current, interact within the rotating space system of the core which is independent of the external stationary space system. The resultant force between the current and the magnetic field is thus contained within the rotating space system and does not produce torque opposite to that of the prime mover that rotates the electromagnet.

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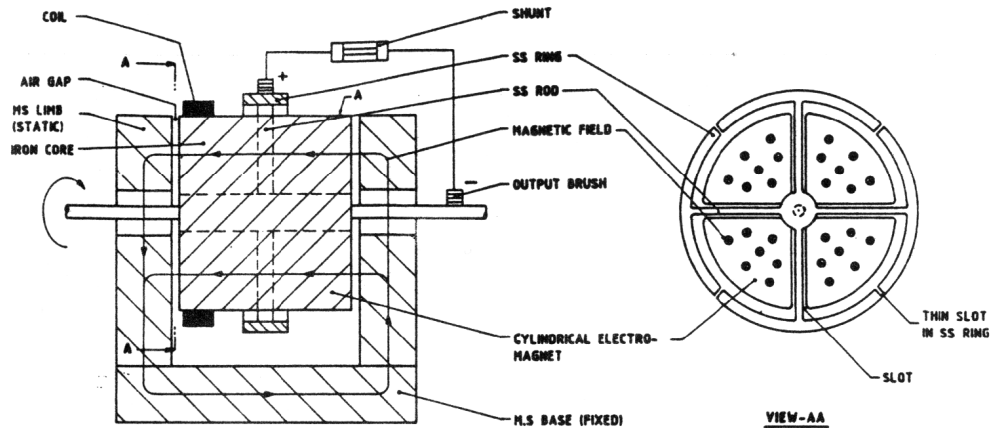


Fig. 1

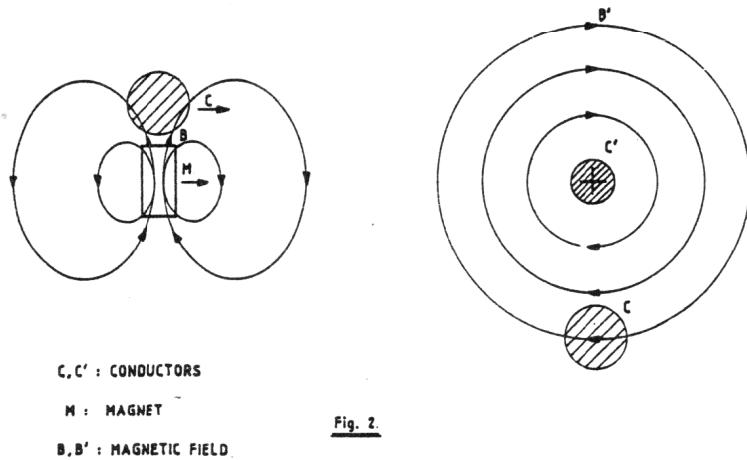


Fig. 2

EDITOR'S COMMENTS

There is nothing more practical than a good theory.

Ludwig Boltzmann

The preceding paper of my friend Paramhansa Tewari is dedicated to another simple experiment where the motional-transformer induction can be demonstrated. Dr. Tewari has observed an effect which can be explained and calculated in the most direct way by the formula for the motional-transformer induction. The effect is "puzzling" only for those people who remain true to the nonsensical concepts of established electro-magnetism and continue to operate with the "field" concepts and the electromagnetic intensities, instead to use the clear and natural "far action" concepts (even forgetting the notion "action") and the electromagnetic potentials.

As Tewari's experiment is very simple and "didactic", demonstrating in the most direct way the essence of the motional-transformer induction, it was a pleasure for me to republish his paper in DEUTSCHE PHYSIK.

Tewari thus observed that if cutting a cylindrical magnet with planes containing its axis and putting in the narrow slots radial wires which have sliding contacts at the axis and at the periphery, then at rotation of the magnet together with the radial wires an electric tension will appear between the sliding contacts, exactly equal to the tension which will be obtained if the magnet will be cut with planes perpendicular to the axis and the radial wires will be put in the respective narrow slot which now will be perpendicular to the magnet's axis. Well, but in the first case the radial wires are located in a space domain where the magnetic intensity is zero, while in the second case they will be located in a space domain where the magnetic intensity will be different from zero.

According to the conventional electromagnetic concepts, in the first case an electric intensity cannot be induced, as conventional theory asserts that any magnetic effect is determined by the magnetic intensity. Conventional physics accepts that magnetic effects may be determined not by the intensity but by the potential only in quantum physics; such a quantum "non-intensity" effect is the well-known Bohm-Aharonov effect.

Meanwhile in Tewari's experiment, executed as in his fig. 1 where the cylindrical magnet is closed by a yoke, not only the radial wire but the whole its circuit is in a space domain where the magnetic intensity is zero. Thus Tewari's experiment is a catastrophe for conventional physics.

For explaining the non-null effect in his experiment, Tewari refers to his nebulous (at least for me) "space vortex theory". Meanwhile if one proceeds from the most primitive and childish, I should say "aboriginal", electromagnetic concepts, based only on the axiomatic laws of Coulomb and Neumann for the electric and magnetic energy of two charged particles respectively at rest and in motion, and of course from the pri-

mitive, childish and "aboriginal" absolute space-time concepts, one comes immediately to the notions of the motional, rest-transformer and motional-transformer inductions. In his fig. 2 Tewari also arrives, at least qualitatively, to these three fundamental kinds of induction. Now I shall show that the effect observed by Tewari can be easily calculated.

To make the experiment more convenient for mathematical description, I shall make in the cylindrical magnet not a cut with a constant width as Tewari has done (see view A-A in his fig. 1), but a "wedge cut", as one is doing when cutting a cake (see my figs. 1 and 2).

Assuming that the magnet is long enough, we shall have for the magnetic potential generated in a cylindrical frame of reference with a z-axis along the axis of the electromagnet and a north magnetic pole on the positive z-axis (see TWT-II, p. 121)

$$\begin{aligned} A_\phi &= (1/2)\mu_0 n I \rho \quad (\text{for } \rho < R), \\ A_\phi &= (1/2)\mu_0 n I R^2 / \rho \quad (\text{for } \rho > R), \end{aligned} \quad A_\rho = 0, \quad A_z = 0, \quad (1)$$

where μ is the permeability of the iron core, n is the number of turns of the magnetizing coil on a unit of length, I is the current in the coil, R is the radius of the cylindrical iron core, and this formula (as all formulas in this paper) is written in the SI system of units.

The cross-section in fig. 1 is done at the middle of the magnet. The radial wire which is along the x-axis (the polar axis) has a sliding contact at point A. The wire continues then along the positive z-axis and at its top, at point B, has another sliding contact. For clarity one can imagine that the magnetic flux of the cylindrical magnet is closed by a yoke as in Tewari's fig. 1.

I shall calculate the global electric intensity induced in the radial wire proceeding from the Newton-Lorentz equation (take equation (35) from p. 35 of DEUTSCHE PHYSIK, 1(2) and write it in the SI system of units)

$$\mathbf{E}_{\text{glob}} = \epsilon_0 \mu_0 \mathbf{v} \frac{\partial \Phi}{\partial t} - \text{grad} \Phi - \frac{\partial \mathbf{A}}{\partial t} + \mathbf{v} \times \text{rot} \mathbf{A}. \quad (2)$$

Putting here $\Phi = 0$, we shall have (note that for this case (p.7) there is $\text{div} \mathbf{A} = 0$)

$$\mathbf{E}_{\text{glob}} = - \partial \mathbf{A} / \partial t + \mathbf{v} \times \text{rot} \mathbf{A} = \mathbf{E}_{\text{mot-tr}} + \mathbf{E}_{\text{mot}}. \quad (3)$$

The magnetic potential in the wedge cut will be determined first by the current in the coil's windings and will be

$$A_\rho = 0, \quad A_\phi = (1/2)\mu_0 n I \rho, \quad A_z = 0, \quad (4)$$

as in the cut there is $\mu = 1$.

Then the magnetic potential in the wedge cut will be determined by the "molecular currents" flowing along the edges of the wedge cut. In fig. 1 I have indicated by arrows the "molecular currents" flowing at the periphery of the magnet's iron. The mag-

netic potential generated by the molecular current flowing along the side CO will have the following components in the used cylindrical frame of reference

$$A'_\rho = - (1/2)\mu_0 n I R^2 / (R + \rho\phi), \quad A'_\phi = 0, \quad A'_z = 0, \quad (5)$$

while the magnetic potential generated by the molecular current flowing along the side OD will have the following components

$$A''_\rho = (1/2)\mu_0 n I R^2 / (R - \rho\phi), \quad A''_\phi = 0, \quad A''_z = 0, \quad (6)$$

where angle ϕ must be taken in formula (5) in the positive direction, and in formula (6) in the negative direction, beginning respectively from the sides OC and OD.

Indeed, for $\phi = 0$, we have for both cases

$$|A_\rho| = (1/2)\mu_0 n I R, \quad (7)$$

and this is equal to the ϕ -component of the magnetic potential at the circumference of the cylindrical magnet (see formulas (1) at $\rho = R$). On the other hand, at a distance $d = |\rho\phi|$ from the cutting sides OC and OD, the ρ -component of the magnetic potential is again equal to the ϕ -component at a distance d from the magnet's circumference.

The net magnetic potential along the x-axis, where we put the wire OA, will have the following components

$$A_\rho = A'_\rho + A''_\rho = 0, \quad A_\phi = (1/2)\mu_0 n I \rho, \quad A_z = 0. \quad (8)$$

For the induced motional electric intensity, taking the expression for $\text{rot} \mathbf{A}$ in cylindrical coordinates from formula (5) in my preceding paper on Brooker's experiment, writing the components of the wire's velocity in cylindrical coordinates (Ω is the angular velocity)

$$v_\rho = 0, \quad v_\phi = \rho\Omega, \quad v_z = 0, \quad (9)$$

and making use of formulas (8), we shall have

$$\mathbf{E}_{\text{mot}} = \mathbf{v} \times \text{rot} \mathbf{A} = \rho\Omega \hat{\phi} \times \frac{1}{\rho} \frac{\partial (A_\phi)}{\partial \rho} \hat{z} = \mu_0 n I \Omega \hat{\phi}. \quad (10)$$

For the induced motional-transformer electric intensity, making use of formulas (5) and (6), we shall have

$$\mathbf{E}_{\text{mot-tr}} = - \partial \mathbf{A} / \partial t = - \frac{\partial A'_\phi}{\partial t} - \frac{\partial A''_\phi}{\partial t} = \frac{\mu_0 n I R^2 \rho}{2(R + \rho\phi)^2} \frac{\partial \phi}{\partial t} \hat{\phi} + \frac{\mu_0 n I R^2 \rho}{2(R - \rho\phi)^2} \frac{\partial \phi}{\partial t} \hat{\phi} \approx \mu_0 n I \rho \Omega \hat{\phi}, \quad (11)$$

where the approximation is done taking into account that $\rho\phi \ll R$.

As the motional-transformer electric intensity (11) is μ times bigger than the motional electric intensity (10), the latter can be ignored with respect to the former.

However when the cut in the magnet will be done by a plane perpendicular to the magnet's axis and the slot will be thus perpendicular to the axis, by making calculations similar to those done in formula (10), we shall obtain for the global electric intensity in this case

$$\mathbf{E}_{\text{glob}} = \mathbf{E}_{\text{mot}} = \mathbf{v} \times \text{rot} \mathbf{A} = \mu_0 n I \rho \Omega \hat{\phi}. \quad (12)$$

We see that the induced motional-transformer electric intensity (11) is equal to the induced motional electric intensity (12), as it was observed by Tewari.

Thus the effect observed by Tewari is the most trivial effect of a motional-transformer induction which can be explained and calculated by the fundamental Newton-Lorentz equation, if one will finally forget the secular illusion that there is a "magnetic field" and if one will put an end to the insipid and annoying speculations à la Faraday whether a magnetic field can be moved or not moved.

As I wrote many times, stationary electromagnetism is a crystally transparent theory which any intelligent man knowing vector analysis can learn in five days (six are too much). If humanity for almost 200 years does not understand it, writes its fundamental equation wrongly and cannot make the most childish calculations, the reasons are the wrong Faraday-Maxwell field concepts, the abandonment of the electromagnetic potentials and, last but not least, the idiotic theory of relativity.

Here I should like to put a full stop to the generator effects in Tewari's experiment, which I shall further call the "slotted Faraday disk".

Before considering the motor effects in the slotted Faraday disk it would be expedient to give a short review on the "N-machine story".

+++++

We know that the traditional Faraday disk is a generator transforming mechanical energy into electric energy. There are two types of Faraday disks: cemented, as the one on the right side of fig. 3, where the disk, from where current is extracted, and the cylindrical magnet rotate together, and uncemented, as the one on the left side of fig. 3, where only the disk rotates but the cylindrical magnet is solid to the laboratory. Further, any of these two Faraday disks may be open, as the one on the right of fig. 3, or closed by a yoke, as the one on the left of fig. 3.

All Faraday disks can be used also as motors. When used as motors I call them Barlow disks, respectively cemented, uncemented, open and close Barlow disks.

Bruce de Palma (see TWT-II, p. 150) was the first man who observed in his cemented open Faraday disk that the generated electric power is greater than the driving mechanical power and called this strange generator violating the energy conservation law the N-machine. Bruce de Palma thought first that the N-machine has no motor effect and thus that the whole generated electric power is produced from nothing, as it seemed to him that his N-machine was reactionless. Later Bruce established that the cemented Faraday disk has a motor effect (this motor effect was observed first by Barlow in the first decade of electromagnetism with an uncemented disk), but the electromagnetic braking is not 100%, i.e., that the generated electric power was more than the braking mechanical power. Such a less than 100% braking was observed also by Adam Trombley in a closed cemented Faraday disk. Trombley even received a patent for his machine and admonition from the Department of Defence of the USA that if he will

continue to disseminate information on the effects in the N-machine, he will be sentenced as a spy, as this topic has been classified by the American government. Both Bruce and Adam are my friends. After my visit of Santa Barbara in 1985 Bruce supported my research activity with considerable donations.

Later many persons built different types of N-machines. Some of them reported "over unity effects", i.e., "less than unity braking" for their generators, others reported "unity effects", i.e., "100% electromagnetic braking". Of the second kind of people I shall mention my friend Sven Mielordt who, after many years of very intensive experimentation reported in one of the German RAUM & ZEIT issues for 1991 that the electromagnetic braking in his machine is exactly 100%. The most pronounced researcher announcing in the last time over unity effects is P. Tewari who disposes of considerable financial possibilities and has constructed many (perhaps ten) different N-machines. I have seen and tested (for me the test was inconclusive) the first Tewari's machine (weight about 1 ton) which he demonstrated at the Dr. Nieper's conference in Hannover in 1987. The over unity effects reported by Tewari are even bigger (of the order of 400%, i.e., 25% electromagnetic braking) than the over unity effects reported by Bruce de Palma for his last machines.

I constructed two N-machines where the generator (the cemented Faraday disk) was always coupled with a motor, so that a perpetuum mobile could be obtained if the over unity effect should be high enough. In my first machine (see TWT-II, p. 150) the open cemented Faraday disk was coupled with a closed uncemented Barlow disk exactly as in fig. 3. In my second machine called ADAM (Apparatus Discovered in Austria by Marinov) (see TWT-II, p. 324) the open cemented Faraday disk was coupled with a König-Marinov motor. The measurements with the first machine were very inaccurate and consider them as inconclusive. The second machine showed the existence of an over unity effect, especially when the solid Faraday disk was exchanged by a disk filled with mercury. Nevertheless the over unity effect was pretty low, i.e., the electromagnetic braking pretty high. I could not measure input and output powers. I measured the coast-down times at different regimes of the machine. I cannot thus give exact figures for the over unity effect but according to my estimations, for a solid Faraday disk, the over unity effect could be no bigger than 110%, i.e., the electromagnetic braking was at least 90%. It became clear for me that it was impossible, at my financial and experimentation possibilities, to run an N-machine with a closed energetic circle, i.e., as a perpetuum mobile, and in 1985 I stopped any research in this field. I sold my first machine to P. Pappas and my second machine to A. Heerfordt.

In 1988 I did measurements on the Dillingen N-machine of my friends Sawicki, Hacksbacher, Seitz. This was a very well built machine reaching some 6000 rev/min. The methods of the input-output measurements were reliable. At the measurements assisted another passionate builder of N-machines, Dr. Wojtek Chrystowski. On the next page there is a protocol which we signed after the measurements.



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Dillingen 27.02.1988

Protokoll

Am 27.02.1988 haben sich in Dillingen bei Psitron die Herren

Rudolf Kreisel, Welzheim
Stefan Marinov, Graz,
Wojtek Chrystowski, Gernsbach,
Eduard Sawicki, München,
Hans Hackspacher, Dillingen,
Franz Seitz, Dillingen

zur Besprechung und Demonstration der N-Technik und des Mamin Coliu
getroffen. Die Ergebnisse der Dillinger N-Maschine wurden von H. Stefan
Marinov notiert und wurden hernach diskutiert. Die Mamin Coliu Phänomene
wurden demonstriert und ebenfalls diskutiert.

Es wurde nur eine Messung durchgeführt. Das Resultat betrug 109% und mit
Berücksichtigung des Antriebsmotorwirkungsgrads wurden 122% ermittelt.

Hans Hackspacher
Wojtek Chrystowski
Stefan Marinov
Rudolf Kreisel
Eduard Sawicki

Thus the reports of Tewari for 400% over unity effect are very intriguing. Tewari
invited me to visit his laboratory and I intend to do this as soon as I could afford
me the trip. Tewari is one of the most fine and graceful men whom I ever met in my life.

I should like to give now only certain brief notes on Tewari's machines, basing my
comments on his typed paper entitled "Space power generator". I would like very much
to publish the whole paper in DEUTSCHE PHYSIK but its considerable length (16 pages)
does not allow this. However when presenting Tewari's views, I shall reproduce the
relevant parts of his paper.

1. According to me the generator effects in cemented and uncemented Faraday disks,
as well as the motor effects in cemented and uncemented Barlow disks must be exactly
the same. In my opinion the reason for a less than 100% braking in the Faraday disk
lies not in the fact that the cylindrical magnet is cemented to the disk and rotates
with it, but in the fact that the current is generated in a disk and not in wires (see
my speculations on this topic on p. 325 of TWT-II). I have, however, not carried out
measurements to prove the above assertion, although the relevant experiments will be
pretty simple. Tewari's opinion on this topic is:

The basic
difference between a conventional homopolar generator and a space power
generator (SPG) is in the mounting of the electromagnet's coil. While
in the homopolar generator there is relative motion between the coil
and the core's conductor, in SPG such a relative motion is non-existent.
It can thus be inferred that in SPG, due to the co-rotation of the coil
and the core, the magnetic field produced by the coil and the magnetic
field of the load current, have no relative motion and that should preci-
sely be the basic reason for the absence of torque in opposition to the
prime mover's torque when the machine is loaded.

2. In his paper Tewari presents Trombly's machine (fig. 4) and asserts the fol-
lowing:

In fig.4,
basic design of a homopolar generator developed by Adam Trombly is
shown. The magnetic field's path through air is accross a narrow gap
and this reduces the ampereturns to a large extent, however, the
disadvantages of this system revealed through the experiments by the
writer is in the generation of high torque in opposition to the prime
mover within the air gap through which the load current passes and
hence, the advantage of free power generation in the core is substan-
tially lost.

According to my concepts, if sending current in the direction indicated by the arrows in fig. 4, the magnet will act on the current AB with a torque pointing away of the reader and on the current CD with a torque pointing to the reader, but both these currents do not act with torques on the magnet. This can be shown immediately if making a cut along both dotted lines, so that both pieces of the magnet should have independent rotational degrees of freedom. By sending current one will see that the outer magnet will not rotate. Thus contrary to Tewari's expectations, the current AB in the gap cannot produce drag and brake the rotation. As Tewari certainly has observed electromagnetic braking in a Trombley's type N-machine, he has to conclude that the braking is due only to the torque with which the magnet acts on the current CD (here again the current CD does not exert a torque on the magnet).

The experiment with the cut along the two dotted lines magnet is very interesting from another point of view: it gives a clear demonstration for the invalidity of Ampere's formula for the interaction of two current elements. According to this formula (formula (39) on p. 15 of DEUTSCHE PHYSIK, 1(2)) the outer piece of the magnet has to begin to rotate in a direction opposite to the direction in which the wire AB would rotate if it would have a rotational degree of freedom, as Ampere's formula preserves Newton's third law, and consequently the angular momentum conservation law. As this will be not the case, one sees here another experimental confirmation for the validity of Whittaker's formula (formula (37) on p. 15 of DEUTSCHE PHYSIK, 1(2)), which violates Newton's third law and the angular momentum conservation law.

3. Immediately after the text cited in point 2, Tewari writes the following:

Fig.5 shows basic features of SPG, in which the loss of power in the airgap-1 as mentioned above is partly gained in the airgap-2 since the direction of load current in the airgap-2 is reversed while the magnetic field direction in both the airgaps remain the same. The machine abbreviated as SPGM is in fact a combination of SPG and Space Power Motor (SPM). Efficiency as high as 400% at load current of 3000 A dc and generated voltage 3 V dc, at 3000 rpm have been repeatedly measured from different designs of SPGMs.

As said in point 2, the currents flowing in the airgap-1 and airgap-2 do not exert any braking or driving action on the magnet. The adding of the second generator leads to the only result that now the tension induced in the circuit will be lower and a torque supporting the rotation will act on the radial current in the second smaller disk, i.e., the second disk will be a Barlow disk and only the big disk will remain a Faraday disk.

Thus this Tewari's machine is exactly of the kind of my two machines where the ge-

nerator is coupled with a motor. To establish whether his machine produces energy from nothing (or extracts it from space, according to Tewari's language), he has to make my coast-down measurements (see TWT-II, p. 324). A definite test that energy is produced from nothing is only the following one: Let, at an open circuit, the coast-down time from a certain angular velocity Ω be T seconds. If at a closed circuit the coast-down time from the same angular velocity Ω will be bigger than T, then, obviously, energy from nothing is produced. If not, then tedious measurements are to be done to see whether energy from nothing is produced. At these measurements and consequent calculations, surely, many errors may be introduced.

In my machine ADAM I could not obtain, at a closed circuit, a coast-down time bigger than T when the disk was of solid metal. But with a mercury disk I could!

++++

And now I come to the motor effects in the slotted Faraday disk of Tewari. As now the electric intensity is induced in a wire which is in a space domain where the magnetic intensity is zero, Tewari supposes that the electromagnetic braking will be zero. He states this clearly in his last sentence:

The resultant force between the current and the magnetic field... does not produce torque opposite to that of the prime mover that rotates the electromagnet.

I shall show that this assertion of Tewari is not true: a torque will appear.

Before giving the demonstration I should like to note that the explanation and the calculation of the generator effects is a very simple problem, as for this aim we have to know only the magnetic potential at a given space point where a wire element is located, the velocity of this wire element and the velocity of the magnet producing the potential (if the magnet's velocity is not rectilinear, then the velocities of all its current elements).

To explain the motor effects is much more difficult and the calculation is sometimes impossible (perhaps only on a computer), as we must know the positions and the velocities of all current elements building the magnet.

The difficulty in treating the motor effects explains why Fr. Müller, who was excellent in the observation and explanation of the generator effects, was unsuccessful when stumbling at the motor effects.

Instead of a wedge cut, as shown in fig. 1, we can make only a radial hole in the magnet's iron, where the radial wire OA is to be put (see similar holes in the demonstrational Faraday-Barlow machine on p. 90 of DEUTSCHE PHYSIK, 1(1), in which the current conducting bars are put). For better understanding when referring to figs. 1 and 2 I shall, however, continue to speak about a "wedge cut".

As the magnetic intensity in the domain of the wedge cut is zero, no force will act on the current flowing along the wire OA. From here Tewari makes the conclusion that no electromagnetic braking will appear when current will be generated in the

wire. This, however, is not true: now the current in the wire will exert a torque on the magnet and will brake the rotation.

The situation with the "axial" slot is exactly opposite to the situation with the "basic" slot which we have, practically, in all traditional Faraday disks. At a basic slot, i.e., when the slot is perpendicular to the magnet's axis, the magnet exerts a torque on the current OA, but the current OA does not exert a torque on the magnet. At an axial slot, i.e., when the slot is parallel to the axis, the magnet does not exert a torque on the current OA, but the current OA exerts a torque on the magnet.

"Confirm these predictions by calculations" would say the reader. - Sorry! The calculation is too difficult not only for me but also for the best computer specialist.

How then can one become sure that these assertions are true? - Only by observations. If the magnet has a rotational degree of freedom and the wire OA is fixed to the laboratory, then the magnet will be moved when current will be sent through the wire OA (of course, the motion will be limited by the space of the wedge cut). If there is a sliding contact at point A and the wire is fixed to the magnet, magnet and wire will begin to rotate together (this common rotation again disproves Ampere's formula).

The situation is analogical to case 6 in table 1 on p. 89 of DEUTSCHE PHYSIK, 1(1), for the demonstrational Faraday-Barlow machine. In this machine the current in the bars exerts a torque on the magnet, but the magnet exerts an opposite torque only on the current in the disk. Meanwhile neither the magnet exerts a torque on the current in the bars, nor the current in the disk exerts a torque on the magnet.

One may ask: Where should be the opposite torque in Tewari's slotted Faraday disk, shown in his fig. 1, which we have to call, as a matter of fact, a slotted Barlow disk, as we consider now motor effects? - The answer which will dismay all conventional physicists is: There will be NO an opposite torque: the slotted Barlow disk will rotate AS A WHOLE, if executed as in Tewari's fig. 1, without the necessity of sliding contacts, and violating thus the angular momentum conservation law.

Also the slotted Faraday disk in Tewari's execution in his fig. 1 will generate electric current when rotating it AS A WHOLE, without the necessity of sliding contacts but it will NOT violate the energy conservation law, as the respective motor effect will brake the rotation.

To all these interesting topics is dedicated my next paper.

FIGURE CAPTIONS

Fig. 1. Cross-section of a slotted Faraday disk perpendicular to the axis of the cylindrical magnet.

Fig. 2. Open slotted Faraday disk.

Fig. 3. Cemented and uncemented, open and closed Faraday and Barlow disks.

Fig. 4. Trombley's N-machine (closed cemented Faraday disk).

Fig. 5. Tewari's space power generator (closed cemented Faraday disk coupled with a closed cemented Barlow disk).

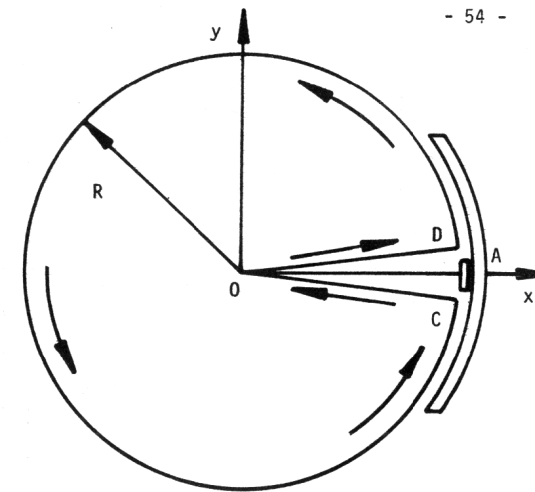


Fig. 1

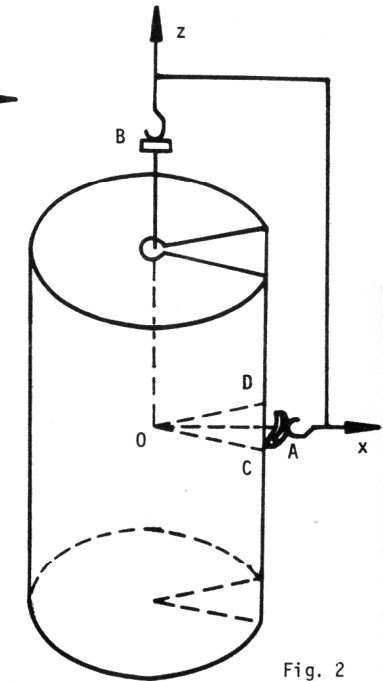


Fig. 2

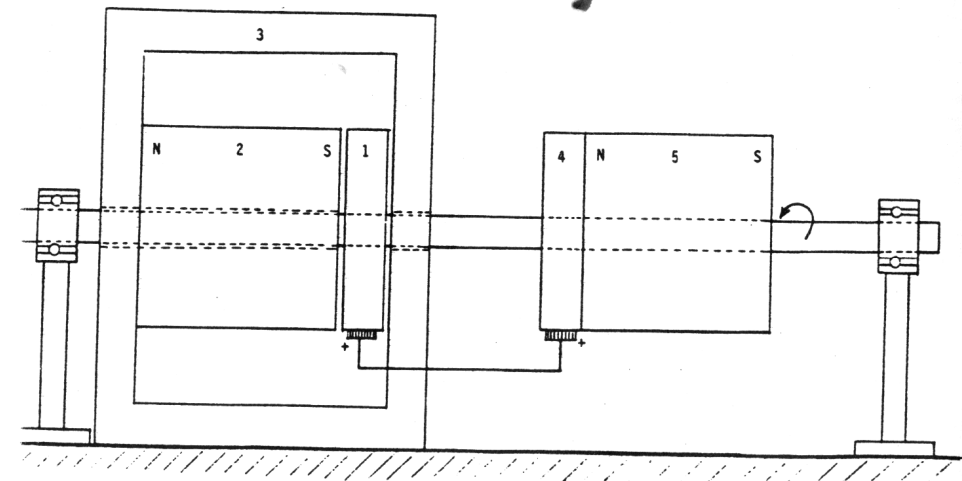


Fig. 3

THE FANTASTIC EFFECTS DEMONSTRATED BY THE CLOSED BARLOW AND FARADAY DISKS

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I predict that the closed Barlow disk will rotate as a whole and thus will violate the angular momentum conservation law, while the closed Faraday disk will generate electrical energy when rotating it as a whole. I present the childishly simple technical drawing of such a machine, called ACHMAC (Autonomous Closed Half-polar MACHine) which is in construction.

I shall consider only the normal (unslotted) Faraday and Barlow disks. The transition to the effects in the slotted machines can be made then very quickly.

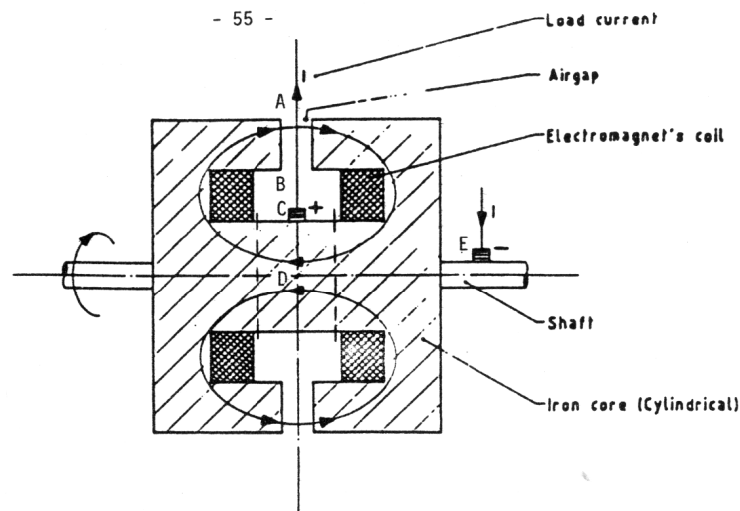
In TWT-II, p. 112, when introducing my classification of the electromagnetic motors and generators (the non-polar, half polar, unipolar, one-and-a-half polar and bipolar machines), I considered the closed half polar machine. This machine was presented in fig. 7 on p. 166 of TWT-II, and I reproduce this drawing in fig. 1 of the present paper. Let me note that I call "half polar" the machines which normally are called "unipolar", as the coil in these machines covers only the half of the pole and then proceeds along the axis of the cylindrical magnet. According to my classification, "unipolar" must be called the machines presented in fig. 8 on p. 167 of TWT-II.

Let us consider the generator and motor effects in the closed half polar machines, which will be called, respectively, closed Faraday and Barlow disks (see fig. 1).

1. GENERATOR EFFECTS. When rotating the coil, motional electric tension will be induced along the wire ab. Obviously, at the rotation of the coil an electric tension can be not induced along the wire ac, as its velocity is zero. Neither along the other parts of the coil a motional electric tension can be induced, as they rotate in space domains where the magnetic intensity generated by the magnet is zero. Thus at a uniform rotation of the whole coil only a constant tension in the radial wire ab will be induced.

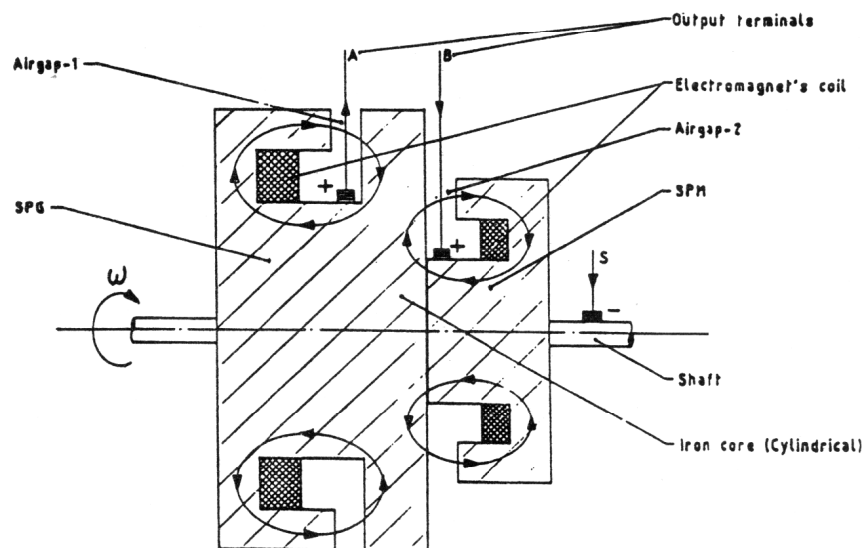
If keeping now the coil at rest, we shall rotate the magnet about the same axis, a motional-transformer tension will be induced in the coil which, however, will have a variable magnitude, being zero at the disposition shown in fig. 1 and becoming maximal after a rotation over 180° when the left vertical wire of the coil will be reached by the rotating magnet. The calculation of this motional-transformer induction is very difficult, perhaps even impossible, but it, surely, will be weak and thus can be ignored. In any case for a bigger part of a rotation it will be near to zero.

Thus if we should rotate coil and magnet together at their disposition shown in fig. 1, the induced in the coil tension will be only the motional tension induced in the wire ab.



TROMBLY'S HOMOPOLAR GENERATOR

Fig. 4



Note:- Terminal A is more positive than terminal B

SPACE POWER GENERATOR

Fig. 5

And look now what a strange machine should we have: a solid body ROTATING AS A WHOLE and generating electrical power. If putting this machine on the Earth's geographical pole, it will deliver electrical energy because of its rotation together with the Earth.

2. MOTOR EFFECTS. One will immediately ask: And if we should rotate the closed Faraday disk as a whole and produce electrical power, will there be a braking electromagnetic torque whose mechanical power should be equal to the generated electrical power? - Yes. There will be such a braking electromagnetic torque. To understand why it will appear, let us consider the motor effects in the closed half polar machine (in the closed Barlow disk) when current will be sent in the coil.

When sending current in the machine shown in fig. 1, at ANY disposition of the coil with respect to the magnet, only a constant torque will act on the current wire ab. This will be the torque which will oppose the mechanic torque setting the machine in rotation and leading to generation of current in the coil. It is obvious, if taking into account the traditional Faraday and Barlow disks with sliding contacts, that the produced electric power will be equal (or only slightly superior because of de Palma's "N-effect") to the mechanical power invested for the rotation. This "N-machine", however, has NO sliding contacts and can have as many windings as one wants. Thus ALL TECHNOLOGICAL PROBLEMS with which Bruce de Palma and all builders of N-machines fight since more than a decade are ELIMINATED.

The motor effect of the closed half polar machine has, however, another much more important effect: THIS MOTOR WILL VIOLATE THE ANGULAR MOMENTUM CONSERVATION LAW.

When analyzing in TWT-II the closed half polar machines some eight years ago, I was, as all physicists on this planet, in the "claws" of the laws of conservation. I could not admit that such a simple machine, which every child can construct, will violate the angular momentum conservation law. And I artificially supposed that the current in the wire ac has to act on the magnet with a torque equal and opposite to the torque with which the magnet acts on the current in the wire ab. I ruminated at that time during DAYS AND NIGHTS how to explain to the reader (and to myself, as the author is the first and the MOST IMPORTANT READER) the appearance of this "balancing" torque. Any explanation was clumsy and stupid. I simply could not arrive at a satisfactory explanation. And now I see the reason: such an opposite torque does NOT exist! If I had the courage to accept this fact eight years ago, I could construct the childish simple machine, which I am now constructing, eight years ago and could demonstrate to the people visiting me in the stable a violation of a fundamental physical law eight years ago.

Eight years ago I have already written on my shield: Be sure that a physical explanation which a normal child cannot understand is WRONG. But in the case with the closed half polar machine I betrayed this saint slogan and writing in TWT-II a highly clumsy and stupid explanation I went to sleep. And waking after eight years from my

sleep I see that the current in the wire ac surely will not exert a torque on the magnet.

Let me note that in my wrong assumption that the current ac will exert a torque on the magnet a very perfidious role was played by my demonstrational Faraday-Barlow machine. I beg the reader to read the next pages attentively, so that the "perfidy" of the Faraday-Barlow machine can be revealed by him.

As already noted in my comments to Tewari's paper, the torque with which the currents in the bars of the demonstrational Faraday-Barlow machine act on the magnet is equal and opposite to the torque with which the magnet acts on the current in the disk. Thus the demonstrational Faraday-Barlow machine, as a whole, cannot violate the angular momentum conservation law. Consequently if all parts of this machine are fixed one to another and it has a rotational degree of freedom as a whole, then, by introducing a d.c. source between the two insulated one from another parts of the axis (see fig. 1 on p. 90 of DEUTSCHE PHYSIK, 1(1)), the machine cannot be set in rotation. Analogically, if rotating the machine as a whole by hand, no tension will be induced in the circuit "as a whole", as the motional tension induced along the disk's radii will be equal and opposite to the motional-transformer tension induced along the bars.

I constructed then the demonstrational Faraday-Barlow machine (see it in fig. 2 on p. 90 of DEUTSCHE PHYSIK, 1(1)) and all my expectations were splendidly confirmed by the experiment. Thus I made the inference that the same will be the situation with the closed unipolar machine presented in fig. 1, namely, it will not rotate as a whole, and if rotating it as a whole by an external torque, an electric tension will be not induced in the coil "as a whole".

I saw that it was impossible to explain WHERE and WHY a torque opposite to the torque exerted on the current wire ab could appear, but under the pressure of the century-old laws of conservation over human mind I put on paper the following stupidity:

In the closed half polar machine, one can keep the magnet solid to the laboratory and bring the coil to rotation by sending current through it, or one can keep the coil solid to the laboratory and bring the magnet to rotation by sending current through the coil. In the first case the driving moment is exerted by the cylindrical pole on the radial wire ab, while in the second case the driving moment is exerted by the projections of the current elements of the vertical wire ac in planes perpendicular to the circular axis of the ring magnet on the corresponding circular currents of the magnet. Now the centers of the circular magnet's currents do not lie on the axis of rotation (as is the case in the open half polar machines), and the Biot-Savart forces of those circular currents display a rotational moment. (TWT-II, p. 138; note that the emphasis of this stupidity is of the very year 1984.)

The substantial difference between the demonstrational Faraday-Barlow machine and the closed unipolar machine is the following: the wire which connects the disk's pe-

riphery with the end point of the axial wire does not cross more the magnet in the latter, while it "crosses" the magnet through the slots where the bars are placed in the former. This distinction makes these two machines substantially different, so that the former cannot violate the angular momentum conservation law and cannot generate electric energy when rotating it as a whole, but the latter can.

Realizing that the closed unipolar machine of fig. 1 will violate the angular momentum conservation law, I made immediately a working drawing (fig. 2) which is now with my mechanician. The driving moment of this machine will be thousands of times stronger than the driving moment of the ARAB-machine (see DEUTSCHE PHYSIK, 1(3), p. 21). I give to this machine the name ACHMAC (Autonomous Closed Half-polar Machine).

The ring magnet is a permanent ferrite magnet. The cylindrical core and the yoke closing the magnetic flux are of soft iron. On the other (antipodal) side of the yoke there is a piece of brass whose moment of inertia balances the moment of inertia of the yoke and which serves also as one part of the current circuit.

At rotation of the machine by hand, tension will be induced along the annular radii of the cylindrical core. If rotating the upper part to the reader, the induced current will flow along the upper radii downwards and crossing the middle brass ring which connects the magnet electrically to the axle it will continue to flow along the brass axle to the right. Crossing the metal cap with the thread which is to be screwed to its left position to make contact with the brass ring fixed to the right-angular brass bar, the current will reach the latter and finally will reach the balancing piece of brass. As the middle part of the balancing piece of brass is connected electrically with the iron core, the circuit becomes closed and thus current $I = U/R$ will flow in the circuit, where U is the induced tension and R is the ohmic resistance of the circuit. If we would like to measure the induced tension or the flowing current, the brass cap with the thread is to be screwed out to the right, and by the help of two wires sliding on the left rim of the cap and on the right rim of the brass ring fixed to the right-angular bar, the induced tension is to be conducted to a voltmeter, or the flowing current to an amperemeter.

To rotate the machine as a whole as an electromotor, the brass disk connecting the right-angular bar with the balancing brass piece is to be exchanged by the plastic disk shown in fig. 2 over the machine, and the accumulator is to be inserted into the circuit. When the negative electrode of the accumulator is connected to the balancing piece of brass, the upper part of the machine will rotate to the reader.

FIGURE CAPTIONS

Fig. 1. The closed half polar machine.

Fig. 2. The machine ACHMAC. After its construction the machine can be purchased from me for \$ 3,000.

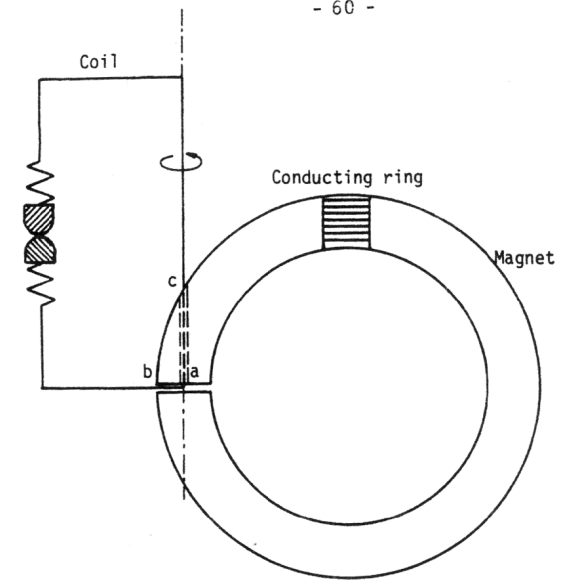


Fig. 1

-  magnet, accumulator
-  iron
-  plastic (PVC)
-  brass
-  insulator

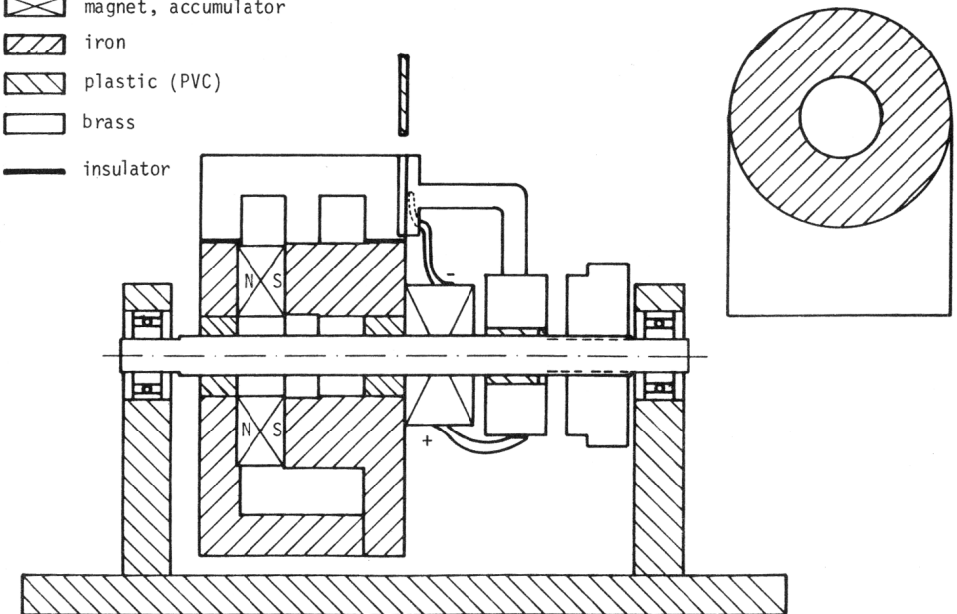


Fig. 2

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