Stefan Marinov

THE THORNY WAY OF TRUTH

Part IV

Documents on the violation of the laws of conservation

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NOTHING CAN BE KNOWN AT ALL; IF IT COULD BE KNOWN,
IT CANNOT POSSIBLY BE COMMUNICATED; AND IF IT COULD
BE COMMUNICATED, IT WILL NEVER BE UNDERSTOOD OR BELIEVED.

GORGIAS (483 - 380)

STUPIDITY CAN BE AS DANGEROUS AS SUBVERSION. IF A
COUNTRY IS LOST THROUGH STUPIDITY, IT IS NO LESS LOST
THAN IF THE LOSS IS DUE TO SUBVERSION.

ROBERT L. CAROLL

DIEU ME GUARDE D'ETRE SAVANT,
D'UNE SCIENCE SI PROFONDE.
LES PLUS DOCTES, LE PLUS SOUVENT,
SONT LES PLUS SOTTES GENS DU MONDE.

D'AILLY (NATURE, **1**, 99)

"КАТО СИ ПЕЕШ, ПЕПКЕ-ЛЕ, КОЙ ЛИ МИ ТЕ СЛУША?"
ПЕПКА /мецосополаново/: "ГО ШАНТЪ ПУР МУА!"

МОНАХ ВТОРОЙ СТАТЬИ СТЕФАНИДУС

Früher steckten die Leute ihren Finger in die Erde, um nach dem Geruch festzustellen, in welchem Land sie seien. Jetzt, wenn man seinen Finger in unseres Dasein steckt, es riecht nach nichts.

So weit Kirkegaard.

Ich hab meinen Finger in die Einsteinschen Theorien gesteckt. Es stank nach unserem Dasein.

Chasing away SR (Satanic Relativity) from the realm of science

P R E F A C E

Well, the reader has the fourth part of THE THORNY WAY OF TRUTH in his hands. I am wondering: how many volumes have I to issue? Five, six, seven? or fifty (as Lenin)? But the fifty volumes of Lenin have been published after his death.

My physics books are in sale in all scientific book-shops of London. Some of the books were in sale in Brussels, Paris, Genoa, Graz. A couple of universities and hundreds of persons have purchased or stolen one or other of them. Nevertheless воз и ньне там, i.e., relativity and the laws of conservation are further the saintly sanctity of physics.

Why? Why the truth is silenced and the untruth triumphs? Which are the reasons? Which is the explanation of this strange situation when humanity refuses to accept the scientific truth, a truth with tremendous technical and economical consequences that in a couple of years will change the whole way of life on our planet?

I have lengthly discussed this question with friends and colleagues. Different persons gave different explanations, but the reasons most often raised were the following:

1) There is a conspiracy of the established scinetists who are afraid to lose authority, position, and glory.

2) There is a conspiracy of the oil-sheiks (Arabian and Arian) as they are afraid to lose their Kresian riches.

3) There is a conspiracy of the dark forces who have the power in the world, as they are afraid that free energy will make people free from the shackles which along the electric lines going through the water, coal, and atom power-station are concentrated in the hands of those dark forces.

4) There is a Jewish conspiracy as the zionists are afraid to see one of their idols slain.

Et cetera, et cetera, et cetera.

I saw that none of these explanations is true. There is a conspiracy on no one of those levels. The reason is one and only one: human stupidity. The documentation presented in the four volumes of THE THORNY WAY OF TRUTH gives the proof.

Here the phenomenon known under the name "the new king's dress" plays a very important role. Some of the scientists are not as stupid as the flatterers in the king's entourage. And they can perfectly well discern physical truth from physical untruth, physical reality from the nonsensity of mathématically contradicting formulas. Even the flatterers in the king's entourage are not as stupid as they show it officially. This rather amazing situation where the king is dead many and many years ago and there is only his dress in the "museum of revolution" (as Lenin's suit in Moscow's museum) and the epigones kneel in a venerable silence around the gilded glass case in which under the plate with the inscriptoon "the dress of our passed king" there is actually Kirkegaard's nouthingness, can be well explained with the following calambour which I wrote in the psychiatry in Sofia when I had no other book in my hands but a French grammar and I tried to orient myself in the labyrinth of the French conjugations:

Lorsqu'un homme sage comprend qu'il ne peut comprendre la théorie d'Einstein, mais pour que personne de ces hommes sages, qui comprennent qu'ils ne peuvent la comprendre et font semblant de la comprendre, ne comprenne, qu'il comprend qu'il ne peut la comprendre, cet homme sage comprend, qu'il doit faire semblent de la comrendre, et alors tous ces hommes sages, qui ont compris qu'ils ne la comprenaient pas, mais faisaient semblent de la comprendre, ne comprendront pas, qu'il a compris qu'il ne la comprenait pas.

But now the problem is not in light kinematics, in the twin paradox, and in the mass increase at high velocity. Now there are violations of the laws of conservation, there are simple and easily repeatable experiments which shake the whole body of contemporary physics. How long am I asking will the scientific community make as if all these expe-

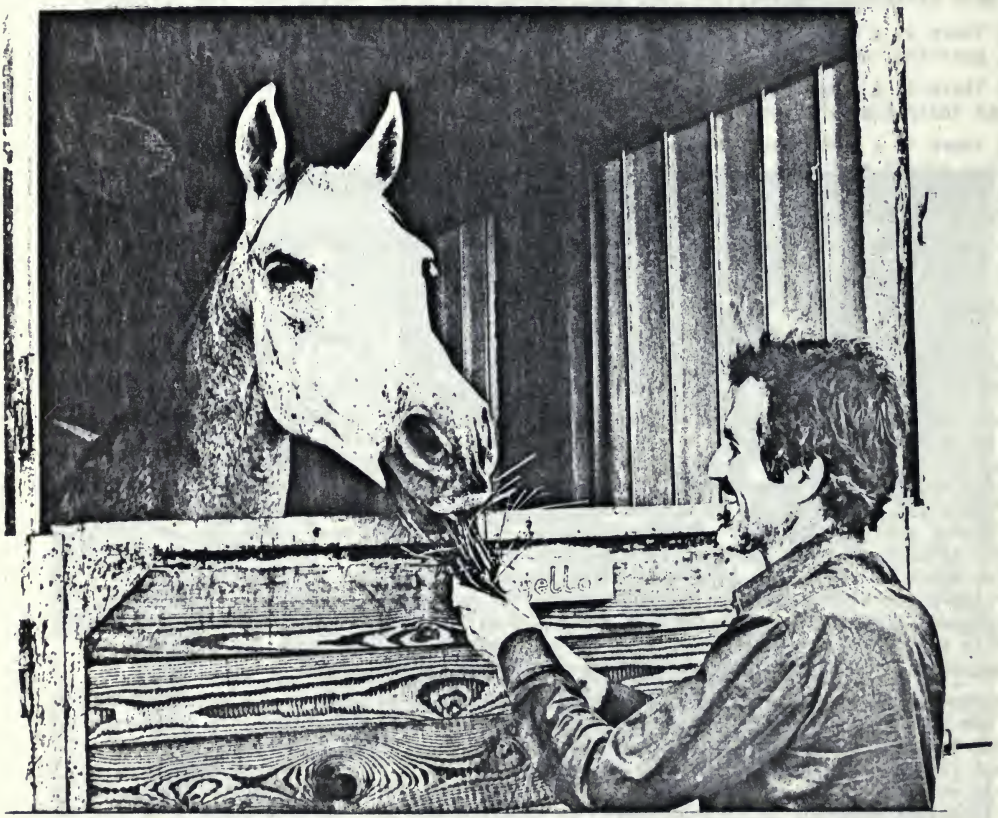
riments do not exist? How long? - No answer does come from Olympus. No single word. Because when experiments speak gods keep mum.

Graz, 20 January 1989 Stefan MARINOV

PREFACE TO THE SECOND EDITION

The second edition appears a month after the first one. There are changes only in the paper published on p. 136 and the results of the January 1989 measurements with my quasi-Kennard experiment are given (p. 116).

Graz, 23 February 1989 Stefan MARINOV



I established that horses are very clever beings (as opposed to other ones). When seeing food in my hands, the horses always come to take it. In the picture is my beloved Jagello.

THE REASON IS ONE AND ONLY ONE: HUMAN STUPIDITY

(scientific essay)

If you want to make people angry, lie. If you want to make them absolutely livid with rage, tell them the truth.

The second law of Murphy

In my paper "The Myths in Physics" (TWT-III, sec. ed., p. 59), I wrote that it is difficult to give an explanation why certain myths in physics are so persistent, although there is a clear experimental evidence that those myths have nothing in common with physical reality. In the paper I enumerated ten such myths. Their number can, of course, be increased.

One can pose the question on a larger basis: Why physics is in the state in which it is, i.e., why physics is science puzzling and incomprehensible? Is this due to the sophistication of the Lord who has created a world which man's brain cannot decipher, or the path on which man is searching for a solution is simply a wrong one, and if finding the right path, all "puzzles" will be easily resolved?

Nevertheless, although knowing, it seems, rather nothing about our world, we can make sophisticated experiments revealing tiny effects which we can predict, and construct fantastical machines working with an unbelievable precision. How is it possible to

know so little and to be able to do so much? Thus it was Einstein who wrote: "The highly unexplainable aspect of our world is that it is explainable." In my opinion, the actual contraposition is the following one: "The highly unexplainable aspect of our world is that it is so badly explainable."

Here I shall evade to discuss physics in general. I shall concentrate my attention only on classical physics; with more limitation on space-time physics; and with further limitation on electromagnetism.

Let first throw a brief look at gravitation. Before Newton gravitation was a puzzle: Why the planets move as they move? Why the bodies fall to the Earth as they fall? Newton wrote the formula for the potential energy of two masses m_1, m_2, separated by a distance r,

$$U_g = -\gamma m_1 m_2 / r, \tag{1}$$

where γ is a coupling constant depending on the units in which energy, mass, and distance are measured, and gravitation was EXPLAINED (as a matter of fact, Newton wrote first the formula for the forces acting on those masses). The explanation was COMPLETE. The motion of all gravitating bodies could be calculated proceeding from the above simple formula which Newton wrote axiomatically. In gravitation (excluding cosmology) there are NO puzzles, there are no open questions. As the only effect which can be not exactly calculated by Newtonian gravitation, one can consider the seculiar perihelion rotation of the planet Mercury. I showed (Classical Physics, vol. IV) that taking into account the high-velocity form of Newton's law (1)

$$U_g = -\gamma \frac{m_1 m_2}{(1 - v_1^2/c^2)^{1/2}(1 - v_2^2/c^2)^{1/2} r}, \tag{2}$$

where v_1, v_2 are the velocities of the masses m_1, m_2, one can calculate also this effect.

If such a big domain in physics can be so easily explained, proceeding from a simple, a childishly simple formula, then we have not to lose the hope for the rest.

One can object that gravitation is still not explained, as we do not know its "essence". I think that to be wise, man must remain humble. Such an "essence" can never be revealed. If we should be able to do in any branch of physics the same what Newton has done in gravitation, we can say that physics is explained.

Let me emphasize that an eventual discovery of magretic energy, i.e., of a "magnetic" companion to gravitational energy, which I have hypothetically introduced in my theory of gravimagretism (see Classical Physics, vol. IV) by the formula

$$W_g = -\gamma m_1 m_2 \mathbf{v}_1 . \mathbf{v}_2 / c^2 r, \tag{3}$$

changes NOTHING in Newtonian gravitation.

Physicists are such creatures who live by numbers alone and if the hat is the right size, they wear it. Thus a certain branch in physics is explained if by the help of a set of simple axiomatically written formulas, by using then only the rigorous mathematical logic, we can calculate (or have the possibility to calculate) all physical

effects in that branch. Of course, one will immediately pose the question, when a set of axiomatic formulas can be considered as "simple" and which mathematical logic can be accepted as "rigorous". As these questions are pretty large, I should prefer to not discuss them here.

It is commonly accepted that gravitation is a simple branch of physics, while electromagnetism is a complicated one. I affirm (and show it in my books and papers) that gravimagretism of particles which is entirely explainable proceeding only from formulas (1) and (3), and electromagnetism of particles which is to be explained proceeding only from the electric and magnetic energies of two charges q_1, q_2, moving with the velocities $\mathbf{v}_1$, $\mathbf{v}_2$

$$U_e = q_1q_2/r, \qquad W_e = q_1q_2\mathbf{v}_1.\mathbf{v}_2/c^2r \tag{4}$$

(the coupling constant is taken equal to unity) are two identical physical branches. Moreover, electromagnetism of particles is more simple than gravimagretism because formulas (4) are valid both in low- and high-velocity electromagnetism, while formulas (1) and (3) must be substituted in high-velocity gravimagretism by the formula (2) and by a similar formula corresponding to (3).

Thus electromagnetism of particles is a completely explained branch of physics.

As in gravitation there are only one kind of masses (let us call them positive masses) which attract one another, gravitation of media is a simple generalization of gravitation of particles and we can conclude that also this branch of physics is completely explained.

However, in electromagnetism there are two kind of charges, positive and negative, which attract (positive-negative) or repel (positive-positie, negative-negative) one another. This allows to have a piece of matter (a medium) which is electrically neutral but along which charges can move whose magnetic interaction can be observed (as in gravimagretism this cannot be done and as the magretic forces are v_1v_2/c^2 times smaller than the respective gravitation forces, there is little hope that some day magretic interactions will be observed). Unfortunately until now humanity has not understood how charges move in a neutral medium (in a so-called conductor). The motion of charges in vacuum is more or less clear but their motion in matter remains a puzzle. There are experiments giving evidence that the velocity of charges in a conductor is of the order of mm/sec, other experiments give a velocity near to light velocity c (as I also assume). Now Milnes (Radio Electronics, **54**, 55, 1983) and Pappas + Obolensky (Electronics & Wireless World, p. 1162, December 1988) have shown that signals can propagate along wires with a velocity higher than c and even tending to infinity. On the other hand, the indiscernability of the individual charges (electrons) in a conductor makes the definition of current (or signal) bearer difficult. Defining the current intensity as the quantity of charge crossing a surface unit in a unit of time, we put the problem about the velocities of the charges under the rug. Thus if in a unit volume of one wire 10 electrons move with a velocity 1 cm/sec and in a second wire one electron moves with

a velocity 10 cm/sec, we consider the densities of these two electric currents as identical and as physically indiscernable one from another.

If now we shall introduce in electromagnetism of media the notions of polarization and magnetization (which are substantially different one from another - see TWT-I, third ed., p. 323), we can say that also the domain of phenomenological electromagnetism of media becomes quite understandible.

How is then possible that until now humanity has not constructed such machines as my Bul-Cub machine without stator, or my Rotating Ampere Bridges with Sliding Contacts or Displacement Current, or my MAMIN COLIU machine, which violate the laws of angular momentum and energy conservation and which are entirely in the domain of phenomenological electromagnetism? The answer can be only one: human blindness.

But to the question, which is the reason that after the construction of such machines humanity further does not realize their importance, the answer is: HUMAN STUPIDITY. Nobody can be blaimed for blindness. But for stupidity one can be blaimed. As blindness is from God, stupidity from man.

I wish to mention here also the machine TESTATICA constructed by Mr. Paul Baumann in the community Methernitha in the village Linden near Bern (see TWT-III, sec. ed., p. 264 and the present volume). TESTATICA is a perpetual motion machine delivering continuously 3 kW of free power. The machine works since ten years. Until now I could not construct a perpetual motion machine with a closed energetic circle, so that the violation of the energy conservation law in my machines can be established by observation and calculation. But the machine TESTATICA (as well as my machines violating the angular momentum conservation law) must be only OBSERVED. The conclusion that they violate the respective laws of conservation is obvious.

Nevertheless human stupidity is so tremendously big that it does not allow to man to see obvious things. My collection of documents THE THORNY WAY OF TRUTH, especially volumes II, III, and IV give an undisputable proof.

One can object that such a reaction must be not called stupidity, but legitimate doubt in unexpected phenomena, belief in dogmas, prejudices. I call all those doubts, beliefs and misbeliefs STUPIDITY. What else? Stupidity, only stupidity and nothing else than stupidity. Moreover, the action of all my machines can be predicted on the grounds of the fundamental formulas which are in use in conventional physics. Thus this is not stupidity but super-stupidity.

There are persons who give other explanations for the present state in physics and in science in general. I mentioned in the preface that the opinion about a conspiracy of the high priests in science is widely accepted. Many think that the thousands senseless scholastic papers which are published any month in the scientific press are fruits of malicious intentions and that the void boring congresses of solo singers where nobody speaks with a humanly understandible language and where nothing is discussed serve to mystify the truth but not to clear it. And the whole this fair of scientific vanity

(remember Block: За городом вырос пустынный квартал / на почве болотной и зыбкой, / там жили поэты - и каждый встречал / другого надменной улыбкой) is directed, controled and steered by some dark forces which know the truth but keep it for themselves.

Let me cite along these lines the opinion of Dr. R. Clark published in the book "Das kommende NEUE ZEITALTER und seine Wegbereiter":

WISSENSCHAFTS-SKANDAL ?

"Man kommt zu der schockierenden Erkenntnis, daß die derzeitige Wissenschaft, wie sie an den Universitäten gelehrt wird, eine monströse Fabrikation und Betrug ist. Sie besteht aus offensichtlich Lügen und fadenscheinigen Annahmen und ist zu einem politischen und sozialen Vehikel der Gedankenkontrolle der Macht-Elite geworden.

Diese Elite hat gigantische Betrügereien auf den Gebieten der Finanz, Geschichte, der Medizin und Gesetzgebung auf dem Kerbholz, aber der Betrug auf dem Sektor der als Wissenschaft bezeichnet zu werden pflegt, ist bis heute noch nicht entlarvt worden. Wissenschaft soll ein Spiegelbild der Wirklichkeit sein - und nicht ein Mythos zur Stützung des Kontrollsystems der Machtelite. Die Prestige-Institutionen wie Princeton, M.I.T., Stanford, Cal. Tech., Oxford, Cambridge sind nichts anderes als Seminarien für das Training selbstherrlicher Hohepriester. Die angeblich großen Namen in der Wissenschaft, wie Einstein, Oppenheimer usw. sind oder waren nichts anderes als politisch motivierte, berechnende Reptilien. Die Texte und Journale dieser sogenannten 'Wissenschaft' sollten in den Büchereien unter 'Science-Fiktion' katalogisiert werden. In totaler Unkenntnis der Dinge müssen wir die irrsinnige Möglichkeit eines Atomkrieges und die Realität von gefahrdrohenden Reaktoren und gefährlicher Atommüll-Lagerung erdulden. Unsere Unkenntnis ist ihr Profit: so einfach ist die Sache. Das Ausmaß dieser 'SCIENCEGATE' (Wissenschafts-Skandal!) liegt jenseits jedes rationalen Begreifens. Das Schlangennest der Macht-Elite muß unter allen Umständen entlarvt werden. Das ist sprichwörtlich eine Überlebens-Angelegenheit, denn um des Profits willen sind sie bereit, uns alle zu ermorden."

Dr. Richard L. Clark
Exponent kosmischer Energieforschung

Thus, according to Dr. Clark, and according to many others (I shall cite my friends Dr. P. Pappas and Dr. R. Santilli) the high priests in science are not at all stupid. They are cunning people leading humanity by the nose by the help of falsification, cheat, and fraud, and preserving in this way their spiritual, financial, and political power, as this was the case with the high priests in ancient Egypt. Such elements, of course, can be found when one tries to answer the question why science is there where it is. I think, however, that the principal reason is not falsification, cheat, or fraud, but stupidity. Take the case of Lyssenko in the Soviet Union. Of course, falsification, cheat, and fraud have played there some role, but the primary cause for the suppression of the free scientific thought was there a stupidity acting in a totalitarian society. Here in the West we have stupidity acting in a plutocratic society. And the forms of Western Lyssenkoism are quite different, arn't they?

I should like to cite the opinion of my friend G. Barth who in the last issue of his journal "Wissen im Werden" (vol. 21, No. 2, 1988) presents explanations very near to my own (p. 11):

> Der Mensch ist ein Herdentier, ein zoon politikon nach Aristoteles. Um in der Herde eine relative Ordnung zu finden, sind Leittiere und Herdentiere unterschieden. Wie die Verhaltensforschung zeigt, ist die Rangordnung keine immerwährende, absolute, sondern fließend, veränderlich.
>
> Die Verhaltensweisen der beiden Gruppen sind auch im Menschen vorprogrammiert. Nicht alle streben nach Macht, nicht alle sind bereit, sich unterzuordnen. Aber wohl allen Menschen ist die Bewunderung für das Große und Starke angeboren. Wir sind bereit, die überlegene Macht anzuerkennen, die Gewalt über uns zu respektieren. Die unumschränkte Macht der Könige wird ins Göttliche übersteigert. Alles für die Macht ober uns: "Er höret gern, ein Lied zu seiner Ehre". Welch naiver Untertanengeist spricht aus diesem Kirchenlied.
>
> Die Leittiere, die Vertreter der brutalen körperlichen Gewalt, die Fürsten, und die nicht minder rücksichtslosen Vertreter der Gewalt über den menschlichen Geist, die Magier, die Priester und in neuer Zeit die Wissenschaftler, setzen alles ein, die Menschen im Zustand der außenbestimmten Verantwortungslosigkeit zu erhalten. Wichtigste Hilfsmittel sind ihnen die Schulen und die Massenmedien, die Weltpresse. Für die Professoren ist Wahrheit, was sie in der Schule von Professoren erlernt haben. Wahrheit ist, was von oben kommt, von Nobelpreisträgern, von der anerkannten Wissenschaft, vom kirchlichen Lehramt. Ihrem eige-

nen Urteil vertrauen sie nicht. Selbständiges Denken haben sie in der Schule nicht gelernt. Wer selbständig denkt, bleibt im Netz der Vorschriften und Prüfungen hängen.

Selbst wenn ein Professor eine Schulwahrheit als falsch und unsinnig erkannt hat, wagt er nicht, für die erkannte Wahrheit einzutreten. Die Gruppe verfolgt Abtrünnige mit unbegrenztem Haß, wie das Schicksal zahlreicher Einsteinkritiker beweist. Der Neid und das Bewußtsein der eigenen Unfreiheit verstärken den Haß.

Die Professoren sind außenbestimmt, ohne Verantwortung, jenseits von Gut und Böse, in einer wertfreien Wissenschaft. Die Tatsache, daß mehr als die Hälfte aller Naturwissenschaftler ohne menschliche Verantwortung, gegen gute Bezahlung, die totale Ausrottung der Menschheit vorbereitet, beweist dies. Teller, der Vater der Bombe, meinte, er sei unschuldig, wenn sein Produkt in die Hände von Narren falle. Aber er hat seine Bombe für das Geld dieser Narren, für Politiker und Generale geschaffen, jenseits von Gut und Böse. Besser kann man die totale Verantwortungslosigkeit der Wissenschaftler nicht demonstrieren.

Von Professoren Wahrheit zu erwarten ist ebenso sinnlos, wie von Politikern Frieden zu erhoffen. Wenn ich sehe, wie der deutsche Bundespräsident nach tätiger Reue sein Plansoll übererfüllt; daß der Präsident des Bundestages sofort zurücktreten mußte, weil er seine Abscheu nicht genügend zum Ausdruck brachte, dann frage ich mich: Warum sollen die Professoren mehr menschliche Verantwortung zeigen als Politiker - und weniger Angst?

Immer sind es die Einzelnen, die das Neue, den Fortschritt hin zum Menschen, mit Mühe durchsetzen. Auch bei den Professoren kann es nur der einzelne sein, der genug Verantwortung und Mut besitzt, für die eigene Wahrheit einzutreten. Die Masse folgt dann nach. Auf diesen einzelnen warte ich noch.

22-11-88 Gotthard Barth.

According to me, Barth is much more near to the truth than Clark.

I should like to analyze certain actions of the "high priests" in science against me in order to reveal the background of those actions. I shall present only the facts, so that the reader can draw his own conclusions. My conclusions are presented in the title of this essay.

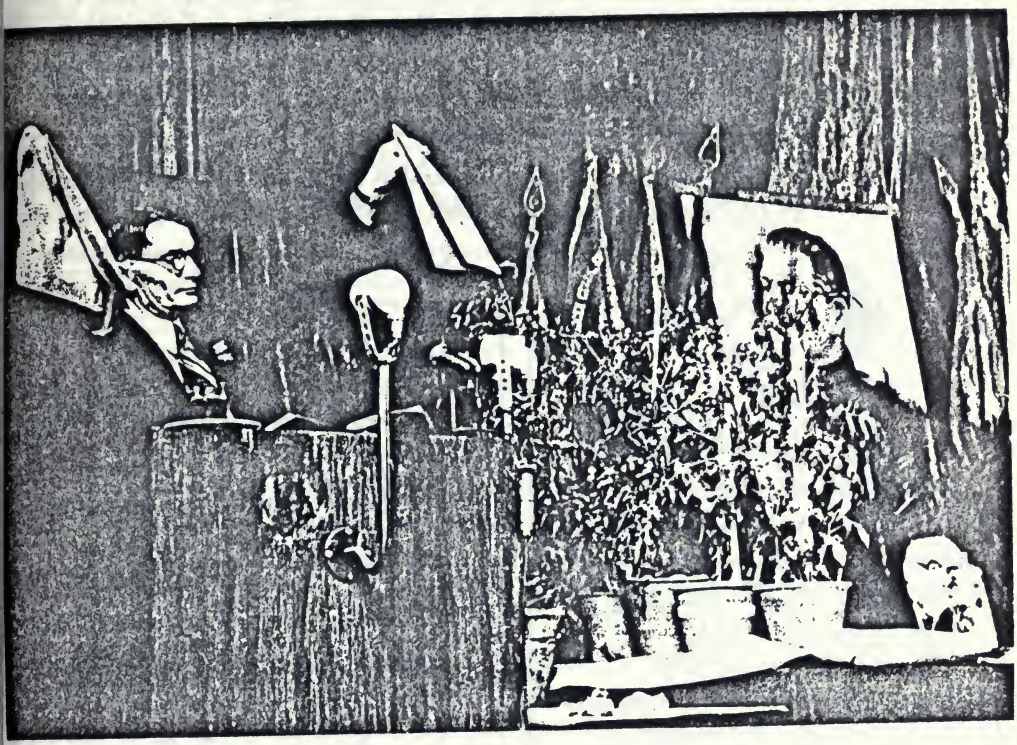
Let us analyze my expulsion from the aether conference in the Imperial College, London, in September 1988.

Read first my letter to Dr. Duffy of the 10 June 1988 and the appeal of the Conference attached to this letter. Read then my letter to Dr. Duffy of the 5 August 1988. Read then my fax to NEW SCIENTIST of the 5 September 1988 and the address "Marinov to the participants of the aether conference" attached to it. Read finally the fax of NEW SCIENTIST to me of the 6 September 1988. As NEW SCIENTIST asked me to cancel a good deal of my advertisement, I renounced to its publication. I decided to send to the conference my London friend Mr. A. Christov to sell my books and to distribute the address to the participants of the conference. When I brought the package with the books to the Graz post office, it was said to me that because of the strike in the English post, no packages for England are accepted. Thus I decided to bring my books alone. I bought an air ticket and about an hour before the opening I was at the Imperial College. When Dr. Duffy saw me, he said that I should be not allowed to attend the conference, as it is too late now for paying the participation charge. Thus I came from Austria to London to put 150 £ in the mouth of Dr. Duffy and he refused to swallow them; if someone will object that this act can be not qualified as stupidity, I am asking the world what has one to understand under this word. I said to Dr. Duffy that I shall be only a hearer and I shall neither ask for the word nor pose questions. Dr. Duffy answered with Mr. Gromiko's "NIET". Then I said to Dr. Duffy that I shall stay only in the passage selling my books. Dr. Duffy looked at me with Lyssenko's eyes and said firmly: "If you will not leave the Imperial College on the spot, I shall call the security men to conduct you by force." "Is the Imperial College yours?" I asked. "Today it's mine" answered Dr. Duffy. "Dr. Duffy, I said, I shall sit here in a chair, I shall not approach the people, I shall leave them to approach me, as a good deal of them know me personally." "You will disturb the conference." "How?" "By influencing the participants. Go out, Dr. Marinov, go out." "No, I shall not go out." "Well, then you will be confronted with other people." And three security men appeared in less than 10 seconds. Being a non-violent fighter, I left that the security-men take me under the armpits and throw me on the street.

Thus I came to London, sacrificing my daily bread, to inform the participants of the aether conference that after revealing the errors of the relativity theory, I constructed experiments violating the laws of energy and angular momentum conservation. Instead to look at my experiments, the "aetherists" expulsed me from the conference as a potential terrorist. One will say that this was the mafia of the high priests who has ordered to Dr. Duffy to isolate me, that those were Bondi, McCrea, Bergmann, Wheeler and Co. acting through Dr. Duffy. No, dear reader. It was only the personal stupidity of Dr. Duffy and of the people around him. Nothing else.

After returning to Graz, I found in my mailbox the letter of Dr. Duffy of the 1 September which, because of the English post strike, has come with a delay.

My expulsion from the GR11 Conference, Stockholm, July 1986, where I was conducted by the security men not only to the street but back to Vienna was due also to the per-



Lyssenko's philippic against the weismannists-morganists at the genetic conference in the Academy of Agrarian Sciences of USSR, Moscow, 1948. It is to be noted that Lyssenko's adversaries were not expulsed from the conference and they could address it. And thinking about Dr. Duffy, I say: "Молодчина Даффчик! Учителя московского, и того перещеголял!"

sonal stupidity of its organizer, Prof. B. Laurent, and to the stupidity of the people around him. To nothing else. (See TWT-III, sec. ed. p. 170 and p. 163.)

But I wrote in the preface to the second edition of TWT-II that the principal protagonist of the drama called THE THORNY WAY OF TRUTH, to whose fourth act I write now the introduction, is the editor of NATURE, Dr. J. Maddox. I concentrated my attention and actions on him, because whether one contacts 100 editors of scientific journals or only one, the result is exactly the same. I have the feeling that in the editorial offices of any physical journal sits the same editor and my papers are sent always to the same referee. Why say I "feeling"? Is this not a fact, reverend reader? Peruse the hundreds letters and referees' opinions in the four volumes. Can you find two different editors or two different referees? - Some 30 years ago I visited the town Canton in South China as a deck officer of a merchant ship. On my first free day I visited the town. I walked the whole day and had the feeling of having visited the whole town but at the fall of

night I realized that I have erred only in three streets. The next day I took a compass with. I crossed the whole town indeed, but it seemed as if I circulated only in three streets. The same "town of Canton" are the scientific journals in the whole world.

Since 20 years I submit papers to Dr. Maddox. Permanent rejections (see the comics).

But after my first visit of his office in 1985, he accepted a paper of me. In the three years after the acceptance I spoke with Dr. Maddox at least 600 times on the phone and exchanged hundreds of letters and faxes. During my second visit in 1987, Dr. Maddox began to compose personally my paper on his computor and after completing a sheet gave it to me for correction. But in the following year Dr. Maddox could not finish the composition of the paper, although hundreds of times promised to do this on the phone and a couple of times even asserted that the paper is composed and already sent by the post to me for final correction. At this situation, in June 1988, I went to London and composed the paper on one of NATURE's computors (see the text in TWT-III, sec. ed. p. 146). The paper had to appear on the 18 August 1988, then on the 13 October (see Dr. Madox' letter on p. 330 of TWT-III). Then Dr. Maddox phoned me and said that he invites me to

London (paying my trip and sojourn) to have a new lengthier conversation and only after this conversation he will decide when to publish my paper.

I was in London and we discussed the matter on the 14 and 15 December. In the afternoon discussion on the 14 December also his collaborator, Dr. Roland, took part. As a result of all my endeavours to explain to Dr. Maddox what is electromagnetism and what demonstrate all my machines, for the time being Dr. Maddox wrote only his "Christmas puzzle" on the 22 December (see it in this volume). (See the note on p. 21!!!).

I am asking the reader: can a normally intelligent man call such an obvious thing a "puzzle"? I explained to Dr. Maddox in all detail Kennard's 1917 experiment. "I must read Kennard's report, give me the reference" said Dr. Maddox. "You have not to bother, Kennard's experiment is published in TWT-III, p. 156. You have it here. Look," said I. "Moreover, Kennard's experiment is nothing else than a variation of the Faraday's cemented and uncemented disks experiments, went I. Today there are only few people to know that the rotating Faraday disk was the first electromagnetic induction experiment. The experiments with the coils and the slab magnets came later. And Faraday's rotating disk experiments as well as Kennard's experiment, where Faraday's sliding contacts are taken away and the electric charges separated at the end points of the disk's radius are measured, can be explained only be the help of the formulas for the motional and motional-transformer inductions

$$E_{mot} = \mathbf{v}\times\mathrm{rot}\mathbf{A}, \quad . \quad E_{mot\text{-}tr} = (\mathbf{v}.\mathrm{grad})\mathbf{A} \qquad (5)$$

where in the first formula **v** is the velocity of the wire with respect to the magnet at rest and in the second formula **v** is the velocity of the magnet with respect to the wire at rest, **A** being the magnetic potential generated by the magnet at the point where the wire is located. What a puzzle is there?" I remember that when I was with Dr. Maddox for the first time in 1985 and wrote the second of these formulas, he objected that such a mathematical expression: (**v**.grad) acting on a vector **A** does not exist. I said then to Dr. Maddox: "Give my CLASSICAL PHYSICS? I shall show it." "It must be somewhere here in my books but I do not know where exactly," said Dr. Maddox. "Wait a minute," said I. I looked at his books piled up in a "creative disorder" and after 10 seconds found my CLASSICAL PHYSICS. I opened the pages where the operators grad, div, rot and (**v**.grad) were introduced. "Oh, yes, said Dr. Maddox, you are right, such an operator does exist." In those three years I try to explain to Dr. Maddox the physical substance of the motional-transformer induction (as I try to explain it to Dr. Kurti, to Prof. Vigier and to the lions with mouse's tails in PHYSICAL REVIEW). *VERGEBENS!* The rezult is a "PUZZLE". Four visits, hundreds of phone calls, letters and faxes, and such a simple thing can still be not accepted!

I showed to Dr. Maddox also my paper "Action of constant electric current on electrons at rest due to the absolute velocity of the Earth" (see this volume). I explained to him how have I carried out the inertial variation of Kennard's experiment where the absolute velocity of the apparatus can be revealed. Dr. Maddox looked at me

as if I narrate the story about Christ's resurrection.

In gravitation and in phenomenological electromagnetism puzzles can exist only for stupid people. There can be no puzzles for normally intelligent people as ALL effects in these two physical branches can be explained by the help of formula (1) for gravitational effects and by the help of formulas (4) and by introducing the material constants permittiviy ε and permeability μ for electromagnetism. Of course, one must take into account that as the gravitational energy of any particle with the mass of the whole world is, according to formula (2),

$$U_w = -\frac{m}{(1-v^2/c^2)^{1/2}} \int_V \frac{\gamma\, dm'}{r(1-v_{m'}^2/c^2)^{1/2}} = -\frac{mc^2}{(1-v^2/c^2)^{1/2}}, \quad (6)$$

because the above integral taken over the volume V of the whole world is exactly equal to c^2 (see the paper "The fundamentals of classical gravimagretism and electromagnetism" in this volume), the so-called "kinetic energy" of the particles is nothing else than their gravitational energy with the mass of the whole world, so that the famous energy conservation law is to be defined as follows: the changes of the electric, magnetic and local gravitational energies of a particle are equal to the change of its world gravitational energy

$$dU_e + dW_e + dU_g = dU_w. \quad (7)$$

Put formulas (1), (4) and (6) into (7) and you have ALL formulas in gravitation and phenomenological electromagnetism. All, ALL, A-L-L!!! And NO single puzzle! I have done this partly in the papers "The fundamentals of classical gravimagretism and electromagnetism" and "Radiation of electromagnetic waves" published in this volume and in my encyclopaedic book "Classical Physics". No single other assumption than the above formulas and the RIGOROUS mathematical logic.

The first conclusion which is drawn putting formulas (4) and (6) into (7) is that only the full kinetic forces, $m\mathbf{u} + (1/c)d\mathbf{A}/dt$ (where $\mathbf{u}$ is the acceleration of the particle and $\mathbf{A}$ is the magnetic potential generated by the surrounding system at the point of the particle's location) of two interacting particles are equal and oppositely directed, but their kinetic forces, $m\mathbf{u}$, may be not equal and oppositely directed. Thus Newton's third law is NOT valid in electromagnetism. Using this OBVIOUS violation, I constructed my Rotating Ampere Bridges with Displacement Current and with Sliding Contacts. The bridge with the displacement current demonstrated a violation of the angular momentum conservation law (see p. 126 in this volume). The flying Ampere bridge (i.e., the Propulsive Ampere Bridge with Displacement Current) proposed by me (see again p. 126) will violate the momentum conservation law. Those, dear Dr. Maddox, are the puzzles! And not the childish experiment which you analyse in NATURE and whose issues are brilliantly explained by me. But even in the violation of the laws of conservation I do not see puzzles, as these violations can be EXPLAINED. Let us only open the discussion, let us publish first the EXPERIMENTAL EVIDENCE. Let us bring to the attention of the world

the drawings and the photographs of my experiments, and the reports on the observed effects.

I repeat. In physics only stupid people see "puzzles". Clever people see "effects". Clever people construct experiments, observe the effects and try to explain them. Stupid people do NO experiments (98% of the living physicists produce only "theory"), do not observe effects being even AFRAID to look at the experiments of the others, remain uncertain and filling the pages of the scientific journals with nonsensical formulas search how to suppress the work of the clever people.

I do not intend, however, to put Dr. Maddox in the category "stupid people". NOT AT ALL! The facts that Dr. Maddox since 20 years does not break the contacts with me and even payed my trip to learn more about my theory and experiments are eloquent enough. My impression is that Dr. Maddox intended to publish my paper (TWT-III, p. 146) on the 18 August. But then he phoned me from his house in Wales and said that Dr. H. Bondi intends to write a comment on this paper and the publication will be postponed. Later he said me on the phone that Dr. Bondi does not find enough substance in my paper. Then came the story with Benveniste and the homoeopathic medicine. During our December conversation I said to Dr. Maddox: "Bondi is afraid to criticize my paper not because of the lack of substance but because of the abundance of substance in which he cannot orient himself. The siuation with this paper, Dr. Maddox, is comical indeed. A good deal of this paper is dedicated to Silvertooth's experiment. Pay attention! Dr. Silvertooth published a paper where he gives the account on an experiment with which he claims of having succeeded to measure the Earth's absolute velocity. And the whole camp of the relativists remains as if their mouths are filled with water. Marinov, an acanite absolutist, tries to appear in NATURE with a report on the repetition of Silvertooth's experiment with which he shows that the effects which are measured in such an experiment are SPRIOUS and exist only if there is not an enough exact parallelism of the light beams. Thus in this case Marinov, as a matter of fact, supports RELATIVITY. And Bondi suppresses the paper. The relativists are so afraid of my name that only after hearing it and their knees begin to shake. Do you know why Dr. Bondi has not criticized my paper?" "Why", asked Dr. Maddox. "Bondi cannot understand fig. 3 in that paper", I said. "You exagerate", replied Dr. Maddox. "I don't exagerate. I know what Bondi knows. The scheme for the interference of the light waves when the wavelengths of the there and back waves are different is a hard nut for him. Transmit at case my greetings to Bondi and ask him whether he understands fig. 3. If he can understand it, then ask him, who is right: Silvertooth or Marinov. And let him publish his judgement. No, Dr. Maddox. Bondi will prefer to keep further the water in his mouth."

During the December conversation Dr. Maddox promised me that he will publish the criticism of Tiomno on my "coupled shutters" experiment and my answer (see TWT-III, pp. 229 and 233) in the next three weeks. I suggested that the account on that experiment which was rejected by NATURE four years ago (see TWT-II, p. 292) should be also pub-

lished. Dr. Maddox answered with Mr. Gromiko's most preferred word.

Then Dr. Maddox said that he will send my paper "Propulsive and rotating Ampere bridges violate the principle of relativity" to a friend of him who will reconstruct my Rotating Ampere Bridge with Sliding Contacts (see the paper in this volume). If the bridge will rotate, as I affirm, and if this motor will have back induced tension, as I affirm, he will publish my report and the report of his friend. "Your report will be published first", added Dr. Maddox looking above his spectacles.

In the conversation I mentioned the name of Dr. Peter Graneau (M.I.T., Massachusetts). Dr. Maddox exclaimed: "Graneau! He has phoned yesterday in my office when I was out." I said: "Maybe Pappas has informed Graneau that I am with you today and this was the reason." Then I continued: "Look, Dr. Maddox. Your friend is not interested in the matter. He either will not reconstruct my Ampere bridge, or will do it in a year. Send my paper to Graneau. I know Graneau. He has money and technical possibilities. And he is INTERESTED in the matter. In ten days after receiving your letter the Rotating Ampere Bridge will be reconstructed. If he will need eleven days, you can cut my head." Dr. Maddox promised to contact Graneau.

Then I asked Dr. Maddox once more whether he is interested to visit the machine TESTATICA in Linden. "Yes, answered Dr. Maddox, I should like to see it." I promised to try to organize such a visit for him during my next visit of the community Methernitha in January 1989.

I think that my endeavours to bring to the attention of the scientific community the information that Einstein's theory is a rubbish and thatthe laws of conservation can be violated will finally bring some fruits. Human stupidity is a hard nut. But with strongjaws one can crack it. And do not forget: on hundred stupid men and women there is always one clever.

At the end of this essay I should like to present my poetic interpretation of Langevin's twin paradox written many and many years ago in Sofia:

Jump pluckily from frame to frame
and no one could this jumping blame.
I see your face short, you see mine,
but both are feeling pretty fine
and for our father's crown, my brother,
we have now not at all to bother.
So if I leave you, dear twin,
on the left breast of mummy-queen,
and, after journey at high speed,
I would return to you indeed
and see yourcul on father's throne,
whilst I would suck quite alone

on the right side of mummy's breast,*
this would be better than the best,
because with this mystification
both we'll be kings of our nation.
In times of dark absolutism
one of us had to make a treason,
and the one who was better skilled
would let the othet be the killed,
but in the relm of relativism
the fratricide is out of reason.

Choir:
God bless Einstein, the king of kings,
who has unriddled nature's sphinx.

Note added in proof.

Dr. Maddox deceived me once more (for the 1001-st time!!!) and did not publish his "Christmas puzzle" consisting of the figures 1 and 2 on p. 42 of TWT-III, sec. ed. In our phone conversation of the 3rd January 1989 he promised to publish the "puzzle" in one of the January-issues. I did not ask him of which year - of 1989, 1990 or in some of the January-issues of the last years of this millenium. Poor Dr. Maddox! Maybe he hopes to be able to "solve" the puzzle in the realm of relativity if thinking one or two months more. Thus I can only give the advise to the readers of this book to peruse the January-1989-issues of NATURE to find the "puzzle" written by Dr. Maddox if they hope that Dr. Maddox has not deceived me in the 3-January phone conversation.

And I cannot end my "Note added in proof" without citing the chinese philosopher Pij-Hui-Tchai who has lived during the fifth dynasty Hak-Mu-E: "There is no bigger difficulty for human mind than the acceptance of obvious things. Especially the learned sages accept easily the most phantasmagorical complicated and unlogical untruth, but oppose doggedly the simple, evident and clear truth."

Let me note that Dr. Maddox solves the "puzzle" already FOUR years. He has given his first solution in his letter of the 8.III.85 (see TWT-II, 3rd ed., pp. 296, 301).

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* As it follows from line 7, Her Majesty the Mother-Queen is attached to the rest frame, to which also the future king is attached. According to line 13, the same Mother-Queen, with the second brother, is attached to the space ship's frame, and during the journey to the stars they both should suffer acceleration. From this conclusion we can draw the only conclusion: poets are crazy. However, let us not forget that very often poets unwillingly help the men of science. - Remember our Master's voice: "Für meine wissenschaftliche Tätigkeit hat mir Dostojewski viel mehr gegeben als Gauß oder als irgendein anderer Mathematiker."

Let me add that according to my absolute space-time theory the above story is realizable exactly as it is described, as the course of time depends on the absolute velocities of the frames. Thus the twin-traveller will return indeed younger but there is no paradox at all as there is no paradox if a body loses weight if put in a liquid.

Marinov at the press-conference in hotel Weitzer, Graz (which cost him 5000 öS), on the 19th July 1984, where he announced of having observed violations of the energy conservation law. To the question of the lady-journalist from "Tagespost" which was the most difficult task in his scientific activity, costing him the most efforts, time, and money, Marinov answered: "Compel people to look at the experiments."

(The articles in the Graz press on the conference are published in TWT-II, pp. 271 and 272.)

ИМА ЛИ ГЛАСНОСТ НА ЗАПАД?

Тъй като радио СВОБОДНА ЕВРОПА е излъчило до сега стотици предавания, освещаващи наличието на свобода на словото и печата, т.е. на наличието на гласност на Запад, аз бих искал да поговоря днес, в моето първо обръщение към моите сънародници по тази вълна, относно липсата на гласност на Запад. За да мога да направя моя коментар по-сгъстен и конкретен, ще се спра само на липсата на свобода в науката, оставяйки настрана политиката и изкуствата, тъй като при умела манипулация от страна на власт-имеющите свободата в политиката лесно може да се превърне в лаладжийство, а тази в изкуствата в гъзарщина. Но науката е тънка работа. И опасна. Който държи науката в ръцете си, той държи истинската власт. И това не е от днес или вчера, когато не войника с ножа е синонима на властта, а учения с атомната бомба, с лазера и с particle beam gun, т.е. с оръдието със сноп от частици. Спомнете си, че в древния Египет властта е била в ръцете на жреците, които са били тогавашните учени, астрономи, мелиоратори и архитекти и че на засекречването на научните знания под сенките на пирамидите могат да завидят даже и тия, дето човъркат в почтовите яшчици под северните сияния днес.

И въобще човекът е станал господар над природата и над другите зверове /извинете, че така построих фразата, та се получи, че и човекът е звяр/, понеже е почнал да се ползува от плодовете на знанието и уменията, т.е. на науката.

И тъй как стоят нещата със свободата на науката на Запад. Като погледнеш: издават се хиляди научни списания, свикват се стотици международни конгреси, градят се университети и научни центрове, където професори, асистенти и студенти привидно имат пълната свобода да търсят научната истина и, ако я намерят, свободно да я обменят. Но така ли е наистина? - Всяка западна държава има правото, в случай че сметне изследването в дадена насока засягащо националната отбрана или "висшите държавни интереси", да го засекрети, без да се уточнява кои държавни интереси се считат висши и кои нисши. При това санкциите, които се прилагат против неподчинилите се, са драконовски. Моят приятел Адам Трамбли от Калифорния, който беше разработил много хитър вариант на Брус-де-Палмовата H-машина /Брус е също добър мой приятел/, произвеждаща свободна енергия, беше предупреден от Де-О-Де-то, т.е. Department of Defence, или Министерство на Отбраната, че в случай че не преустанови всякаква работа и обмен на информация в тази насока, ще бъде съден като шпионин на чуждестранна държава. А по този параграф можеш да получиш и смъртна присъда в мирно време. Спомнете си изгарянето на съпрузите Розенберг на електрическия стол или 18-те години строг тъмничен затвор на Мордохай Вануту, когато поискаха да развяват знамето на научната гласност. Но в науката избягват да разиграват театри по съдилища /даже и при закрити врати/, в случай че поискат някъде нещо да режат. В последните години системно изчезват или биват убити един подир друг редица учени от английската атомна индустрия, но полицията не е успяла да разкрие нито едно от тези мистериозни убийства.

Но я да оставим "мокрите дела" на страна. Тези истории със електрическите столове и

със среднощните убийства стават, когато власт-имеющите знаят значението на дадени know how и know where, т.е. "зная как" и "зная къде". Когато научните открития още не са оформени в продукти и циркулират само в средата на учените нещата стоят малко по-иначе. Тука действува третият обединен закон на Паркинсон-Мърфи: всяко откритие, което води до разрушаването на създадената научна система, да се гони като черна котка. Път да се дава само на тези открития, които укрепват и подтвърждават установената система. В случая думата "откритие" е твърде силна, по-добре е да се каже "нововъведение" или "рационализация", тъй като едно откритие никога не укрепва, а разрушава. Пример. Хората са направили хиляди експеримента, които подтвърждават принципа на относителността. За хиляда и първия експеримент зелената врата винаги е отворена: всяко научно списание ще си разтвори страниците и на всеки конгрес ще му се даде трибуна. Но появи ли се експеримент, опровергаващ принципа на относителността, и червената сезамова врата се затваря автоматически. За пример няма нужда да ходим до източната или западната Индии. Всеки специалист по въпросите на пространството и времето знае, че още през 1973 година проведох експеримент /след това многократно повторен/ по лабораторното измерване на абсолютната скорост на земята, т.е. опитно опровергах принципа на относителността и показах, че теорията на Айнщайн е щуротия. За моите статии страниците на списанията и вратите на конгресите се затвориха. Но тъй като успях да пусна две публикации преди да се разбере добре значението на този експеримент, то по тези въпроси жреците наложиха табу - никакво коментиране, никакво споменаване. През септември тази година отидох на конференция по въпросите за етера в Империал Колидж в Лондон. Пет минути след появяването ми организаторите извикаха трима мъжаги от службата за сигурност и бях изхвърлен пред вратите на Колежа. Този път не тъй далече. Защо казвам "този път"? - Защото когато през 1986 година отидох на единадесетата международна конференция по гравитация и обща относителност в Стокхолм, бях екстрадиран в съпровод на двама цивилни полицая чак до Виена.

Ето ви научна гласност на Запад. Не вярвате? - Абе елате тука и опитайте да развявате горбачовото знаме на гласност в науката, па ще видите.

Някой ще каже: Де бре, Стефане, какво си направил - опровергал си принципа на относителността. Много важно. Я жреците табу са наложили, я не са ти забелязали експеримента.

Тъй. Не е така. Понеже този принцип на относителността като го откъртиш, много други кътни зъби се разкъртват. Според Айнщайна с големите мустаци ако държиш магнит в едната ръка и жичка в другата, то дали движиш жичката или магнита, все едно и също напрежение трябва да се индуцира. А оказва се, че не е така: като движиш жичката спрямо магнита едно е напрежението, а като движиш магнита спрямо жичката - друго. А от тука чалъми се намират да се правят машини, които да се движат самички. На такива машинки им казват ПЕРПЕТУУМ МОБИЛЕ.

Аде-де, ще викнете вие от татковината, дето сега слушате това предаване. Че в България и децата знаят, че перпетуум мобиле не може да се направи. Знаят децата! - Знаят,

понеже няма научна гласност по Европата. Ако имаше гласност, друго щяха да знаят.

През юли тази година бях в селцето Линден на 40 километра южно от Берн в Ементалската долина, дала името на прочутото ементалско сирене. Там има една религиозна комуна, която се казва МЕТЕРНИТА. И един най-обикновен часовникар на име Паул Бауман, член на тази комуна, е построил електромагнитно перпетуум-мобиле, което работи от десет години автономно и произвежда 3 кило-вата свободна мощност /три киловата харчи голямата плоча на една електрическа печка/. От десет години, братя българи. Кажете го това на децата в България. Тоест, от десет години въпроса за енергетичната и екологическа кризи на света е ТЕХНИЧЕСКИ решен. А кой знае? - Тук-там някой знае. Швейцарското правителство, да, знае. От NASA, т.е. от американската Байконурия, както разбрах, някои хора са ходили в Линден, и те знаят. Въпреки това десет години след това епохално откритие автомобилите продължават да пърдят по шосетата на света, куминте продължават да бълват Це-О и Це-О-два в небесата, а разни зелени и червени размахват плакати, хващат се за ръцете на хора дълги километри, хвърлят камъни, катерят се по оградите на атомните централи и се давят с псета и полицаи. А въпросът е решен. Машинката на Паул Бауман се върти и от нищо прави нещо.

Не искам да обвиня само жреците, че държат едно гигантско откритие в тайна. Самата комуна смята, че не е време да се дава това научно откритие на човечеството. По следните съображения: Светът, според комунарите, живее с такива морални норми, че едно перпетуум мобиле, т.е. неограничен източник на енергия, не само че ще облекчи и подобри живота на хората, но още повече ще го влоши, а може даже да доведе до катастрофа и до пълен социален хаос. Тяхният принцип е следният: Ако други комуни се организират според ортодоксалните християнски принципи, то те с радост ще подаряват подобни машини на тези комуни, за да бъдат енергетически независими. А какви са тия ортодоксални християнски принципи?

Гостувах им два дена /както Томас Моор на остров Утопия/ и видях следното: В комуната собственост няма. Всички се хранят в две столови, където всеки може да седне, където иска, и да яде колкото си иска. Храната е проста, но вкусна и грижливо сготвена. Хранят се на самообслужване. Имат един магазин, от където всеки може да си вземе, каквото си иска. Но има само предмети от първа необходимост. Според комунарите вторите и третите необходимости са не само излишни, но и вредни. Работят в две предприятия на комуната /една модерна градина за цветя и малка фабрика за шкафове и стелажи/, чиято продукция се експортира извън селцето за да имат пари да купуват от вън каквото не могат да произведат сами. Но се стараят да си правят всичко сами: строят си къщите сами, инсталирали са собствена телефонна мрежа с триста поста за 150 комунара, даже са си построили собствен телевизионен предавател /един предавател за 150 зрителя/. А швейцарската телевизия не я гледат, понеже я считат за вредна. Заплата не получават, в отпуска не ходят, в пенсия не излизат. Разбира се, при болест получават съответна болнична отпуска и лекарска грижа. Стараят се да бъдат винаги добри и мили един към друг и ако някога някой някого задене с нещо, правят си самокритика и си искат прошка. А какво правят през свободното

си време? - Медитират. Вярвам тази дума вече и в България я знаят. Христос като се е отшелничвал в пустинята, какво е правил - медитирал е. Свети Симеон, дето е прекарал живота си на капителата на една колона, и той това е правил - медитирал е.

Аз като ходих нагоре-надолу по уличките на селцето и като говорих с хората, и се плеснах по челото. Ами че всичко това вече съм го виждал. Преди много и много години когато ходихме с моите другарчета при дъновистите край семинарията в София, където сега новата съветска легация се е барикадирала зад пет-метрова бетонна стена. Разликата е само една: Дъновистите сутрин с музика и физкултурни движения посрещаха изгрева на слънцето /дъновистите не бяха християни и се покланяха на слънцето/, а метернитарите медитират индивидуално седнали на скамейки и в пълно мълчание. И дъновистите ми се струваха по-весели, по-засмени хора. А може би просто тогава, през детските години, аз съм бил по-весел и по-засмян и затова и дъновистите така съм виждал. Кой знай.

Тъй че перпетуум мобиле има. Чуйте тази тайна, която никой тука по Европата и по двете Индии не я знае. Закона за съхранението на енергията не е верен. Човечеството лесно ще може да прескочи през енергетичната и екологична пропасти, дето са зинали пред него.

А ако мислите, че на Запад има гласност, дълбоко се лъжете.

Някой, вярвам, ще възкликне: Аде бре, Стефане, гласност няма, а ти по Свободна Европа свободно за машинката на Метернитарите плещеш и айнщайновите теории ги минаваш под рубриката "щуротии".

Ако това мое слово стигне до вашите уши, братя българи, причината ще бъде само една: недоглеждане. Никаква друга. Че вземете Ленин. Беше ли в ръчичките на царската полиция? - Беше. А защо един божи ден се озова в Швейцария да се шматка насам натам по ементалската и други долини и да пръска искри, та успя после една шеста част от земното кълбо, а то насмалко и цялото, да запали? Отговорът и там е само един: от недоглеждане. Но, слава Богу, именно тези недоглеждания са и базата на свободата на Запад и в тях ни е цялата наша надежда.

До скоро чуване пак на същата вълна.

Стефан Маринов

Marinov's note. Уви, братя българи, догледаха! По тука при капиталистите пари имаш ли, и на ксероксите можеш да си щампотиш каквото си искаш. Ето го и есето напечатано. Така че тука "на Запад" има дупчици пръстче да провреме. Та в тия дупки ни е и цялата надежда. Вие ще кажете: "Ама как, Стефане, книгата ти до нас ще стигне?" Ще стигне, братя, и по България дупки има, а с всеки ден все по-широчки стават.

International Communication Agency
United States of America
Washington, D.C. 20547

Voice of America
USICA

25 May, 1983

Dear Mr. Marinov,

This is to aknowledge(as you requested), receiving your book, sent to my Office on your own initiative. Since there was no mention of payment, the assumption was that this is one of the many unsolicited publications we get all the time from different sources and quarters. Please, accept my apologies if the lack of aknowledgement has caused you any concern or displeasure.

I would also like to inform you that it is the policy of VOA's Bulgarian Service not to accept unsolicited materials, including books, i.e. not to use them for our purposes, as in reviews or advertisements on the air.

Therefore, acting on your request, I am sending back the book, which I found rather interesting and revealing. Let's hope that it might be found useful by some other International broadcasting services in the Free World.

Sincerely,

Deliasko S. Tiufekchiev
Chief, VOA Bulgarian Service

Marinov's note. През декември 1988, когато посетих Д-р Мадокс в НЕЙЧЪР, отидох и в Бушхауз /БиБиСи/, понеже разстоянието е един хвърлей. Дадох есето "Има ли гласност на Запад" на г-н Уудуорд, ръководителят на българската секция, с когото много мило поприказвахме. Обеща да ми се обади на другия ден по телефона в дома на моя приятел Ал. Христов, при когото бях отседнал, но освен Паппас от Атина друг никой не дрънна.

А горното писмо го изрових от архивата си, за да покажа на българската читаща публика, че ако човек стои в Щатите повече от три години, оглупява. Аз стоях половин година. За мен, възможно, това е било едно от най-щастливите полугодия в живота ми. Но като гледах, че месеците текат и като гледах че американците хем се зъбят, че ще ме екстрадират, хем не пращат полицая с букаите, и си размислях: Стефане, внимавай да не останеш и ти три години, и да оглупееш. И им казах на чапанците: "Дръжте се, крачета, да бягаме, батко ще ви купи чехлички." И ето че се спасих - не оглупях.

Книжката, за която става дума в горното писмо, е моята "Изыди, Сатана!" На следващата страница давам, какво казва ГЛАС НАРОДЕН за нея.

А нашите кретени с квадратно-бетонните глави градят контра-предаватели, "гласа" да го заглушават. Щурав свят, Боже-е-е, щурав. Човек не знае, да плаче ли, да се смее ли, хоро ли да играе.

Diamanten-Meirow GmbH

Diamanten-Meirow GmbH · Westliche 92 · D-7530 Pforzheim

D-7530 PFORZHEIM
WEST GERMANY
Westliche 92
Telefon (07231) 12092
Telex 783493 diame d
Handelsregister HR-B 624
Geschäftsführer:
Marc Igal Meirow
Deutsche Bank, Fil. Pforzheim 02/06110
(BLZ 66670006)
Fax 07231/13430

Ihre Nachricht vom | Ihr Zeichen | Unser Zeichen | Tag Pforzheim, 28. 9. 1988

Уважаеми г-н Маринов,

Преди една-две години наши приятели от Париж ни подариха книгата Ви „Изыди, сатана!". Прочетохме я на един дъх и трябва да си призная, че от Ал. Константинов насам нищо не ни е „грабвало" по този начин. За съпруга ми тази книга стана нещо като Новия Завет с постоянно почетно място на нощното шкафче - препрочита се непрекъснато. И вярвайте ни - доста Ваши фрази вече солидно са се загнездили в речта ни.

Отдавна търсим начин да се свържем с Вас, но никому не беше известно къде се намирате. И все пак светът се оказа малък! Днеска ни дадоха адреса Ви и бързаме да Ви пишем. Искате ли да се запознаем? Ние сме и двамата от София, на средно-напредваща възраст сме и от доста години живеем извън България. Иска ни се да ни гостувате у дома за няколко дни, ако можете да пътувате (дано описаните в книгата приключения са вече история!) Ракия и мезе имаме, български гозби умеем да готвим. А Вие сте поразително приятен събеседник. Трябва плюс това да знаем какво става с Гогов... Заповядайте!

Надяваме се, че ще ни се обадите с два реда или по телефона (след 7231 - 12092, желателно привечер). Междувременно приемете поздравите на двама искрени почитатели -

A. + T. Meirow

ANZHEL MEIROW
LUKAS-MOSER-STR. 1
D-7530 PFORZHEIM

SCIENTIFIC PAPERS

THE FUNDAMENTALS OF CLASSICAL GRAVIMAGRETISM AND ELECTROMAGNETISM

Ştefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Graz, Austria

A B S T R A C T

According to my absolute space-time conceptions, the fundamental equations in electromagnetism and gravitation are almost identical. For this reason I introduce in gravitation hypothetically an analogue to the magnetic energy which I call magretic energy, and I give to the new theory of gravitation the name gravimagretism. Proceeding from the axiomatics of my classical space-time theory (presented in this paper), I obtain the fundamental equation of motion in gravimagretism. I call it the Newton-Marinov equation and it is the gravimagretic analogue of the famous electromagnetic Newton-Lorentz equation (usually called the Lorentz equation). The Newton-Marinov equation shows that the gravitational potential generated by all celestial bodies must be accepted equal to $-c^2$ and that the kinetic (or inertial) energy of the particles is nothing else than their gravitational energy with the mass of the whole world. I reveal the importance of the full forms of the physical quantities which are obtained when the time and space quantities are coupled with the corresponding space and space-time quantities. I show that when one works with the full quantities the third Newton's law has a general validity, but the classical Newton's third law is not valid. Recently I demonstrated violations of the classical Newton's third law by the help of several electromagnetic experiments, leading to violation of the law of conservation of angular momentum. Then I give the differential and integral relations between densities and potentials and I obtain the Maxwell-Marinov equations which are the gravimagretic analogues of the electromagnetic Maxwell-Lorentz equations. I show that the specifity of high-velocity physics is due only to the peculiar aether-Marinov character of light propagation which differs within effects of second order in v/c from the "natural" aether-Newtonian character, and I introduce this peculiarity in the axiomatics.

1. INTRODUCTION

As a result of my experimental and theoretical work in the last twenty years, I firmly established that space and time are absolute categories, such as defined by Newton and as conceived inuitively by everybody during one's childhood and student life. The crucial experiments supporting this viewpoint are my "rotating axle" experiments[1-6], by means of which for the first time in history I succeeded in measuring the Earth's absolute velocity in a laboratory.

Proceeding from the absolute space-time concepts, I tried to build all of classical (i.e., non-quantum and non-statistical) physics on a firm and clearly defined axiomatical basis. I established that this axiomatical basis can be chosen in a very simple, intuitively comprehensible manner, and that all fundamental equations in classical physics can be then obtained by plain and rigorous mathematical speculations.

The internal logic of the theory has impelled me to introduce axiomatically, by analogy with the magnetic energy, a companion to the gravitational energy which I called the magretic energy. Until now human experience has not established the existence of such a type of energy, but neither has it shown whether such an energy should not exist. Thus the magretic energy is a hypothetical notion. Nevertheless, I hope that in the future, when experimental techniques will offer the necessary possibilities, the existence of magretic energy should be revealed.

I propose an aether-type model for light propagation, i.e., I assume that light propagates with a constant velocity along any direction only in absolute space. However, the "aether" is not some medium at rest in absolute space in which light propagates like sound in the air. I firmly defend the corpuscular (Newton) model of light propagation, rejecting the wave (Huyghens-Fresnel) model, so that I call my model for light propagation "aether-Newtonian".

Within effects of first order in V/c (V is the absolute velocity of the frame considered, c is the velocity of light in absolute space or the to-and-fro velocity in any inertial frame), all physical and light propagation phenomena can be rightly described by the traditional "Newtonian" mathematical apparatus, and thus within this accuracy the Galilean transformation is adequate to physical reality. I call

this the low-velocity mathematical approach.

The low-velocity mathematical apparatus wrongly describes the effects of second (and higher) order in V/c. For a correct explanation of these effects, the "aether-Newtonian" character of light propagation must be replaced by the "aether-Marinov" character. The high-velocity mathematical approach, based on the Lorentz transformation and on its companion the Marinov transformation (both of which can be considered as mathematical presentation of the "aether-Marinov" character of light propagation), as well as on the 4-dimensional mathematical formalism of Minkowski, rightly describes the effects of any order in V/c.[3,5,7] However, the Lorentz transformation and the 4-dimensional mathematical apparatus must be treated from an absolute point of view, as is done in my absolute space-time theory. If they are treated and manipulated from a "relativistic" point of view, as is done in the Einstein approach to the theory of relativity, results inadequate in regard to physical reality are obtained. The errors to which the theory of relativity leads are within effects of first order in V/c.

In my approach I assume axiomatically (see the second axiom in sect. 2) that the velocity of light, propagating along the direction **n** in absolute space and along the direction **n'** in a frame moving with a velocity **V** in absolute space, is not equal to

$$c' = c\{1 - (\mathbf{n}'\times\mathbf{V}/c)^2\}^{1/2} - \mathbf{n}'.\mathbf{V} = c(1 - 2\mathbf{n}.\mathbf{V}/c + V^2/c^2)^{1/2} , \qquad (1.1)$$

as it must be according to the traditional "Newtonian" concepts but to

$$c' = \frac{c(1 - V^2/c^2)^{1/2}}{1 + \mathbf{n}'.\mathbf{V}/c} = \frac{c(1 - \mathbf{n}.\mathbf{V}/c)}{(1 - V^2/c^2)^{1/2}} . \qquad (1.2)$$

These formulas differ one from another only within terms of second (and higher) order in V/c. In this paper I shall not present motivations for the substitution of formulas (1.1) by the formulas (1.2) and the reader can find such motivations in the Refs. 3,5,7,8. Accepting axiomatically the validity of formulas (1.2), I remove from the way to the scientific truth a terribly heavy stone which has for about a century tormented humanity. I showed[3,5,7,8] that either one has to introduce the peculiar aether-Marinov character of light propagation into the theory, or one should be un-

able to bring all effects observed in space-time physics under one hat.

Formula (1.1) shows that the time which a light pulse needs to cover a distance d in the moving frame is equal to $\Delta t_{\parallel} = 2d/(1 - V^2/c^2)$ when this distance is parallel to the frame's motion and to $\Delta t_{\perp} = 2d/(1 - V^2/c^2)^{1/2}$ when it is perpendicular to the frame's motion. Formula (1.2) shows that in both these cases the time should be the same $\Delta t_{\parallel} = \Delta t_{\perp} = 2d/(1 - V^2/c^2)^{1/2}$ and with the factor $(1 - V^2/c^2)^{-1/2}$ larger than the time needed to cover the same distance d when it is at rest in absolute space. (Take into account that when d is parallel to the frame's motion $\mathbf{n}'.\mathbf{V} = \mathbf{n}.\mathbf{V} = V$, $(\mathbf{n}'\times\mathbf{V})^2 = 0$, and when it is perpendicular $\mathbf{n}'.\mathbf{V} = 0$, $\mathbf{n}.\mathbf{V} = V^2/c$, $(\mathbf{n}'\times\mathbf{V})^2 = V^2$.)

If we define the time unit in the absolute (attached to absolute space) frame and in the relative (moving) frame by the time which light needs to cover a certain distance d to and fro, we obtain that the time unit in the moving frame (which I call proper time unit) is larger by the factor $(1 - V^2/c^2)^{-1/2}$ from the time unit in the rest frame (which I call universal time unit). Thus the Marinov-aether character of light propagation automatically introduces the time dilation, which I consider (and I show this[3,5]) as a physical effect. One may add that formulas (1.2) can be considered as introducing also automatically the "length contraction", but I firmly defend the opinion that the "length contraction" is not a physical effect and appears in the mathematical apparatus only because of the peculiar aether-Marinov character of light propagation.

I showed[3,5,7,8] that if the isotropy of the to-and-fro light velocity in the moving frame will be coupled with the principle of relativity, the Lorentz transformation formulas should be obtained, while if it will be coupled with the existence of absolute space, the Marinov transformation formulas should be obtained. My experiments[1-6] have shown that the Marinov transformation is adequate to physical reality and I showed[3,5,7,8] how the Lorentz transformation is to be reconciled with physical reality, i.e., with the space-time absoluteness. I showed also[3,5,7,8] the fundamental difference between the Lorentz and Marinov invariances which can be briefly delineate as follows:

If there is an isolated material system of several interacting particles, the most natural and simple approach is to consider the motion of these particles in a frame attached to absolute space. Then we can make the following two transformations:

1) To move the whole system with a velocity **V** in absolute space and to consider the appearing in the system physical phenomena further in the absolute frame.

2) To leave the system untouched and to consider the appearing in the system phenomena in another (relative) frame which moves with a velocity **V** in absolute space.

According to the principle of relativity, these two transformations must lead to identical results for all phenomena which can be observed in the system, as for the theory of relativity an absolute space does not exist and if there is a system and observer, it is immaterial whether the observer moves with respect to the system or the system moves with respect to the observer.

According to my absolute space-time theory, the two mentioned transformations do not lead to identical results, although a big part of the observed phenomena remain identical, first of all the low-velocity mechanical phenomena, but not the electromagnetic and high-velocity mechanical phenomena.

When we wish to obtain results adequate to physical reality, we have to use the Lorentz transformation only when making the first of the above transformations. In such a case the "moving frame" K' in which we first consider the material system (usually if the system represents a single particle, it is at rest in K', and if the system has many particles, its center of mass is at rest in K') and the "rest frame" K in which we then consider the system (and in which the single particle or the center of mass of the system move with a velocity **V**) is one and the same physical frame attached to absolute space. Thus it is not the observer who has changed his velocity with respect to absolute space, but the system has changed its velocity from zero to **V** with respect to absolute space. As the velocity of light in absolute space is c along any direction, then in the "moving frame" K' and in the "rest frame" K it will preserve its constant value along all directions because, I repeat, K and K' are, as a matter of fact, one and the syme physical frame. When making such a kind of trans-

formation we must always replace the 4-dimensional scalars observed in K' by their 4-dimensional analogues in K, i.e., we have to work with the Lorentz invariant quantities.

When making the second of the above transformations, we have to use the Marinov transformation. In such a case the frame K is attached to absolute space and the moving frame K' moves with a velocity **V** in absolute space, i.e., those are two different physical frames, whilst the observed system has always the same character of motion with respect to absolute space. Now the velocity of light will be c in the rest frame K, but it will be direction dependent in the moving frame K'. When making such a kind of transformation we have to replace the 3-dimensional scalars observed in K by their 3-dimensional analogues in K', keeping in mind that the Marinov invariant quantities as the space and time energies have the same values in K and K'.

When K and K' are two inertial frames, then it is not easy to find experiments revealing the difference between the above two transformations and I was the first man constructing such experiments. However when K' is a rotating frame, then it is of cardinal importance whether the observed system rotates with respect to the observer or the observer rotates with respect to the system. Being unable to understand the difference between the first and second transformation for inertial frames, relativity was unable to understand many substantial differences for the case where K and K' rotate one with respect to another. Moreover ideal inertial frames do not exist because for any frame moving with an enough constant velocity in absolute space always a far enough center can be found, so that the motion of the frame can be considered as rotation about this center.

2. AXIOMATICS

The fundamental undefinable notions (concepts) in physics are:

a) space,

b) time,

c) energy (matter).

I consider the notions "matter" and "material system" as synonyms of the notions

"energy" and "energy system".

An image (model) of a given material system is any totality of imprints (symbols) with the help of which, if corresponding possibilities and abilities are at our disposal, we can construct another system identical with the given one. We call two material systems identical if their influence on our sense-organs (directly, or by means of other material systems) is the same. We call two images of a given material system equivalent if with their help identical systems can be constructed. An image is adequate to physical reality if the impact of the considered material system on our sense-organs, as predicted from this image, is the same as the actual impact.

A material system is called isolated if it can be represented by a model independent of other material systems.

We imagine space as a continuous, limitless, three-dimensional totality of space points. The different Cartesian frames of reference (these are geometrical conceptions) with which we represent space may have various relations with respect to each other. Depending on their relationship to each other, any pair of Cartesian frames of reference will belong to one or more of the following three classes:

1. Frames with different origins.

2. Frames whose axes are mutually rotated.

3. Frames with differently oriented (or reflected) axes (right or left orientation).

The fundamental properties of space may be defined as:

1. Homogeneity. Space is called homogeneous if considering any material system in any pair of space frames of the first class, we always obtain equivalent images.

2. Isotropy. Space is called isotropic if considering any material system in any pair of space frames of the second class, we always obtain equivalent images.

3. Reflectivity. Space is called reflective if considering any material system in any pair of space frames of the third class, we always obtain equivalent images.

We imagine time as continuous, limitless, one-dimensional totality of moments (time points). Here frame of reference for time of the first and third class only can be constructed, i.e., time frames with different origins and with oppositely directed axes. The fundamental properties of time may be defined as:

1. Homogeneity. Time is called homogeneous if considering any material system in any pair of time frames of the first class, we always obtain equivalent images.

2. Reversibility. Time is called reversible if considering any material system in any pair of time frames of the third class, we always obtain equivalent images.

The assertions of my first (for space), second (for time), third (for energy), fourth (for the first type of space energy), fifth (for the second type of space energy), sixth (for time energy), seventh (for the first type of space-time energy), eighth (for the second type of space-time energy) and ninth (for conservation of energy) axiom are the following:

AXIOM I. Space is homogeneous, isotropic and reflective. The unit for measurement L for distances (i.e., space intervals along one of the three dimensions of space) has the property of length and may be chosen arbitrarily. Absolute space is the reference frame in which the world as a whole is at rest.

AXIOM II. Time is homogeneous. The unit of measurement T for time intervals has the property of time and is to be established from the following symbolical relation

$$L/T = c, \tag{2.1}$$

where c is a universal constant which has the property of velocity (length divided by time). Light propagates in absolute space with this velocity which is called universal light velocity. In a frame moving with a velocity **V** in absolute space the two-way light velocity along any arbitrary direction, called proper light velocity is

$$c_0 = c/(1 - V^2/c^2)^{1/2}, \tag{2.2}$$

while the one-way light velocity along a direction concluding an angle θ' with **V**, called proper relative light velocity, is

$$c_0' = c/(1 + V\cos\theta'/c). \tag{2.3}$$

Thus $c' = c_0'(1 - V^2/c^2)^{1/2}$ must be called universal relative light velocity. The time unit in any frame is defined by the period for which light covers a half-length unit to and fro. Hence the universal time intervals are measured on light clocks which rest in absolute space, while the proper time intervals are measured on light clocks which

rest in the moving frame.

AXIOM III. All individually different material systems can be characterized by a uniform (i.e., having the same qualitative character) quantity which is called energy and which can only have different numerical value for different material systems. The unit for measurement E for energy has the property of energy and is to be established from the following symbolical relation

$$ET = h, \tag{2.4}$$

where h is a universal constant which has the property of action (energy multiplied by time) and is called Planck's constant. If we assume the numerical values of h and c to be unity, then the corresponding units for measurement for length, time and energy are called natural. Material points (or particles) are those points in space whose energy is different from zero. Every particle is characterized by a parameter m, called universal mass, whose dimensions and numerical value are to be established from the relation

$$e = mc^2, \tag{2.5}$$

where e is the energy of the material point when it is at rest in absolute space and is called universal energy. When a particle moves in absolute space its energy is denoted by e_0 and is called proper energy. The quantity m_0, called proper mass, is to be established from the relation

$$e_0 = m_0c^2. \tag{2.6}$$

Other important characteristics of a material point are the quantities

$$\mathbf{p} = m\mathbf{v} \quad (\mathbf{p}_0 = m_0\mathbf{v}) \qquad \text{and} \qquad \bar{p} = mc \quad (\bar{p}_0 = m_0c), \tag{2.7}$$

called, respectively, the universal (proper) space momentum and the universal (proper) time momentum. Furthermore every particle is also characterized by the quantities

$$\mathbf{k} = \mathbf{p}/h = m\mathbf{v}/h \quad (\mathbf{k}_0 = \mathbf{p}_0/h = m_0\mathbf{v}/h) \quad \text{and} \quad \bar{k} = \bar{p}/h = mc/h \quad (\bar{k}_0 = \bar{p}_0/h = m_0c/h), \tag{2.8}$$

called, respectively, the universal (proper) wave vector and the universal (proper) wave scalar. Two material points can be discerned one from another if the space distance between them (at a given moment) is more than their proper wave length $\lambda_0 = 1/k_0$, or the time interval between their passages through a given space point is more than

their proper period $\tau_o = 1/c\bar{k}_o$. If these conditions are not fulfilled, the particles interfere - a phenomenon introduced and studied in quantum physics.

AXIOM IV. The individual image of a material system in space is given by the value of its gravitational energy U_g. The energy U_g of two particles is proportional to their proper time momenta $\bar{p}_{o1}$, $\bar{p}_{o2}$ divided by c and inversely proportional to the distance r between them

$$U_g = -\gamma\bar{p}_{o1}\bar{p}_{o2}/c^2r = -\gamma m_{o1}m_{o2}/r. \qquad (2.9)$$

The coupling constant γ, called the gravitational constant, shows what part of the energy unit represents the gravitational energy of two unit masses separated by a unit distance. The mass m_e of an important class of elementary (non-divisable) particles, called electrons, is a universal constant called the mass of electron. If one works with natural units and assumes the numerical value of the electron mass to be unity, i.e., $m_e = 1\ EL^{-2}T^4$, then the gravitational constant has the value $\gamma = 2.78\times10^{-46}\ E^{-1}L^5T^{-4}$.

AXIOM 5. In addition to the mass parameter, every particle is characterized by a parameter q, called the electric charge. The quantities

$$\mathbf{j} = q\mathbf{v}, \qquad \bar{j} = qc \qquad (2.10)$$

are called, respectively, the space current and the time current. The individual image material system
of a Λ in space, in addition to its gravitational energy U_g, is also given by the value of its electrical energy U_e. The energy U_e of two particles is proportional to their time currents $\bar{j}_1$, $\bar{j}_2$ divided by c and inversely proportional to the distance r between them

$$U_e = \bar{j}_1\bar{j}_2/\varepsilon_o c^2 r = q_1q_2/\varepsilon_o r. \qquad (2.11)$$

The coupling constant $1/\varepsilon_o$ is called the inverse electric constant and ε_o - the electric constant; the inverse electric constant shows what part of the energy unit represents the electrical energy of two unit charges separated by a unit distance. The dimensions of the electric charge q and of the electric constant ε_o are to be established from (2.11), thus the dimensions of one of them are to be chosen arbitrarily. The electric charge of every elementary particle is equal to q_e, $-q_e$, or 0, where q_e

is a universal constant called the charge of electron. If we work with natural units and assume the numerical value of the electron charge to be unity, i.e., $q_e^2 = 1$ EL, then the electric constant is dimensionless and has the numerical value $\varepsilon_0 = 861$.

AXIOM VI. The individual image of a material system in time is given by the value of its proper time energy E_0. The proper time energy e_0 of one particle depends on its absolute velocity $\mathbf{v}$, i.e., on its velocity with respect to absolute space; the change (the differential) of the proper time energy is proportional to the scalar product of the velocity and the differential of the velocity, the mass of the particle being the coupling constant

$$de_0 = m\mathbf{v}.d\mathbf{v}. \tag{2.12}$$

AXIOM VII. The individual image of a material system in space and time is given by the value of its magretic energy W_g. The energy W_g of two particles is proportional to the scalar product of their proper space momenta $\mathbf{p}_{01}$, $\mathbf{p}_{02}$ divided by c and inversely proportional to the distance r between them

$$W_g = -\gamma \mathbf{p}_{01}.\mathbf{p}_{02}/c^2r = -\gamma m_{01}m_{02}\mathbf{v}_1.\mathbf{v}_2/c^2r. \tag{2.13}$$

The coupling constant γ, called the magretic constant, is equal to the gravitational constant.

AXIOM VIII. The individual image of a material system in space and time, in addition to its magretic energy W_g, is also given by the value of its magnetic energy W_e. The energy W_e of two particles is proportional to the scalar product of their space currents $\mathbf{j}_1$, $\mathbf{j}_2$ divided by c and inversely proportional to the distance r between them

$$W_e = \mu_0 \mathbf{j}_1.\mathbf{j}_2/c^2r = \mu_0 q_1 q_2 \mathbf{v}_1.\mathbf{v}_2/c^2r. \tag{2.14}$$

The coupling constant μ_0, called the magnetic constant, is equal to the inverse electric constant.

AXIOM IX. Full energy H of a material system is called the sum of the time energy E_0 and the space energy U. Total energy $\tilde{H}$ is the full energy plus the space-time energy W. The numerial value of the total energy of an isolated material system remains constant in time, that is

$$d\tilde{H} = 0, \quad \text{i.e.,} \quad dE_0 + dU + dW = 0. \tag{2.15}$$

Remark. If we take a general look at the equations (2.9), (2.11), (2.13) and (2.14), we see that it is more reasonable to choose as parameters of the space and space-time energies in gravimagretism and electromagnetism not the masses and the electrical charges of the particles but their Marinov masses and Marinov electrical charges

$$m^* = m/c, \qquad q^* = q/c. \tag{2.16}$$

With the Marinov masses and charges the space and space-time energies of two particles will be written (in the CGS-system of units we take $\varepsilon_0 = 1/\mu_0 = 1$)

$$U_g = -\gamma m^*_{o1} m^*_{o2} c^2/r, \qquad W_g = -\gamma m^*_{o1} m^*_{o2} \mathbf{v}_1 \cdot \mathbf{v}_2/r, \tag{2.17}$$

$$U_e = q^*_1 q^*_2 c^2/\varepsilon_0 r, \qquad W_e = \mu_0 q^*_1 q^*_2 \mathbf{v}_1 \cdot \mathbf{v}_2/r. \tag{2.18}$$

3. TRANSFORMATION OF COORDINATES

For the sake of simplicity, the space geometry in this section will be one-dimensional.

If in the frame K', moving with the velocity V with respect to frame K, the radius vector of a certain point, which is at rest in K', is x', then its radius vector with respect to frame K will be

$$x = x' + Vt, \tag{3.1}$$

where t is the (absolute) time interval between the initial moment when the origins of both frames have coincided and the moment of observation. This is the direct Galilean transformation. The inverse Galilean transformation will be

$$x' = x - Vt. \tag{3.2}$$

The Galilean transformation seems to be in conformity with the principle of relativity as by considering frame K attached to absolute space or frame K' nothing changes in the transformation formulas. I shall, however, add that since the time of Copernicus humanity does not make the error when considering an object moving with a certain velocity to the fixed stars to consider the object at rest and the stars moving with the opposite velocity. The Galilean transformation under this Copernican insight is, obviously, in conformity with the aether-Newtonian character of light propagation.

The aether-Marinov character of light propagation introduces changes into the Galilean transformation formulas. Taking into account the aether-Marinov character of

light propagation, I showed[3,5,7] that:

1) By assuming the principle of relativity as valid, one obtains the Lorentz transformation formulas.

2) By assuming the principle of relativity as not valid, one obtains the Marinov transformation formulas.

As these demonstrations are time and space consuming, I shall not give them here, and I shall only give the formulas for the:

1. Direct and inverse Lorentz transformations

$$x' = (x - Vt)/(1 - V^2/c^2)^{1/2}, \quad t' = (t - xV/c^2)/(1 - V^2/c^2)^{1/2}, \quad (3.3)$$

$$x = (x' + Vt')/(1 - V^2/c^2)^{1/2}, \quad t = (t' + x'V/c^2)/(1 - V^2/c^2)^{1/2}. \quad (3.4)$$

2. Direct and inverse Marinov transformations

$$x = (x' - Vt)/(1 - V^2/c^2)^{1/2}, \quad t_o = t(1 - V^2/c^2)^{1/2}, \quad (3.5)$$

$$x = x'(1 - V^2/c^2)^{1/2} + Vt_o/(1 - V^2/c^2)^{1/2}, \quad t = t_o/(1 - V^2/c^2)^{1/2}. \quad (3.6)$$

One sees that the Lorentz transformation formulas are entirely symmetric and thus one can attach either frame K to absolute space (in this case light velocity will be isotropic in K and anisotropic in K') or frame K' (in this case light velocity will be isotropic in K' and anisotropic in K), while the Marinov transformation formulas are not symmetric, so that always frame K is to be considered attached to absolute space and always the velocity of light is isotropic in K and anisotropic in K'.

The time "coordinates" in the Lorentz transformation does not represent real physical time, as in their transformatiin formulas space coordinates appear. I call such time relative (or Lorentz time). The time in the Marinov transformation is real measurable physical time. There is only the stipulation that the time units used in frames moving with different velocities with respect to absolute space are different, as in my second axiom I chose the time unit in any frame to be equal to the duration which a light pulse takes to cover a half-unit distance to and fro. I showed[3,5] that as in any periodic phenomenon, independent of its character, light velocity plays a decisive role, the time dilation appears not only in "light clocks" but in any other "clock".

The Marinov transformation is adequate to physical reality. The Lorentz transformation can be kept adequate to physical reality only if it will be considered from an absolute point of view, thus if the relative time will be considered not adequate to real time and the relative (or Lorentz) velocity appearing in the Lorentz transformation formulas for velocities will be considered not as real velocity. In Refs. 3 and 5 I show the way in which the Lorentz transformation can be saved from the pernicious Einstein's relativistic claws. In Einstein claws the Lorentz transformation contradicts physical reality and the errors to which it leads are of first order in V/c. Let me remember that the errors to which the Galilean transformation formulas lead are of second order in V/c. Thus the Lorentz transformation in Einstein's claws is a worse mathematical apparatus than the Galilean transformation.

In the Lorentz transformation, it is assumed that the velocity of light has an absolute constant value in any inertial frame; however, as the space coordinates enter into the transformation formulas for time, time is assumed "relative". In the Marinov transformation, time is assumed absolute (consequently the space coordinates are not present in the transformation formulas for time) and the velocity of light appears to be relative, i.e., direction dependent in any moving frame. My approach is straightforwardly adequate to physical reality, while in the Lorentz transformation the absoluteness of time is transferred to light velocity and the relativity of light velocity is transferred to time. Nevertheless the Lorentz transformation is very useful in theoretical physics because it allows the introduction of the powerful mathematical apparatus of the 4-dimensional formalism which gives extreme simplicity and elegance to electromagnetism and, according to my concepts, to gravimagretism too. In my absolute space-time theory[5] I work intensively with the 4-dimensional mathematical formalism and I introduced the following very convenient notations:

$$\overset{\mapsto}{a} = (\vec{a},\ i\bar{a}) = (\mathbf{a},\ i\bar{a}) \tag{3.7}$$

is a 4-vector where $\vec{a} = \mathbf{a}$ is its space part and $\bar{a}$ is its time part.

$$\overset{\leftrightarrow}{a} = \begin{vmatrix} \overset{\leftrightarrow}{a} & i\vec{a} \\ i\tilde{\vec{a}} & -\bar{a} \end{vmatrix} \tag{3.8}$$

is a 4-tensor where $\overleftrightarrow{a}$ is its space-space part, $\vec{a}$ is its space-time part, $\tilde{\vec{a}}$ is its time-space part and $\tilde{a}$ is its time-time part.

$$\square = (\partial/\partial x, \partial/\partial y, \partial/\partial z, -i\partial/c\partial t) \tag{3.9}$$

is a symbolical 4-vector called by me the Erma operator (in honour of my girl-fried, the Bulgarian physicist Erma Gerova), the square of which is the symbolical 4-dimensional scalar, called the d'Alembert operator (the symbol is proposed by me)

$$\square\square = \square.\square = \partial^2/\partial x^2 + \partial^2/\partial y^2 + \partial^2/\partial z^2 - \partial^2/c^2\partial t^2. \tag{3.10}$$

4. VELOCITY, ACCELERATION, SUPER-ACCELERATION

I introduce two kinds of velocity of a particle (by analogy with the universal and proper light velocities):

The universal velocity

$$\mathbf{v} = d\mathbf{r}/dt, \tag{4.1}$$

where dr is the distance covered by the particle (which is absolute and does not depend on the frame in which we are working) for a time interval dt registered on a universal clock (i.e., a clock attached to absolute space).

The proper velocity

$$\mathbf{v}_0 = d\mathbf{r}/dt_0 = d\mathbf{r}/dt(1 - v^2/c^2)^{1/2} = \mathbf{v}/(1 - v^2/c^2)^{1/2}, \tag{4.2}$$

where the time interval dt_0 is read on a proper clock (i.e., a clock attached to the particle).

It is logical to introduce three kinds of acceleration

The universal acceleration

$$\mathbf{u} = d\mathbf{v}/dt = d^2\mathbf{r}/dt^2. \tag{4.3}$$

The first proper acceleration

$$\mathbf{u}_0 = \frac{d\mathbf{v}_0}{dt} = \frac{d}{dt}\left(\frac{d\mathbf{r}}{dt_0}\right) = \frac{\mathbf{u}}{(1 - v^2/c^2)^{1/2}} + \frac{\mathbf{v}}{c^2}\frac{\mathbf{v}.\mathbf{u}}{(1 - v^2/c^2)^{3/2}}. \tag{4.4}$$

The second proper acceleration

$$\mathbf{u}_{00} = \frac{d\mathbf{v}_0}{dt_0} = \frac{d}{dt_0}\left(\frac{d\mathbf{r}}{dt_0}\right) = \frac{\mathbf{u}}{1 - v^2/c^2} + \frac{\mathbf{u}}{c^2}\frac{\mathbf{v}.\mathbf{u}}{(1 - v^2/c^2)^2}. \tag{4.5}$$

Further is it logical to introduce four kinds of super-acceleration:

The universal super-acceleration: $\mathbf{w} = d\mathbf{u}/dt$.

The first proper super-acceleration: $\mathbf{w}_o = d\mathbf{u}_o/dt$.

The second proper super-acceleration: $\mathbf{w}_{oo} = d\mathbf{u}_{oo}/dt$.

The third proper super-acceleration: $\mathbf{w}_{ooo} = d\mathbf{u}_{oo}/dt_o$.

5. TIME ENERGY

5.1. The low-velocity consideration

From the axiomatical relation (2.12), immediately after integration, the form of the time energy of a particle with mass m in low-velocity physics can be obtained

$$e_o = mv^2/2 + \text{Const.} \tag{5.1}$$

If we assume Const = 0, we obtain the form of the kinetic energy

$$e_k = mv^2/2. \tag{5.2}$$

If we assume Const = mc^2 (see the third axiom), we obtain the form of the time energy in low-velocity physics

$$e = mc^2 + mv^2/2. \tag{5.3}$$

5.2. The high-velocity consideration

To obtain the time energy of a particle in high-velocity physics, we have to put in the axiomatical relation (2.12) the proper velocity $\mathbf{v}_o$ instead of the universal velocity $\mathbf{v}$. There are three possibilities

$$de^o = m\mathbf{v}_o.d\mathbf{v}, \qquad de_o = m\mathbf{v}.d\mathbf{v}_o, \qquad de_{oo} = m\mathbf{v}_o.d\mathbf{v}_o, \tag{5.4}$$

and after integration we obtain three different expressions for the time energy in high-velocity physics

$$e^o = -mc^2(1 - v^2/c^2)^{1/2} \cong -mc^2 + mv^2/2 = -e + e_k, \tag{5.5}$$

$$e_o = mc^2/(1 - v^2/c^2)^{1/2} \cong mc^2 + mv^2/2 = e + e_k, \tag{5.7}$$

$$e_{oo} = mc^2/2(1 - v^2/c^2) \cong mc^2/2 + mv^2/2 = e/2 + e_k, \tag{5.8}$$

where all constants of integration are taken equal to zero. I call these three forms, respectively, Lagrange time energy, Hamilton time energy and Marinov time energy. All

these three forms of time energy are used in theoretical physics, however the Hamilton energy is the most convenient as the proper time momentum, $\bar{p}_o$, is proportional to it

$$\bar{p}_o = e_o/c = m_o c = mc/(1 - v^2/c^2)^{1/2}. \qquad (5.9)$$

From here we obtain the relation between proper mass and universal mass

$$m_o = m/(1 - v^2/c^2)^{1/2} = m^* c_o, \qquad (5.10)$$

where $c_o = c/(1 - v^2/c^2)^{1/2}$ is the proper light velocity in a frame attached to the particle, which I call proper time velocity of the particle. According to my conceptions one has to work always with the universal mass and its velocity dependence is to be transferred to the time velocity of the particle. Thus I use the notion "proper mass" only for certain convenience and the reader has never to forget that in the Newton's gravitational law (see the fourth axiom) the mass appears coupled with light velocity. Or to say even more clear: the notion "mass" does not exist; only the notion "energy" ("time momentum") does exist.

The product of the mass of the particle by its acceleration is called kinetic force; thus

$$f = mu, \qquad f_o = mu_o =, \qquad f_{oo} = mu_{oo} \qquad (5.11)$$

are, respectively, the universal kinetic force, the first proper kinetic force, and the second proper kinetic force of the particle. I denote always the kinetic force of the particle (system of particles) by small letter "f" and the potential force acting on the particle (system of particles) by capital letter "F".

6. THE LAGRANGE EQUATIONS

6.1. The low-velocity consideration

The space energy U and the space-time energy W are called by the common name potential energies. As can easily be seen, the space-time energy is to be considered only in high-velocity physics as its presence leads to effects of second order in v/c; in low-velocity physics, when speaking about potential energy, we take into account only the space energy. In low-velocity physics I write the time energy E without the subscript "o" and usually I mean only the kinetic energy.

Let us assume that in a time dt the space (potential) energy U and the time (kinetic) energy E of an isolated system of n particles have changed their values by dU and dE. Denote by $\mathbf{r}_i$, $\mathbf{v}_i$, $\mathbf{u}_i$, e_i, respectively, the radius vector, velocity, acceleration, and energy of the i-th particle. As space energy depends only on the distances between the particles (I repeat, the velocity dependence of the gravitational space energy is a high-velocity phenomenon), we shall have

$$dU = \sum_{i=1}^{n} \frac{\partial U}{\partial \mathbf{r}_i}.d\mathbf{r}_i. \tag{6.1}$$

Time energy depends only on the velocities of the particles, and thus

$$dE = \sum_{i=1}^{n} \frac{\partial E}{\partial \mathbf{v}_i}.d\mathbf{v}_i = \sum_{i=1}^{n} \frac{\partial e_i}{\partial \mathbf{v}_i}.d\mathbf{v}_i = \sum_{i=1}^{n} \frac{d}{dt}(\frac{\partial e_i}{\partial \mathbf{v}_i}).d\mathbf{r}_i, \tag{6.2}$$

where we have taken into account (5.2) and the relation

$$\mathbf{u}_i.d\mathbf{r}_i = \mathbf{v}_i.d\mathbf{v}_i, \tag{6.3}$$

which can be proved right by dividing both sides by dt.

Substituting (6.1) and (6.2) into the fundamental axiomatical equation (2.15), and dividing by dt, we obtain

$$\sum_{i=1}^{n} \{\frac{d}{dt}(\frac{\partial e_i}{\partial \mathbf{v}_i}) + \frac{\partial U}{\partial \mathbf{r}_i}\}.\mathbf{v}_i = 0. \tag{6.4}$$

In this equation all n (as a matter of fact, 3n) expressions in the brackets must be identically equal to zero because otherwise a dependence would exist between the components of the velocities of the different particles, and this would contradict our sixth axiom which asserts that the time energy of a particle of a system of particles depends only on its own velocity. Thus from (6.4) we obtain the following system of n vector equations

$$\frac{d}{dt}(\frac{\partial e_i}{\partial \mathbf{v}_i}) = -\frac{\partial U}{\partial \mathbf{r}_i}, \qquad i = 1,2,\ldots,n, \tag{6.5}$$

which are called the Lagrange equations and represent the fundamental equations of motion in low-velocity physics.

Taking into account (5.2), (4.3), and the first relation (5.11), we see that the

left side of (6.5) represents the kinetic force $\mathbf{f}_i$ of the i-th particle. Introducing the notation

$$Fi = - \partial U/\partial \mathbf{r}_i \tag{6.6}$$

and calling $\mathbf{F}_i$ the potential force which all n-1 particles exert on the i-th particle, we can write equations (6.5) in the form

$$\mathbf{f}_i = \mathbf{F}_i, \qquad i = 1,2,\ldots,n, \tag{6.7}$$

in which form they are called the Newton equations (or Newton's second law).

The potential force which the j-th particle exerts on the i-th particle is $\mathbf{F}_i^j = - \partial U_{ij}/\partial \mathbf{r}_i$, and the potential force which the i-th particle exerts on the j-th particle is $\mathbf{F}_j^i = - \partial U_{ij}/\partial \mathbf{r}_j$, where U_{ij} is the space energy of these two particles. Since U_{ij} depends on the distance between the particles, we shall have

$$\partial U_{ij}/\partial \mathbf{r}_i = - \partial U_{ij}/\partial \mathbf{r}_j, \quad \text{i.e.,} \quad \mathbf{F}_i^j = - \mathbf{F}_j^i. \tag{6.8}$$

Thus the potential forces with which two particles of a system of particles (in general, two parts of a system) act on each other are always equal and oppositely directed along the line connecting them. Consequently also the kinetic forces of two interacting particles will be equal and oppositely directed. This result is called Newton's third law.

6.2. The high-velocity consideration

As the high-velocity forms of the space and space-time enrgies in gravimagretism and electromagnetism are different, the Lagrange equations in these two physical domains will be slightly different. I shall deduce the more complicated equations in gravimagretism, from which the equations in electromagnetism can immediately be obtained.

A. Gravimagretism

In high-velocity gravimagretism the space energy U depends also on the velocities of the particles and equation (6.1) is to be replaced by the following one (see formulas (2.9) and (5.10))

$$dU = \sum_{i=1}^{n} \left(\frac{\partial U}{\partial \mathbf{r}_i}.d\mathbf{r}_i + \frac{\partial U}{\partial \mathbf{v}_i}.d\mathbf{v}_i\right) = \sum_{i=1}^{n} \left\{\frac{\partial U}{\partial \mathbf{r}_i} + \frac{U_i \mathbf{v}_i.d\mathbf{v}_i}{c^2(1 - v^2/c^2)^{3/2}}\right\} = \sum_{i=1}^{n} \left(\frac{\partial U}{\partial \mathbf{r}_i}.d\mathbf{r}_i + \frac{U_i}{c^2}\mathbf{v}_i.d\mathbf{v}_{oi}\right), \tag{6.9}$$

where U_i is the part of the space energy in which the i-th particle takes part.

In high-velocity physics equation (6.2) is to be replaced by the following one (see formula (5.7))

$$dE_o = \sum_{i=1}^{n} \frac{\partial E_o}{\partial v_i}.dv_i = \sum_{i=1}^{n} \frac{\partial e_{oi}}{\partial v_i}.dv_i = \sum_{i=1}^{n} \frac{d}{dt}\{(1 - \frac{v_i^2}{c^2})\frac{\partial e_{oi}}{\partial v_i}\}.dr_i = \sum_{i=1}^{n} \frac{d}{dt}(\frac{\partial e_i^o}{\partial v_i}).dr_i =$$

$$\sum_{i=1}^{n} mu_{oi}.dr_i, \qquad (6.10)$$

where e_{oi} and e_i^o are the Hamilton and Lagrange time energy of the i-th particle.

In high-velocity gravimagretism we have to take into account also the space-time energy W. As the space-time energy depends on the distances between the particles and on their velocities, we shall have (see formulas (2.13) and (5.10))

$$dW = \sum_{i=1}^{n} (\frac{\partial W}{\partial r_i}.dr_i + \frac{\partial W}{\partial v_i}.dv_i) = \sum_{i=1}^{n} (\frac{\partial W}{\partial r_i}.dr_i + \frac{\partial_1 W}{\partial v_i}.dv_i + \frac{\partial_2 W}{\partial v_i}.dv_i) =$$

$$\sum_{i=1}^{n} \{\frac{\partial W}{\partial r_i}.dr_i + d(\frac{\partial_1 W}{\partial v_i}.v_i) - d(\frac{\partial_1 W}{\partial v_i}).v_i + \frac{W_i}{c^2} v_i.dv_{oi}\}, \qquad (6.11)$$

where $\partial_1 W/\partial v_i$ signifies that the differentiation is to be carried out on the velocities in the nominators of W, while $\partial_2 W/\partial v_i$ signifies that the differentiation is to be carried out on the velocities in the denominators of W. W_i is the part of the space-time energy in which the i-th particle takes part.

We have

$$\sum_{i=1}^{n} d(\frac{\partial_1 W}{\partial v_i}.v_i) = \sum_{i=1}^{n} dW_i = d\sum_{i=1}^{n} W_i = 2dW, \qquad (6.12)$$

so that formula (6.11) can be written as follows

$$dW = \sum_{i=1}^{n} \{-\frac{\partial W}{\partial r_i}.dr_i + d(\frac{\partial_1 W}{\partial v_i}).v_i - \frac{W_i}{c^2} v_i.dv_{oi}\}. \qquad (6.13)$$

Substituting equations (6.9), (6.10), and (6.13) into the fundamental equation (2.15) and dividing by dt, we obtain by the same resoning as in Sect. 6.1 the fundamental equations of motion in high-velocity gravimagretism

$$\frac{d}{dt}\{\frac{\partial(E^o + W)}{\partial v_i}\} + \frac{U_i - W_i}{c^2} u_{oi} = -\frac{\partial(U - W)}{\partial r_i}, \qquad i = 1,2,\ldots,n, \qquad (6.14)$$

which I call the <u>full Lagrange equations in gravimagretism</u>. I have written in (6.14) the partial derivative $\partial W/\partial v_i$ instead of $\partial_1 W/\partial v_i$ but the reader must never forget that

on the left side of (6.14) the partial derivative of W must be taken only with respect to the velocities v_i in the nominators of W.

The quantity

$$\tilde{F}_i = - \partial(U - W)/\partial r_i \qquad (6.15)$$

is called full potential force. The quantity $F_i = - \partial U/\partial r_i$ is called potential force and if more precision is needed Newtonian potential force.

The quantity

$$\tilde{f}_{oi} = (m + \frac{U_i - W_i}{c^2})u_{oi} + \frac{d}{dt}(\frac{\partial W}{\partial v_i}) = \tilde{m}u_{oi} + \frac{d}{dt}(\frac{\partial W}{\partial v_i}) = f_{oi} + \frac{d}{dt}(\frac{\partial W}{\partial v_i}) \qquad (6.16)$$

is called proper full kinetic force. The quantity f_{oi} is called proper kinetic force and if more precision is needed proper Newtonian kinetic force.

The quantity

$$\tilde{m} = m + (U_i - W_i)/c^2 \qquad (6.17)$$

is called the full mass and the mass m can be called with more precision Newtonian mass.

The full Newton equations are

$$\tilde{f}_{oi} = \tilde{F}_i, \qquad i = 1,2,\ldots,n. \qquad (6.18)$$

The full Newton's third law concerning the full potential forces which with two particles act one on another

$$\partial(U_{ij} - W_{ij})/\partial r_i = - \partial(U_{ij} - W_{ij})/\partial r_j, \quad \text{i.e.,} \quad F_i^j = - F_j^i, \qquad (6.19)$$

shows that these forces are equal and oppositely directed along the line connecting them. In Sect. 6.1 I showed that this is valid also for the Newtonian potential forces. The full Newton's third law concerning the full kinetic forces of two interacting particles

$$f_{oi} + (d/dt)(\partial W_{ij}/\partial v_i) = - \{f_{oj} + (d/dt)(\partial W_{ij}/\partial v_j)\} \qquad (6.20)$$

shows that these forces are also equal and oppositely directed. But it may be

$$f_{oi} \neq - f_{oj}, \qquad (6.21)$$

thus the Newtonian kinetic forces of two interacting particles in high-velocity physics may be not equal and oppositely directed. Hence at the availability of space-time energy the "Newtonian" Newton's third law is violated.

B. Electromagnetism

In electromagnetism the space energy is not velocity dependent and the space-time energy has not "velocity dependent denominators". Thus, it is easy to see that the full Lagrange equations in electromagnetism will have the form

$$\frac{d}{dt}\frac{\partial(E^o + W)}{\partial v_i} = -\frac{\partial(U - W)}{\partial r_i}, \qquad i = 1,2,\ldots,n. \tag{6.22}$$

Correspondingly the proper full kinetic force will have the form

$$\tilde{f}_{oi} = mu_{oi} + \frac{d}{dt}(\frac{\partial W}{\partial v_i}) = f_{oi} + \frac{d}{dt}(\frac{\partial W}{\partial v_i}), \tag{6.23}$$

and the notion "full mass" cannot be introduced, i.e., only the gravitational and magretic potential energies give an increase to the mass but the electric and magnetic energies do not. This is, as a matter of fact, the unique substantial difference in the mathematical apparatus of gravimagretism and electromagnetism.

Thus also in electromagnetism the "Newtonian" Newton's third law is violated and only the full Newton's third law holds good.

I carried out electromagnetis experiments[9,10] which showed violation of the Newtonian Newton's third law. This violation was demonstrated in a violation of the law of angular momentum conservation, as I succeeded to bring in rotation bodies only by the help of internal forces. Such self-rotating bodies were my Bul-Cub machine without stator and my Rotating Ampere Bridge with displacement current[9]. These experiments, especially the Rotating Ampere Bridge with displacement current showed that the momentum conservation law can also very easily be experimentally violated. A machine violating the momentum conservation law is the Propulsive Ampere Bridge with displacement current (the Flying Ampere Bridge) proposed by me[9]. The Rotating Ampere Bridge with sliding contacts constructed by me[10] showed that the above violations leed also to violation of the energy conservation law. So I constructed the R.A.F.- machine (Rotating Ampere bridge with sliding contatcs coupled with a cemented Faraday disk generator) which demonstrated how easily an electromagnetic perpetuum mobile can be constructed.

One may pose the question: how have I come to a violation of the energy conservation law when this law is a fundamental axiom in my electromagnetic theory (axiom IX)? The

answer is the following: My axiomatics concerns only the physics of particles. As in the physics of particles I assume the energy conservation law as a fundamental axiom, one can, of course, not violate this law in the physics of particles. But my experiments are done with solid bodies (pieces of metal) in which electric currents flow. Here the kinetic forces of the particles are transferred to the whole solid bodies and this is the reason that led to a violation of the energy conservation law in such experiments. Of course, the mathematical and logical analysis of the violation of the laws of conservation needs a much more profound experimental and theoretical research.

7. THE NEWTON-MARINOV EQUATION

Now I shall give another form of the full Lagrange (Newton) equations in gravimagretism.

Let us have a system of n masses m_i moving with velocities $\mathbf{v}_i$, whose distances from a given reference point are r_i. The quantities

$$\Phi = -\gamma \sum_{i=1}^{n} m_{oi}/r_i, \qquad \mathbf{A} = -\gamma \sum_{i=1}^{n} m_{oi}\mathbf{v}_i/cr_i \tag{7.1}$$

are called gravitational potential and magretic potential at the reference point.

If a material point (a particle) with mass m, called a test mass, crosses the reference point with a velocity $\mathbf{v}$, then the gravitational and magretic energies of the whole system of n+1 masses in which mass m takes part will be

$$U = m_o\Phi, \qquad W = m_o\mathbf{v}.\mathbf{A}/c. \tag{7.2}$$

In equations (6.14) we can write U_i, W_i instead of U, W, and e_i^o instead of E^o. Chosing then our test mass as the i-th particle in the system of n+1 particles, we can suppress the index "i" and so we obtain the equation of motion of our test mass in the form

$$\frac{m}{c^2}\{c^2 + \frac{\Phi - \mathbf{v}.\mathbf{A}/c}{(1 - v^2/c^2)^{1/2}}\}\mathbf{u}_o + \frac{m_o}{c}\frac{d\mathbf{A}}{dt} = -m_o\,\mathrm{grad}(\Phi - \mathbf{v}.\mathbf{A}/c). \tag{7.3}$$

This equation can be written also in the form

$$\{(1 - v^2/c^2)^{1/2} + \Phi/c^2 - \mathbf{v}.\mathbf{A}/c^3\}\mathbf{u}_o + d\mathbf{A}/cdt = -\,\mathrm{grad}(\Phi - \mathbf{v}.\mathbf{A}/c), \tag{7.4}$$

which is the equation of motion of a particle surrounded by a gravimagretic system of particles in which the mass of the particle does not take place at all.

The equation (7.4) represents the full Newton (Lagrange) equation in gravimagretism written with the help of the potentials and I call it the Newton-Marinov equation.

When deducing the Newton-Marinov equation I have supposed that the considered material system is isolated. But it is impossible to construct a gravitationally isolated system, as one cannot suppress the gravitational action of all celestial bodies. Looking at formula (7.3), it is logically to assume that the term c^2 in the nominator on its left side represents the gravitational potential generated by all celestial bodies at the reference point taken with a negative sign (let us assume **v** small, so that we can neglect the magretic energy with the celestial bodies), i.e.,

$$c^2 = - \Phi_w = \gamma \sum_{i=1}^{n} m_i/r_i , \qquad (7.5)$$

where n is the number of the particles in the world, or the number of the celestial bodies (in the last case m_i is the mass of the i-th celestial body). From this point of view the mystery of time energy disappears, as time energy represents nothing else than the negative gravitational energy of the particle with the mass of the whole world, i.e.,

$$m_o c^2 = - m_o \Phi_w . \qquad (7.6)$$

So we reduce the energy forms to two kinds - space energy and space-time energy, and it becomes clear that never the "volume" and the "materiality" of the particles can be established, as such "material points", i.e., drops of energy, do not exist. The time energy of any particle is its gravitational energy dispersed in the whole world. Thus, accepting the undefinable notions "space" and "time" as inuitively clear, the only enigmatic notion in physics remains the notion "space energy". (N.B. May be in this link of any particle with the whole universe is to be searched for the explanation of the paraphysical phenomena.)

Embracing this point of view, we can cancel the notion "time energy" in our axiomatics and operate only with the notions "space energy" and "space-time energy" (let me again emphasize that in the same manner we can cancel the notion "mass" and operate only with the notion "energy"). The notion "time energy" can be canceled from our axiomatics if we replace the sixth and ninth axioms by the follwoing ones:

AXIOM VI. The energy e_0 of any particle is its gravitational energy with the mass of the whole world, which we call world energy and denote by U_w, taken with a negative sign. The world energy of a unit mass which rests in absolute space is equal to $-c^2$ energy units. Thus the world energy of a mass m moving in absolue space is

$$U_w = - m_o c^2. \tag{7.7}$$

AXIOM IX. The change in time of the space and space-time energies of an isolated material system is equal to the change in time of its world energy, that is

$$dU + dW = dU_w. \tag{7.8}$$

So we see that the discussion of the problem about the equality of "inertial" and "gravitational" masses loses its sense, as "inertial mass" does not exist. The mass is only gravitational. Thus all costly experiments with which one seraches to establish whether there is a difference between the "inertial" and "gravitating" masses have been and continue to be a waste of time, efforts and money.

In the light of these conclusions the principle of equivalence in the formulation that the gravitational field in a small space domain can be replaced by a suitable non-inertially moving frame also loses its flavour. Let us note, however, that the equivalence principle in its "relativistic" formulation, according to which a gravitational acceleration cannot be experimentally distinguished from a kinematic acceleration is not true, as I have demonstrated it by the help of my accelerated "coupled-mirrors" experiment[3,5,11].

Let us now give the Newton-Marinov equation in another form, using the full mass $\tilde{m}$ in the expressions for the space and time momenta. We have

$$d\mathbf{A}/dt = \partial\mathbf{A}/\partial t + (\mathbf{v}.\mathrm{grad})\mathbf{A}, \tag{7.9}$$

where $(\partial\mathbf{A}/\partial t)dt$ is the change of **A** for a time dt at a given reference point, and $(\mathbf{v}.\mathrm{grad})\mathbf{A}$ is the change of **A** due to the motion of the mass m with velocity **v** during this time dt, i.e., due to the change of the reference point. Taking also into account the mathematical relation

$$\mathrm{grad}(\mathbf{v}.\mathbf{A}) = (\mathbf{v}.\mathrm{grad})\mathbf{A} + (\mathbf{A}.\mathrm{grad})\mathbf{v} + \mathbf{v}\times\mathrm{rot}\mathbf{A} + \mathbf{A}\times\mathrm{rot}\mathbf{v}, \tag{7.10}$$

under the condition **v** = **Const**, we can write the Newton-Marinov equation in the form

$$d\mathbf{p}_0/dt \equiv \mathbf{f}_0 = -m_0(\mathrm{grad}\Phi + \partial\mathbf{A}/c\partial t) + (m_0/c)\mathbf{v}\times\mathrm{rot}\mathbf{A}. \tag{7.11}$$

To this equation we always attach its scalar supplement which is obtained after the multiplication of both its sides by the velocity of the test mass

$$de_0/dt \equiv \mathbf{v}.\mathbf{f}_0 = -m_0\mathbf{v}.(\mathrm{grad}\Phi + \partial\mathbf{A}/c\partial t). \tag{7.12}$$

Introducing the quantities

$$\mathbf{G} = -\mathrm{grad}\Phi - \partial\mathbf{A}/c\partial t, \qquad \mathbf{B} = \mathrm{rot}\mathbf{A}, \tag{7.13}$$

called the gravitational intensity and magretic intensity, we can write the Newton-Marinov equation and its scalar supplement in the form

$$d\mathbf{p}_0/dt = m_0\mathbf{G} + (m_0/c)\mathbf{v}\times\mathbf{B}, \qquad de_0/dt = m_0\mathbf{v}.\mathbf{G}. \tag{7.14}$$

We can define the gravitational intensity also in the following way

$$\mathbf{G}' = -\mathrm{grad}\Phi - \partial\mathbf{A}/c\partial t + (\mathbf{v}/c)\times\mathrm{rot}\mathbf{A} \tag{7.15}$$

and to not introduce the notion magretic intensity at all. I show that if one will follow such a trend in electromagnetism many puzzles of conventional electromagnetism can easily be explained and that it is very easy then to show why the principle of relativity does not hold in electromagnetism[9,12].

Taking partial derivative with respect to time from the gravitational potential Φ (consider the distances r_i in the expression (7.1) as functions of time) and divergence from the magretic potential $\mathbf{A}$, we obtain the equation of potential connection

$$\mathrm{div}\mathbf{A} = -\partial\Phi/c\partial t, \tag{7.16}$$

which in conventional electromagnetism is wrongly called the "Lorentz gauge condition". Equation (7.16) is a lawful physical equation and not a "condition" which one can impose at will.

8. THE NEWTON-LORENTZ EQUATION

The full Newton equation in electromagnetism has the same form as the Newton-Marinov equation, however the mass in the proper space and time momenta is not the full mass of the particle but its Newtonian mass. I call it the Newton-Lorentz equation and I shall write it in a form analogical to (7.3)

$$m\mathbf{u}_0 + (q/c)d\mathbf{A}/dt = -q\mathrm{grad}(\Phi - \mathbf{v}.\mathbf{A}/c), \tag{8.1}$$

and in a form analogical to (7.11)

$$d\mathbf{p}_o/dt = - q(\mathrm{grad}\Phi + \partial\mathbf{A}/c\partial t) + (q/c)\mathbf{v}\times\mathrm{rot}\mathbf{A}, \qquad (8.2)$$

where q is the electric charge of a test mass m moving with a velocity v, and Φ, A are the electric and magnetic potentials of the surrounding system at the reference point crossed by the mass.

9. DIFFERENTIAL RELATION BETWEEN DENSITIES AND POTENTIALS

The mass and momentum densities of a system of particles at a reference point with radius vector $\mathbf{r}$ are the following quantities (these are the so-called δ-densities)

$$\mu(\mathbf{r}) = \sum_{i=1}^{n} m_i\delta(\mathbf{r} - \mathbf{r}_i), \qquad \boldsymbol{\pi}(\mathbf{r}) = \sum_{i=1}^{n} \mathbf{p}_i\delta(\mathbf{r} - \mathbf{r}_i), \qquad (9.1)$$

where $\mathbf{r}_i$ are the radius vectors of the single masses and $\delta(\mathbf{r}) = \delta(x)\delta(y)\delta(z)$ is the three-dimensional δ-function of Dirac.

9.1. The static and quasi-static cases

A system of particles is static if the particles do not move. The system is quasi-static if the particles can move but at any moment at any differentially small volume the same number of particles moving with the same velocity can be found.

First I shall prove the validity of the following mathematical relation

$$\Delta(1/r) = - 4\pi\delta(\mathbf{r}), \qquad (9.2)$$

where $\Delta = \partial^2/\partial x^2 + \partial^2/\partial y^2 + \partial^2/\partial z^2$ is the Laplace operator, and r is the distance between the origin of the frame and the reference point.

Indeed, putting into (9.2)

$$r = |\mathbf{r} - 0| = (x^2 + y^2 + z^2)^{1/2}, \qquad (9.3)$$

we obtain an identity. Only for r = 0 the left-hand side gives the uncertainly 0/0 and the right-hand side gives the uncertainty $\delta(0)$.

To establish whether relation (9.2) is valid also for r = 0, let us integrate (9.2) over an arbitrary sphere with radius R which has its center at the frame's origin. Using the Guass theorem, we shall obtain for the integral on the left-hand side

$$\int_V \Delta(1/r)dV = \int_V \mathrm{div}\{\mathrm{grad}(1/r)\}dV = \oint_S \mathrm{grad}(1/r).d\mathbf{S} = - \oint_S (1/r)dS = - (1/R^2)\oint_S dS = - 4\pi, \qquad (9.4)$$

where S is the surface of the sphere of integration whose volume is V and dS is the elementary area (taken as a vector) of the integrational surface whose direction always points outside from the volume enclosed. The integral on the right of (9.2) taken over the same arbitrary surface, on the grounds of the fundamental property of the δ-function, gives the same result. Since the integrals on both sides of (9.2) are equal and the domains of integration represent spheres with arbitrary radii, both integrands must be also equal. Thus the relation (9.2) is valid also for $r = 0$.

In the same way, or on the grounds of the first axiom for homogeneity and isotropy of space, we can prove the validity of the following relations

$$\Delta(1/|\mathbf{r} - \mathbf{r}_i|) = -4\pi\delta(\mathbf{r} - \mathbf{r}_i), \qquad i=1,2,\ldots,n, \tag{9.5}$$

where $\mathbf{r}_i$ are the radius vectors of n different space points.

Let us assume that $\mathbf{r}_i$ is the radius vector of a space point where a mass m_i is placed (static case) or where at any moment a mass m_i moving with a velocity $\mathbf{v}_i$ can be found (quasi-static case). Multiplying any of the equalities (9.5) by the corresponding mass m_i or momentum divided by c, $\mathbf{p}_i/c$, and suming, we obtain, after having taken into account (7.1) and (9.1), the following differential equations for the potentials in terms of the mass and momentum densities

$$\Delta\Phi = 4\pi\gamma\mu, \qquad \Delta\mathbf{A} = (4\pi/c)\gamma\boldsymbol{\pi}. \tag{9.6}$$

9.2 The dynamic case

The system of particles is dynamic if the particles can have arbitrary velocities.

Let us consider a point (calling it the i-point) which moves with a velocity $\mathbf{v}$ along the x-axis of a rest frame K, and at the initial zero moment crosses the origin of the frame. Let a moving frame K' be attached to this i-point, and let the transformation between K and K' be a special one (as are the transformations considered in Sect. 3). In such a case the radius vector of the i-point in K' will be $\mathbf{r}'_i = (0,0,0)$. If the radius vector of a reference point in frame K is $\mathbf{r} = (x,y,z)$, then, according to the Marinov transformation(3.3), the radius vector $\mathbf{r}'$ of the same reference point in the moving frame K' is given by

$$\mathbf{r}' = (x', y', z') = \left(\frac{x - vt}{(1 - v^2/c^2)^{1/2}}, y, z\right). \tag{9.7}$$

The distance between the i-th point and the reference point considered in frame K' but expressed by the coordinates in frame K will be

$$r_o = |\mathbf{r}' - \mathbf{r}'_i| = |\mathbf{r} - \mathbf{r}_i|_o = \{\frac{(x - vt)^2 + (1 - v^2/c^2)(y^2 + z^2)}{1 - v^2/c^2}\}^{1/2}. \quad (9.8)$$

This distance considered in frame K and expressed by the coordinates in frame K will be

$$r = |\mathbf{r} - \mathbf{r}_i| = \{(x - vt)^2 + y^2 + z^2\}^{1/2}. \quad (9.9)$$

I call r the universal distance and r_o the proper distance[3,5,8]. The difference between these two distances is due to the aether-Marinov character of light propagation. I repeat, this has nothing to do with a physical length contraction (the so-called "Lorentz contraction"). As a matter of fact, here we are considering the distance between two points moving with respect to one another which cannot be connected by a rigid rod, and thus it is meaningless to speak about a contraction of such a "rod". On the other hand, the situation in the frames K and K' is entirely symmetric: in frame K the i-point is moving and the reference point is at rest, meanwhile in frame K' the i-point is at rest and the reference point is moving. I wish that the reader understands once for ever that the Marinov transformation (as well as the Lorentz transformation) serve only for the introduction of the aether-Marinov character of light propagation into the mathematical apparatus of high-velocity physics. The aether-Marinov character of light propagation is incompatible with the classical conceptions for motion of a particle which, I repeat, lead to the aether-Newtonian character of light propagation (cf. formulas (1.1) and (1.2) once more!). The aether-Marinov "abnormality" in the motion of the photons (this "abnormality" exists also in the motion of the particles with non-zero rest mass[5]) leads to the mathematically contradicting equations (9.8) and (9.9) which describe the same physical distance.

Now easily can be established the validity of the following mathematical relation

$$\Box(1/r_o) = - 4\pi\delta(\mathbf{r} - \mathbf{r}_i), \quad (9.10)$$

where $\Box$ is the d'Alembert operator.

Indeed, using in (9.10) the expression (9.8) we obtain an identity. Only for $r_0 = 0$, i.e., for $x - vt = y = z = 0$, the left-hand side gives the uncertainty 0/0 and the right-hand side gives the uncertainly (0).

To establish whether relation (9.10) is valid also for $r_0 = 0$, let us integrate (9.10) over an arbitrary sphere with radius R which has its center at the i-point (thus this sphere is moving along the x-axis of frame K with the velocity v)

$$\int_V \Box(1/r_0)\, dV = -4\pi \int_V \delta(\mathbf{r} - \mathbf{r}_i)\, dV. \tag{9.11}$$

For all points of volume V the integrand on the left-hand side is equal to zero. Thus we can spread the integral over a small domain around the point with coordinates given by $x - vt = y = z = 0$, i.e., about the i-point which is also the origin of frame K'. But as $r_0 \to 0$, we obtain $1/r_0 \to \infty$, and the derivatives with respect to x, y, z will increase much faster than the derivative with respect to t. Hence the latter can be neglected with respect to the former. So we reduce the integral on the left-hand side of (9.11) to the integral (9.4). The integral on the right-hand side of (9.11), on the grounds of the fundamental property of the δ-function gives the same result, and, as in Sect. 9.1, we conclude that the integrands must be equal. Thus the relation (9.10) is valid also for the i-point.

In the same manner as in Sect. 9.1, we can obtain from (9.10) the following relations between potentials and densities for the most general dynamic case

$$\Box \Phi = 4\pi\gamma\mu(t), \qquad \Box \mathbf{A} = (4\pi/c)\gamma\boldsymbol{\pi}(t), \tag{9.12}$$

where the mass and momentum densities $\mu(t)$ and $\boldsymbol{\pi}(t)$ can be funtions of time.

In electromagnetism the formulas analogical to (9.6) and (9.12) will be

$$\Delta\Phi = -4\pi Q, \qquad \Delta\mathbf{A} = -(4\pi/c)\mathbf{J}, \tag{9.13}$$

$$\Box\Phi = -4\pi Q(t), \qquad \Box\mathbf{A} = -(4\pi/c)\mathbf{J}(t), \tag{9.14}$$

where Q and $\mathbf{J}$ are the charge and current densities which in formulas (9.13) are functions only of the coordinates of the "charged" points, and in formulas (9.14) also of time.

10. INTEGRAL RELATIONS BETWEEN DENSITIES AND POTENTIALS

10.1. The static and quasi-static cases

Substituting formulas (9.1) into the definition equalities for the potentials (7.1), we obtain the integral relation between the gravitational and magretic potentials and the mass and momentum densities for a static and quasi-static system of particles

$$\Phi = -\gamma\int_V(\mu/r)dV, \qquad \mathbf{A} = -\gamma\int_V(\boldsymbol{\pi}/cr)dV, \tag{10.1}$$

where μ and $\boldsymbol{\pi}$ are the mass and momentum densities in the volume dV. These equations are to be considered also as solutions of the differential equations (9.6).

10.2 The dynamic case

The integral relations between densities and potentials for the general dynamic system are to be obtained by solving equations (9.12). I showed[5] that the solution of equations (9.12) leads to the following integral relations between densities and potentials

$$\Phi(\mathbf{r}_0,t) = -\frac{\gamma}{2}\int_V\frac{1}{r}\{\mu(\mathbf{r},t-\tfrac{r}{c}) + \mu(\mathbf{r},t+\tfrac{r}{c})\}dV, \quad \mathbf{A}(\mathbf{r}_0,t) = -\frac{\gamma}{2}\int_V\frac{1}{r}\{\mu(\mathbf{r},\ t-\tfrac{r}{c}) + \mu(\mathbf{r},t+\tfrac{r}{c})\}dV, \tag{10.2}$$

where $\Phi(\mathbf{r}_0,t)$ and $\mathbf{A}(\mathbf{r}_0,t)$ are the potentials at the reference point with radius vector $\mathbf{r}_0$ at the moment t and the integral is spread over the whole space or over the volume V in which there are particles of the system.

I call the potentials (giving for brevity only the formulas for the gravitational potential)

$$\Phi' = -\gamma\int_V\frac{\mu(t-r/c)}{r}\,dV, \qquad \Phi'' = -\gamma\int_V\frac{\mu(t+r/c)}{r}\,dV, \tag{10.3}$$

respectively, advanced and retarded potentials. Conventional physics calls wrongly Φ' "retarded" and Φ'' "advanced" potentials. Indeed Φ' is the potential at the moment $t' = t - r/c$ which is before the observation moment t and thus it is an advanced moment, while Φ'' is the potential at the moment $t'' = t + r/c$ which follows after the observation moment t and thus it is a retarded moment. Conventional physics makes the mixing, as it supposes that the "interaction" propagates with the velocity c and it assumes that Φ' is the potential at the moment of observation, i.e., a "retarded potential" and it leaves without attention the other solution Φ'' of the equations (9.12).

The potentials must be given as half-sums of the advanced and retarded potentials as an observer at the reference point can obtain information only about the the advanced and retarded values in the following two ways: 1) either, at the advanced moments $t'_i = t - r_i/c$, messengers will start from any volume dV_i and, moving with the highest possible velocity c, will bring the information about the mass and momentum densities in dV_i to the observer at the reference point, 2) or, at the observation moment t, messengers will start from the reference point and moving with the velocity c will reach every of the volumes dV_i at the respective retarded moment $t''_i = t + r_i/c$ to see which are there the mass and momentum densities. Obviously the densities at the moment of observation will be the half-sums of the advanced and retarded densities.

If in the volume dV_i the charges move with accelerations, they will radiate energy in the form of gravimagretic waves which will propagate in space with the velocity of light. In Ref. 5 - see also the following paper - I show that a mass moving with acceleration generates, besides the "momentary" fields of gravitational and magretic intensities, two other fields: the one propagates with the velocity c away from the mass carrying with itself momentum and energy, and the other acts directly on the mass. I call the "momentary" field due to the masses and their velocities potential field, the field carrying away energy and momentum radiation field, and the "field" acting on the radiating mass, braking its motion, so that the lost kinetic energy should compensate the radiated energy radiation reaction field. The mathematics leads to all these three fields. And all these three fields have been observed in electromagnetism exactly as the mathematics applied to the Newton-Lorentz equation prescribes them.

If we wish to know what gravimagretic energy reaches the reference point at the moment of observation t in the form of gravimagretic waves, we have to use for the calculation not the observation potential (which gives the potential field) but the advanced potential because the radiated energy needs the time r_i/c to come from the volume dV_i to the reference point.

Conventional physics, or, better to say, the majority of the conventional physicists, think that not only the radiated energy propagates with the velocity c but also the potentials propagate with the same velocity and introduce the notion "propagation of

of interaction". Following this trend, they calculate also the potential field by the help of the advanced (in their language, retarded) potential. This is wrong, as one is able to observe only the propagation of energy, i.e., the transfer of mass. An immaterial "interaction" cannot be observed and it is senseless to narrate that such an interaction, like a ghost, can propagate. The wrong treatment of the problem leads to the result that the conventional physicists are unable to calculate the radiation reaction field proceeding directly from the potentials. Their wrong calculations lead to the phantasmagoric self-accelerating solutions[5].

11. LIENARD-WIECHERT FORMS OF THE POTENTIALS

If we should put into the first formula (1.1) $c' = r/\Delta t$, $c = r'/\Delta t$, considering r' as the distance, at the moment of emission of a photon, between a light source moving with a velocity $\mathbf{v}$ and an observer at rest in absolute space, and r as the same distance at the moment of reception of the photon, the following relation between these two distances can be obtained

$$r = r'\left[\{1 - (\mathbf{n}'\times\mathbf{v}/c)^2\}^{1/2} - \mathbf{n}'.\mathbf{v}/c\right], \qquad (11.1)$$

where $\mathbf{n}'$ is the unit vector pointing from the source to the observer at the moment of reception. This is the aether-Newtonian relation between the advanced (emission) distance, r', and the observation (reception) distance, r, involving the observation (reception) angle between the source-observer line and the velocity of the source.

If we should put into the first formula (1.1) $c' = r/\Delta t$, $c = r''/\Delta t$, considering r as the distance at the moment of emission and r'' as the distance at the moment of reception, the following relation between these two distances can be obtained

$$r = r''\left[\{1 - (\mathbf{n}''\times\mathbf{v}/c)^2\}^{1/2} + \mathbf{n}''.\mathbf{v}/c\right], \qquad (11.2)$$

where $\mathbf{n}''$ is the unit vector pointing from the source to the observer at the moment of emission. This is the aether-Newtonian relation between the observation (emission) distance, r, and the retarded (reception) distance, r'', involving again the observation (emission) angle between the source-observer line and the velocity of the source.

The aether-Marinov character of light propagation leads to slightly different (within terms of second order in v/c) relations between the above distances.

Indeed, putting into formula (2.3) $c_0' = r'/\Delta t$, $c = r/\Delta t$ and considering $\cos\theta' = -\mathbf{n}'.\mathbf{v}/v$ as the angle betweem the source-observer line and the velocity of the source at the moment of reception, we obtain the following relation between the advanced (emission) distance, r', and the observation (reception) distance, r,

$$r = r'(1 - \mathbf{n}'.\mathbf{v}/c). \tag{11.3}$$

Analogically, putting into formula (2.3) $c_0' = r''/\Delta t$, $c = r/\Delta t$ and considering $\cos\theta' = \mathbf{n}''.\mathbf{v}/v$ as the angle between the source-observer line and the velocity of the source at the moment of emission, we obtain the following relation between the observation (emission) distance, r, and the retarded (reception) distance, r",

$$r = r''(1 + \mathbf{n}''.\mathbf{v}/c). \tag{11.4}$$

Let us now consider a system of particles consisting of only one particle with mass m. Putting formulas (11.3) and (11.4) into the formulas (7.1), we obtain the so-called Lienard-Wiechert forms of the potentials

$$\Phi = -\gamma\frac{m_0}{r'(1 - \mathbf{n}'.\mathbf{v}/c)} = -\gamma\frac{m_0}{r''(1 + \mathbf{n}''.\mathbf{v}/c)}, \quad \mathbf{A} = -\gamma\frac{m_0\,\mathbf{v}}{cr'(1 - \mathbf{n}'.\mathbf{v}/c)} = -\gamma\frac{m_0\,\mathbf{v}}{cr''(1 + \mathbf{n}''.\mathbf{v}/c)}. \tag{11.5}$$

It is extremely important to note that $\mathbf{v}$, especially in the nominator of $\mathbf{A}$, is the observation velocity of mass m and not its advanced velocity $\mathbf{v}'$, as conventional physics assumes, considering only the left parts of these equations and calling them entirely wrongly "retarded" potentials. It must be absolutely clear that Φ and $\mathbf{A}$ in formulas (11.5) are the observation potentials. By considering in the nominators of $\mathbf{A}$ $\mathbf{v} = \mathbf{v}' + \mathbf{u}'(t' - t) = \mathbf{v}'' - \mathbf{u}''(t - t'')$, where $\mathbf{v}'$, $\mathbf{v}''$ and $\mathbf{u}'$, $\mathbf{u}''$ are the advanced and retarded velocities and acclerations, I could deduce the radiation reaction field directly from the potentials working with the most simple and rigorous mathematical apparatus[5] (see also the following paper).

12. THE MAXWELL-MARINOV EQUATIONS

Taking rotation from both sides of the first equation (7.13) and divergence from both sides of the second equation (7.13), and making use of the mathematical identities

$$\mathrm{rot}(\mathrm{grad}\Phi) = 0, \qquad \mathrm{div}(\mathrm{rot}\mathbf{A}) = 0, \tag{12.1}$$

we obtain the first pair of the Maxwell-Marinov equations

$$\mathrm{rot}\mathbf{G} = -\partial\mathbf{B}/c\partial t, \qquad \mathrm{div}\mathbf{B} = 0. \tag{12.2}$$

Let us now take partial derivatives with respect to time from both sides of the first equation (7.13), dividing it by c,

$$\partial\mathbf{G}/c\partial t = -(1/c)\mathrm{grad}(\partial\Phi/\partial t) - (1/c^2)\partial^2\mathbf{A}/\partial t^2. \tag{12.3}$$

Write the second of equations (9.12) in the form

$$-(1/c^2)\partial^2\mathbf{A}/\partial t^2 = -\Delta\mathbf{A} + (4\pi/c)\gamma\boldsymbol{\pi} \tag{12.4}$$

and put here the mathematical identity

$$\Delta\mathbf{A} = \mathrm{grad}(\mathrm{div}\mathbf{A}) - \mathrm{rot}(\mathrm{rot}\mathbf{A}). \tag{12.5}$$

Substituting (12.5) into (12.4) and taking into account (7.16) and (7.18), we obtain

$$\mathrm{rot}\mathbf{B} = (1/c)\partial\mathbf{G}/\partial t - (4\pi/c)\gamma\boldsymbol{\pi}. \tag{12.6}$$

Let us finally take divergence from both sides of the first equation (7.13)

$$\mathrm{div}\mathbf{G} = -\Delta\Phi - (1/c)\partial(\mathrm{div}\mathbf{A})/c\,\partial t. \tag{12.7}$$

Write the first equation (9.12) in the form

$$\Delta\Phi = (1/c^2)\partial^2\Phi/\partial t^2 + 4\pi\gamma\mu. \tag{12.8}$$

Putting (12.8) into (12.7) and taking into account (7.16), we obtain

$$\mathrm{div}\mathbf{G} = -4\pi\gamma\mu. \tag{12.9}$$

Equations (12.6) and (12.9) represent the second pair of the Maxwell-Marinov equations.

13. THE MAXWELL-LORENTZ EQUATIONS

The analogues to the Maxwell-Marinov equations in electromagnetism are the famous Maxwell-Lorentz equations. Here are the first and second pair of the Maxwell-Lorentz equations

$$\mathrm{rot}\mathbf{E} = -(1/c)\partial\mathbf{B}/\partial t, \qquad \mathrm{div}\mathbf{B} = 0, \tag{13.1}$$

$$\mathrm{rot}\mathbf{B} = (1/c)\partial\mathbf{E}/\partial t + (4\pi/c)\mathbf{J}, \qquad \mathrm{div}\mathbf{E} = 4\pi Q. \tag{13.2}$$

14. ENERGY DENSITY AND ENERGY FLUX DENSITY

This topic will be considered only in the domain of electromagnetism.

Let us multiply equation (13.1) by **B**, equation (13.2) by **E**, and then subtract the first from the second

$$\frac{\mathbf{E}}{c}\cdot\frac{\partial \mathbf{E}}{\partial t} + \frac{\mathbf{B}}{c}\cdot\frac{\partial \mathbf{B}}{\partial t} + \frac{4\pi}{c}\,\mathbf{J}.\mathbf{E} + \mathbf{B}.\mathrm{rot}\mathbf{E} - \mathbf{E}.\mathrm{rot}\mathbf{B} = 0. \tag{14.1}$$

Using the mathematical relation

$$\mathrm{div}(\mathbf{E}\times\mathbf{B}) = \mathbf{B}.\mathrm{rot}\mathbf{E} - \mathbf{E}.\mathrm{rot}\mathbf{B}, \tag{14.2}$$

we can write (14.1) in the form

$$\frac{\partial}{\partial t}\,\frac{E^2 + B^2}{8\pi} + \mathbf{J}.\mathbf{E} + \frac{c}{4\pi}\,\mathrm{div}(\mathbf{E}\times\mathbf{B}) = 0. \tag{14.3}$$

Let us now integrate this equation over an arbitrary volume V containing our electrodynamic system (i.e., containing all its particles) and use the Gauss' theorem for the last term

$$\frac{\partial}{\partial t}\int_V \frac{E^2 + B^2}{8\pi}\,dV + \int_V \mathbf{J}.\mathbf{E}\,dV + \oint_S c\,\frac{\mathbf{E}\times\mathbf{B}}{4\pi}.d\mathbf{S} = 0, \tag{14.4}$$

where the last integral is spread over the surface S of the volume V.

Taking into account the second equation (9.1), where under the momentum density $\boldsymbol{\pi}$ we have to mean the current density $\mathbf{J}$ and under the space momentum $\mathbf{p}_i = m_i\mathbf{v}_i$ of the i-th particle its space current $\mathbf{j}_i = q_i\mathbf{v}_i$, we can write

$$\int_V \mathbf{J}.\mathbf{E}\,dV = \sum_{i=1}^{n} q_i\mathbf{v}_i.\mathbf{E}, \tag{14.5}$$

where n is the number of the charges in the system.

Putting this into (14.4) and taking into account also equation (7.12) where under the proper mass m_o we have to mean the electric charge q and under the gravitational intensity $\mathbf{G}$ (see eq. (7.13)) the electric intensity E, we obtain

$$\frac{\partial}{\partial t}\int_V \frac{E^2 + B^2}{8\pi}\,dV + \frac{d}{dt}\sum_{i=1}^{n} e_{oi} + \frac{c}{4\pi}\int_S (\mathbf{E}\times\mathbf{B}).d\mathbf{S} = 0. \tag{14.6}$$

If we consider the integral on the right side as time (kinetic) energy, then, having in mind the energy conservation law (2.15), we have to assume that the corresponding "particles" move with the velocity c away from the volume V (if our system is isolated) and that in a unit of time the energy

$$\mathbf{I} = \frac{c}{4\pi}\,\mathbf{E}\times\mathbf{B} \tag{14.7}$$

crosses a unit surface placed at right angles to I, which is called <u>intensity of the (electromagnetic) energy flux</u>. The quantity $\mathbf{S} = (1/4\pi)\mathbf{E}\times\mathbf{B}$ is the density of this energy

(at a snap shot) and is called the Poynting vector.

It turns out (see the next paper) that **E** and **B** in the last term of (14.6) are to be considered as the electric and magnetic intensities radiated by the charges of the system and thus are to be denoted by $\mathbf{E}_{rad}$, $\mathbf{B}_{rad}$. Then E and B in the first term of (14.6) are to be considered (very cautiously!) as the potential electric and magnetic intensities generated by the charges of the system and are to be denoted by E_{pot}, B_{pot}. I have undersigned the words "very cautiously" as the electric and magnetic potential intensities become infinitely large at the points where the charges are located and thus the integral on the left side becomes improper. On the other hand, the radiated electromagnetic energy is a real energetic field continuously carrying away energy and its oriented density (the Poynting vector $\mathbf{S} = (1/4\pi)\mathbf{E}_{rad}\times\mathbf{B}_{rad}$) is a physical quantity, while the density of the potential electric and magnetic fields $\bar{S} = (E^2_{pot} + B^2_{pot})/8\pi$ is only in our heads, as in the vacuum between charges which do not radiate there is nothing, and the potential electric and magnetic energies are always related to two charges.

Considering the potential electric and magnetic intensity fields as physical realities conventional physics brought into the physical theory a terrible mess.

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RADIATION OF ELECTROMAGNETIC WAVES

Stefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Graz, Austria

ABSTRACT. I present the mathematical fundamentals of radiation of electromagnetic energy (called generally "radiation of electromagnetic waves" or "radiation of photons"), considering the radiation of a single charge moving with acceleration. I show that the calculation must be done with the observation electric and magnetic potentials where the observation elements of motion are presented either by the advanced or by the retarded elements, taking into account the aether-Marinov character of light propagation, i.e., working with the Lienard-Wiechert forms of the potentials. At this approach I obtain straightforwardly the potential, radiation, and radiation reaction fields. Conventional electromagnetism proceeding from the wrong forms of the potentials (which are partly observation and partly advanced) cannot obtain the radiation reaction field straightforwardly and must introduce the radiation reaction intensities artificially what leads to the fallacious self-accelerating solutions. I show that the potential electric and magnetic intensities "propagate" momentarily in space, while the radiation intensities (which are always perpendicular one to another) propagate with the velocity c. Under this aspect, I show how has one to proceed when calculating the potential and radiation fields at dipole radiation. I point out to an easy experiment which confirms my "far-interaction" concepts.

1. INTRODUCTION

In the preceding paper[1], I presented the axiomatics and the fundamental equations in gravimagretism and electromagnetism in dependence on the space and space-time parameters of the particles (i.e., their masses, respectively, charges, and momenta, respectively, space currents) and the distances between them. In this paper I shall consider the phenomena which appear when the particles move with acceleration. I shall work only in the domain of electromagnetism. The motion of the electric charges with acceleration leads to the phenomenon radiation of electromagnetic energy. This energy leaves the charge moving with acceleration and propagates away from it to infinity. The same phenomena must be expected to appear when masses move with acceleration. I shall show, however, that the radiated gravitational and magretic intensities

are so feeble that their detection is highly improbable.

As in my classical axiomatics I imagine matter only in the form of particles, I shall accept that also the electromagnetic energy is radiated in the form of particles which I call photons. Of course, for these particles the characteristics imposed by the third axiom must be taken into account[1].

2. THE ELECTRIC AND MAGNETIC INTENSITY FIELDS OF AN ACCELERATED CHARGE

To obtain the electric and magnetic intensities generated by a particle moving with acceleration, we have to put in the definition equalities for the electric and magnetic intensities (see formulas (7.13) in Ref. 1)

$$\mathbf{E} = -\operatorname{grad}\Phi - \partial\mathbf{A}/c\partial t, \qquad \mathbf{B} = \operatorname{rot}\mathbf{A} \tag{2.1}$$

the electric and magnetic potentials of the particle (see formulas (7.1) in Ref. 1)

$$\Phi = q/r, \qquad \mathbf{A} = q\mathbf{v}/cr. \tag{2.2}$$

However, as information can be not transferred momentarily, the observation electric and magnetic potentials are to be expressed through the advanced and retarded elements of motion (distances, velocities, accelerations), which are the most near to the observation elements if the information propagates with the velocity of light c.

In Fig. 1 the reference point P, for which we wish to know the electric and magnetic intensities, is taken at the frame's origin. The charge q generating the intensities is drawn moving with a constant velocity $\mathbf{v}$, but we shall assume that this velocity is not constant, i.e., that the charge moves with acceleration.

Let us suppose that for the moment, t, for which we wish to know the intensities, and which I call the moment of observation, the charge is at the point Q, called observation position. Information about the charge's velocity, $\mathbf{v}'$, and acceleration, $\mathbf{u}'$, can be obtained at P for the advanced moment $t' = t - r'/c$, if at t' a signal moving with a velocity c will be sent from the advanced position Q' towards P, or for the retarded moment $t'' = t + r''/c$, if at t a signal moving with the velocity c will be sent from P to the retarded position Q" (this second case, as a matter of fact, is to be interpreted in the way that information about the retarded velocity, $\mathbf{v}''$, and acceleration, $\mathbf{u}''$, can be obtained at P for the retarded moment $t'' = t + r''/c$, if at t'' a signal moving with a

velocity c back in time will be sent from the retarded position Q" towards P). The distances r', r, and r" are called, respectively, advanced, observation, and retarded distances, and the angles θ', θ, θ" between the charge's velocoty **v** and the "charge - reference point" line (whose unit vectors are **n'**, **n**, **n"**), respectively, advanced, observation, and retarded angles.

Conventional physics, proceeding from the wrong concept that the electromagnetic interactions "propagate" with the velocity c, calls all topsyturvy, i.e., conventional physics calls the advanced elements "retarded" and the retarded elements (to which it does not pay much attention) "advanced". I shall use only my terminology.

First I shall make the calculation when the observation elements are presented with the advanced elements and then with the retarded ones. As the character of light propagation is not aether-Newtonian but aether-Marinov, the potentials must be taken in their Lienard-Wiechert forms (see formulas (11.5) in Ref. 1).

A. Calculation with the advanced elements of motion

The observation Lienerd-Wiechert potentials expressed through the advanced elements are

$$\Phi = \frac{q}{r'(1 - \mathbf{n}'.\mathbf{v}/c)}, \qquad \mathbf{A} = \frac{q\mathbf{v}}{cr'(1 - \mathbf{n}'.\mathbf{v}/c)}. \tag{2.3}$$

The velocity in the denominator is a certain middle velocity between the advanced velocity **v'** and the observation velocity **v**, so that moving with this velocity in the time $t - t' = r'/c$, the charge covers the distance $\overline{QQ}$. As this velocity appears only in corrective terms, we can take for it the advanced as well as the observation velocity. The velocity in the nominator of **A** is the observation velocity

$$\mathbf{v} = \mathbf{v}' + \mathbf{u}r'/c, \tag{2.4}$$

where **u** is some middle acceleration between the advanced acceleration **u'** and the observation acceleration **u**. To be able to carry out the calculations, we must have the same symbol for **v** in the nominator and denominator of **A**. Then, after having done the differentiations, we shall substitute v in all corrective terms by v' and in the non-corrective terms according to the relation (2.4). The same shall we do with the acceleration which will appear after taking time derivative from the velocity. As we shall see,

the velocity will appear in the final result only in corrective terms and the acceleration only in non-corrective (substantial) terms. Thus the substitution which we have to do in the final result will be

$$\mathbf{v} = \mathbf{v}', \qquad \mathbf{u} = \mathbf{u}' + \mathbf{w}'r'/c, \tag{2.5}$$

where $\mathbf{w}'$ is the advanced super-acceleration of the charge.

I should like to note that conventional physics (see, for example, Ref. 2) considers the necessity to introduce the advanced quantities as a result of the hypothesis (never proved experimentally) about the "propagation of interaction". Conventional physics asserts that if one wishes to know which are the electric and magnetic intensities at the reference point P at the observation moment t, then in formulas (2.1) one has to put the values of the potentials at the advanced moment $t' = t - r'/c$. Conventional physics calls these potentials "advanced" (as a matter of fact - see the remark above - it calls them "retarded") and writes them, for the case when one works with the charge and current densities, by formulas (10.3) in Ref. 1. In my theory[1,3] the value of the potential at the observation moment is given not by the advanced potential but by the half sum of the advanced and retarded potentials.

Let see now what shall we have when there is only one charge and we cannot work with a constant distance to a certain volume and with the charge and current densities in that volume. Conventional physics asserts that in this case the advanced potentials will be given by formulas (2.3) where $\mathbf{v}$ must be substituted by $\mathbf{v}'$. Such potentials, however, are neither advanced nor observation, as the advanced potentials will be

$$\Phi' = q/r', \qquad \mathbf{A}' = q\mathbf{v}'/cr', \tag{2.6}$$

and the observation potentials

$$\Phi = q/r, \qquad \mathbf{A} = q\mathbf{v}/cr, \tag{2.7}$$

if expressed through the advanced elements of motion, are to be written in the form (2.3) where $\mathbf{v}$ in the nominator of $\mathbf{A}$ is to be presented according to (2.4) through the advanced velocity and acceleration (as already said $\mathbf{v}$ in the denominators of Φ and $\mathbf{A}$ is neither the advanced nor the observation velocity of the charge but some middle velocity). Thus conventional physics works[2] with some "hybrid" potentials which are neither advanced nor observation and for this reason it cannot obtain the

radiation reaction intensity straightforwardly, as I do it in my theory considering **v** in the nominator of **A** as the observation velocity, so that Φ and **A** in (2.3) are the observation potentials.

Why must we, however, express the observation elements of motion in (2.3) - the charge-observer distance and the charge's velocity - through the advanced ones? The reason is not the hypothetical "propagation of interaction". Above I noticed that as the quickest "information link" can be established by the help of light signals, one cannot calculate the intensities of a moving charge taking its position, velocity and acceleration at this very moment because there is no way to know them. At the reference point one can have information only about the advanced elements of motion. But maybe the actual reason is the following one: as the radiated energy propagates with the velocity of light, then to calculate the radiated intensities at the reference point at the observation moment, one must operate with the advanced elements of motion. Thus we are impelled to express the observation elements of motion in (2.3) by the advanced ones in order to obtain then right values for the radiated intensities. The problem is pretty controversial and categarically clear answer cannot be given.

Let us now do the calculations.

In formulas (2.1) we must differentiate Φ and **A** with respect to the coordinates x, y, z of the reference point and the time t of observation. But in the relations (2.3) the potentials are given as functions of t' and only through the relation

$$r' = c(t - t') \tag{2.8}$$

as composite functions of t. Now I shall write several relations which will be then used for the calculation of the composite derivatives.

Having in mind the first relation (2.5), we write

$$\mathbf{v} \cong \mathbf{v}' = -\frac{\partial \mathbf{r}'}{\partial t'}, \tag{2.9}$$

where $\mathbf{r}'$ is the vector of the advanced distance pointing from the charge to the reference point.

Differentiating the equality $r'^2 = \mathbf{r}'^2$ with respect to t', we obtain

$$r' \frac{\partial r'}{\partial t'} = \mathbf{r}' \cdot \frac{\partial \mathbf{r}'}{\partial t'}, \tag{2.10}$$

and using here (2.9), we find

$$\frac{\partial r'}{\partial t'} = - \mathbf{n}'.\mathbf{v}. \tag{2.11}$$

Differentiating (2.8) with respect to t and considering r' as a direct function of t', we find

$$\frac{\partial r'}{\partial t'}\frac{\partial t'}{\partial t} = c(1 - \frac{\partial t'}{\partial t}); \tag{2.12}$$

putting here (2.11), we obtain

$$\frac{\partial t'}{\partial t} = \frac{1}{1 - \mathbf{n}'.\mathbf{v}/c}. \tag{2.13}$$

Similarly, differentiating relation (2.8) with respect to **r** and taking into account that t is the independent variable, we obtain

$$\frac{\partial r'}{\partial r'}\frac{\partial r'}{\partial \mathbf{r}} + \frac{\partial r'}{\partial t'}\frac{\partial t'}{\partial \mathbf{r}} = - c \frac{\partial t'}{\partial \mathbf{r}}; \tag{2.14}$$

putting here (2.11), we obtain

$$\frac{\partial t'}{\partial \mathbf{r}} = - \frac{\mathbf{n}'}{c(1 - \mathbf{n}'.\mathbf{v}/c)}. \tag{2.15}$$

Finally we find the following relation (which will be used only for the calculation of B)

$$\frac{\partial}{\partial \mathbf{r}}(r' - \frac{\mathbf{r}'.\mathbf{v}}{c}) = \frac{\partial}{\partial r'}(r' - \frac{\mathbf{r}'.\mathbf{v}}{c}) + \frac{\partial}{\partial t'}(r' - \frac{\mathbf{r}'.\mathbf{v}}{c})\frac{\partial t'}{\partial \mathbf{r}} =$$

$$\mathbf{n}' - \frac{\mathbf{v}}{c} + (\mathbf{n}'.\mathbf{v} - \frac{v^2}{c} + \frac{\mathbf{r}'.\mathbf{u}}{c})\frac{\mathbf{n}'}{c(1 - \mathbf{n}'.\mathbf{v}/c)} = - \frac{\mathbf{v}}{c} + (c - \frac{v^2}{c} + \frac{\mathbf{r}'.\mathbf{u}}{c})\frac{\mathbf{n}'}{c(1 - \mathbf{n}'.\mathbf{v}/c)}. \tag{2.16}$$

xxxxx

Thus the electric intensity is to be calculated according to the formula (see (2.1))

$$\mathbf{E} = - \frac{\partial \Phi}{\partial \mathbf{r}} - \frac{1}{c}\frac{\partial \mathbf{A}}{\partial t} = - \frac{\partial \Phi}{\partial \mathbf{r}'} - \frac{\partial \Phi}{\partial t'}\frac{\partial t'}{\partial r} - \frac{1}{c}\frac{\partial \mathbf{A}}{\partial t'}\frac{\partial t'}{\partial t}. \tag{2.17}$$

If we substitute here the expressions (2.3) and take into account the relations (2.13) and (2.15), after some manipulations, the following final result can be obtained

$$\mathbf{E} = q \frac{1 - v^2/c^2}{(r' - \mathbf{r}'.\mathbf{v}/c)^3}(\mathbf{r}' - \frac{\mathbf{r}'}{c}\mathbf{v}) + \frac{q\mathbf{r}'\times\{(\mathbf{r}' - \mathbf{r}'\mathbf{v}/c)\times\mathbf{u}\}}{c^2(r' - \mathbf{r}'.\mathbf{v}/c)^3}, \tag{2.18}$$

where, according to (2.5), **v** is to be replaced by **v'**, as it appears only in corrective terms, and **u** is to be replaced by **u'** + **w'r'**/c, as it appears in non-corrective terms. One can easily check the equality of formulas (2.17) and (2.18) by reducing the first

and the second to common denominators and by resolving all products to sums of single terms; then, after canceling mutually some terms in the nominator of formula (2.17), one sees that the remaining terms are equal to the terms in the nominator of formula (2.18).

Remembering the mathematical relation for rotation from a product of a vector and a scalar, we have to calculate the magnetic intensity according to the formula

$$\mathbf{B} = \mathrm{rot}\mathbf{A} = \mathrm{rot}\frac{q\mathbf{v}}{c(r' - \mathbf{r}'.\mathbf{v}/c)} = \frac{q}{c(r' - \mathbf{r}'.\mathbf{v}/c)}\,\mathrm{rot}\mathbf{v} - \frac{q}{c}\mathbf{v}\times\mathrm{grad}\frac{1}{r' - \mathbf{r}'.\mathbf{v}/c}. \qquad (2.19)$$

Since we consider the velocity $\mathbf{v}$ as a function of $\mathbf{r}$ through the advanced time t', we shall have according to the rules for differentiating a composite function

$$\mathrm{rot}\mathbf{v}(t') = -\frac{\partial\mathbf{v}}{\partial t'}\times\frac{\partial t'}{\partial\mathbf{r}}. \qquad (2.20)$$

Substituting (2.15) into (2.20) and then (2.20) into (2.19), we obtain

$$\mathbf{B} = \frac{q}{c^2(r' - \mathbf{r}'.\mathbf{v}/c)^2}\,\mathbf{u}\times\mathbf{r}' + \frac{q}{c(r' - \mathbf{r}'.\mathbf{v}/c)^2}\,\mathbf{v}\times\mathrm{grad}(r' - \mathbf{r}'.\mathbf{v}/c). \qquad (2.21)$$

Putting here (2.16), we get

$$\mathbf{B} = \frac{q}{c^2(r' - \mathbf{r}'.\mathbf{v}/c)^3}\,\mathbf{r}'\times\left(-r'\mathbf{u} + \frac{r'.\mathbf{v}}{c}\,\mathbf{u} - c\mathbf{v} + \frac{v^2}{c}\,\mathbf{v} - \frac{\mathbf{r}'.\mathbf{u}}{c}\,\mathbf{v}\right). \qquad (2.22)$$

Forming the product $\mathbf{n}'\times\mathbf{E}$ (take $\mathbf{E}$ from (2.18)), we obtain an expression equal to the right side of (2.22) and, thus, we conclude

$$\mathbf{B} = \mathbf{n}'\times\mathbf{E}. \qquad (2.23)$$

Now substituting into (2.18) $\mathbf{v}$ and $\mathbf{u}$ from (2.5), we can present $\mathbf{E}$ in a form where only advanced quantities are present

$$\mathbf{E} = q\,\frac{(1 - v'^2/c^2)(\mathbf{n}' - \mathbf{v}'/c)}{r'^2(1 - \mathbf{n}'.\mathbf{v}'/c)^3} + \frac{q}{c^2}\,\frac{\mathbf{n}'\times\{(\mathbf{n}' - \mathbf{v}'/c)\times\mathbf{u}'\}}{r'(1 - \mathbf{n}'.\mathbf{v}'/c)^3} + \frac{q}{c^3}\,\mathbf{n}'\times(\mathbf{n}'\times\mathbf{w}'). \qquad (2.24)$$

In the last term depending on the super-acceleration we have not taken into account the factors which will give terms, where c would be in a power higher than 3 in the denominator, as such terms are negligibly small.

Substituting (2.24) into (2.23), we obtain the following expression for the magnetic intensity where only advanced quantities are present

$$\mathbf{B} = -\frac{q}{c}\frac{(1 - v'^2/c^2)\mathbf{n}'\times\mathbf{v}'}{r'^2(1 - \mathbf{n}'.\mathbf{v}'/c)^3} + \frac{q}{c^2}\frac{\mathbf{n}'\times[\mathbf{n}'\times\{(\mathbf{n}' - \mathbf{v}'/c)\times\mathbf{u}'\}]}{r'(1 - \mathbf{n}'.\mathbf{v}'/c)^3} - \frac{q}{c^3}\mathbf{n}'\times\mathbf{w}'. \qquad (2.25)$$

B. Calculation with the retarded elements of motion

Entirely in the same way as in sect. 2B, we can calculate the electric and magnetic intensities produced by a charge moving with acceleration, if expressing the observation elements of motion through the retarded ones. These calculations are given in Ref.3. Here I shall give only the final formulas which are analogical to formulas (2.24) and (2.25)

$$\mathbf{E} = q\frac{(1 - v''^2/c^2)(\mathbf{n}'' + \mathbf{v}''/c)}{r''^2(1 + \mathbf{n}''.\mathbf{v}''/c)^3} + \frac{q}{c^2}\frac{\mathbf{n}''\times\{(\mathbf{n}'' + \mathbf{v}''/c)\times\mathbf{u}''\}}{r''(1 + \mathbf{n}''.\mathbf{v}''/c)^3} - \frac{q}{c^3}\mathbf{n}''\times(\mathbf{n}''\times\mathbf{w}''), \qquad (2.26)$$

$$\mathbf{B} = -\frac{q}{c}\frac{(1 - v''^2/c^2)\mathbf{n}''\times\mathbf{v}''}{r''^2(1 + \mathbf{n}''.\mathbf{v}''/c)^3} - \frac{q}{c^2}\frac{\mathbf{n}''\times[\mathbf{n}''\times\{(\mathbf{n}'' + \mathbf{v}''/c)\times\mathbf{u}''\}]}{r''(1 + \mathbf{n}''.\mathbf{v}''/c)^3} - \frac{q}{c^3}\mathbf{n}''\times\mathbf{w}'', \qquad (2.27)$$

and the formulas for the observation potentials extressed through the retarded elements of motion from which we proceed and which are analogical to formulas (2.3)

$$\Phi = \frac{q}{r'' + \mathbf{r}''.\mathbf{v}/c}, \qquad \mathbf{A} = \frac{q\mathbf{v}}{c(r'' + \mathbf{r}''.\mathbf{v}/c)}. \qquad (2.28)$$

C. Interpretation of the obtained results

I shall use again the formulas written with the advanced elements of motion.

The three terms in formulas (2.24) and (2.25) are called, respectively, potential, radiation, and radiation reaction intensities.

Replacing again the advanced velocity by the observation velocity (see (2.5)), the potential electric intensity can be written

$$\mathbf{E}_{pot} = q\frac{1 - v^2/c^2}{(r' - \mathbf{r}'.\mathbf{v}/c)^3}(\mathbf{r}' - \mathbf{v}r'/c). \qquad (2.29)$$

Using Fig. 1, we can write

$$r' - \mathbf{r}'.\mathbf{v}/c = r' - r'v\cos\theta'/c = \{r^2 - (r'v\sin\theta'/c)^2\}^{1/2}. \qquad (2.30)$$

But according to the law of sines we have

$$r'/\sin(\pi - \theta) = r/\sin\theta', \qquad (2.31)$$

so that we can write (2.30) in the form

$$r' - \mathbf{r}'.\mathbf{v}/c = r(1 - v^2\sin^2\theta/c^2)^{1/2}. \qquad (2.32)$$

Substituting this into (2.29) and putting there further $\mathbf{r} = \mathbf{r}' - \mathbf{v}r'/c$, we obtain

$$\mathbf{E}_{pot} = q \frac{1 - v^2/c^2}{(1 - v^2\sin^2\theta/c^2)^{3/2}} \frac{\mathbf{r}}{r^3} \cong q \frac{\mathbf{n}}{r^2}. \qquad (2.33)$$

In the same way we obtain for the potential magnetic intensity

$$\mathbf{B}_{pot} = \frac{q}{c} \frac{1 - v^2/c^2}{(1 - v^2\sin^2\theta/c^2)^{3/2}} \frac{\mathbf{v}\times\mathbf{r}}{r^3} \cong \frac{q}{c} \frac{\mathbf{v}\times\mathbf{n}}{r^2}. \qquad (2.34)$$

I consider the difference between the "exact" and "non-exact" values of the potential electric and magnetic intensities as due only to the aether-Marinov character of light propagation. Thus I hardly believe that this can be an effect which can be physically observed. Conventional physics accepts that the "field" of a rapidly moving charge concentrates to a plane perpendicular to its motion, as for $\theta \to \pi/2$ there is $(1 - v^2/c^2)/(1 - v^2\sin^2\theta/c^2)^{3/2} \to \infty$ when $v \to c$. I think that the "effect" is only computational and that it can be not "observed". Of course, the last word has the experiment.

Thus the potential electric and magnetic intensities of an arbitrarily moving electric charge are determined by the distance from the charge to the reference point (being inversely proportional to the square of this distance) and (for $\mathbf{B}$) by the velocity of the charge, both taken at the moment of observation. These intensities are exactly equal to the electromagnetic intensities which the charge will originate at the reference point if its velocity is constant.

The second terms on the right sides of (2.24) and (2.25)

$$\mathbf{E}_{rad} = \frac{q}{c^2} \frac{\mathbf{n}'\times\{(\mathbf{n}' - \mathbf{v}'/c)\times\mathbf{u}'\}}{r'(1 - \mathbf{n}'.\mathbf{v}/c)^3}, \qquad \mathbf{B}_{rad} = \mathbf{n}'\times\mathbf{E}_{rad} \qquad (2.35)$$

determine the electric and magnetic intensities which the energy radiated by the charge originates at the reference point and we call them radiation electric and magnetic intensities. As the radiated energy propagates in space with the velocity of light c, we do not have to express here the advanced elements by the observation elements. Here the "directional" effects are no more computational and they can be easily observed[3]. The radiation electric and magnetic intensities are determined by the distance from the charge to the reference point (being inversely proportional to this distance)

and by the acceleration of the charge taken at the advanced moment. Thus a charge moving with a constant velocity does not originate radiation intensities.

The third terms on the right sides of (2.24) and (2.25)

$$\mathbf{E}_{rea} = \frac{q}{c^3}\,\mathbf{n}'\times(\mathbf{n}'\times\mathbf{w}'), \qquad \mathbf{B}_{rea} = -\frac{q}{c^3}\,\mathbf{n}'\times\mathbf{w}' = \mathbf{n}'\times\mathbf{E}_{rea} \tag{2.36}$$

determine the electric and magnetic intensities acting on the radiating charge itself as a reaction to the photon radiation diminishing its velocity (and thus also kinetic energy) exactly as much as is the radiated in the form of photons energy.

The radiation intensities are those which appear at the reference point when the radiated photons cross this point; if there are electric charges at the reference point, they will come into motion "absorbing" the radiated energy. The radiation reaction intensities act on the radiating charge itself. We call the intensities (2.36) electric and magnetic intensities of radiation reaction.

The electric and magnetic intensities of radiation reaction do not depend on the distance between charge and reference point and are determined by the charge's superacceleration at the advanced moment, which, of course, can be taken equal to the superacceleration at the observation moment.

Thus we see that only the potential and radiation intensities have a character of field quantities, because when position, velocity, and acceleration of the charge are given, these intensities are determined at all points of space, the former "momentarily", the latter with a time delay r'/c. The radiation reaction intensities are determined only for the space point where the radiating charge is located and act only on this charge.

Entirely in the same way, we can establish that the first terms in formulas (2.26) and (2.27) give, respectively, the potential electric and magnetic intensities (2.33) and (2.34). Thus we conclude that the calculation of the potential electric and magnetic intensities with the help of the advanced elements of motion as well as with the retarded elements of motion leads exctly to the same results.

Let us now compare the second and third terms in formulas (2.24), (2.25) and in formulas (2.26), (2.27). If we assume that the advanced elements of motion do not differ

too much from the retarded ones, i.e., if we assume

$$r' = r'' = r, \quad v' = v'' = v, \quad u' = u'' = u, \quad w' = w'' = w, \tag{2.37}$$

then for the electric intensity given by formulas (2.24) and (2.26) and for the magnetic intensity given by formulas (2.25) and (2.27) we obtain

$$E = E_{pot} + E_{rad} + E_{rea} = q\frac{n}{r^2} + q\frac{n\times(n\times u)}{c^2 r} \pm q\frac{n\times(n\times w)}{c^3},$$

$$B = B_{pot} + B_{rad} + B_{rea} = -q\frac{n\times v}{cr^2} \mp q\frac{n\times u}{c^2 r} - q\frac{n\times w}{c^3}, \tag{2.38}$$

where the upper signs are obtained when the calculation is performed with the help of the advanced elements of motion, and the lower signs are obtained when the calculation is performed with the retarded elements of motion.

As said above, the potential intensities are the same when calculated with the advanced and with the retarded elements of motion.

The electric intensity of radiation E_{rad} is the same when calculated with the advanced and retarded elements of motion. However the magnetic intensity of radiation B_{rad} is obtained with opposite sign if the retarded elements are used. Since we relate the intensities of radiation with the intensity of the energy flux[1]

$$I = (c/4\pi)E_{rad}\times B_{rad}, \tag{2.39}$$

we see that the electric and magnetic radiation intensities calculated with the advanced elements of motion give an energy flux intensity directed from the charge to the reference point

$$(4\pi/c)I' = E'_{rad}\times B'_{rad} = -\frac{q^2}{c^4 r^2}\{n\times(n\times u)\}\times(n\times u) = -\frac{q^2}{c^4 r^2}\{(n.u)n - (n.n)u\}\times(n\times u) =$$

$$-\frac{q^2}{c^4 r^2}\{(n.u)n\times(n\times u) - u\times(n\times u)\} = -\frac{q^2}{c^4 r^2}\{(n.u)^2 n - u^2 n\} = \frac{q^2}{c^4 r^2}\{u^2 - (n.u)^2\}n, \tag{2.40}$$

while the electric and magnetic intensities of radiation calculated with the retarded elements of motion give an energy flux intensity directed from the reference point to the charge

$$(4\pi/c)I'' = E''_{rad}\times B''_{rad} = -\frac{q^2}{c^4 r^2}\{u^2 - (n.u)^2\}n. \tag{2.41}$$

As $u^2 - (n.u)^2 \geq 0$, the flux (2.40) corresponds to the real electromagnetic wave radiated in the direction n, while the flux (2.41) corresponds to a wave propagating

in the direction -**n**. This second wave is fictitious, as it must exist if time has the property "reversibility"[1]. Thus only the calculation with the advanced elements of motion corresponds to the real course of time (from the past to the future); the calculation with the retarded elements of motion corresponds to the negative course of time (from the future to the past).

xxxxx

The intensities of radiation reaction do not depend on the distance between the charge and the reference point, and, thus, they have mathematical sense also for the point where the charge itself is placed. So we are impelled to make the conclusion that the electric and magnetic intensities of radiation reaction act on the radiating charge itself. Thus we cannot speak here about advanced and retarded moments, as both these moments coincide with the observation moment.

However, as formulas (2.38) show, the intensities $\mathbf{E}_{rea}$ and $\mathbf{B}_{rea}$ depend on the angle between the super-acceleration and the line connecting the charge with the reference point. Since the reference point for the radiation reaction is the radiating charge itself, we have to eliminate such an angular dependence by averaging over all directions.

The averaging is to be performed in the following way: We plot densely the vectors of the intensities $\mathbf{E}_{rea}$ obtained when the reference point covers a whole sphere around the charge, so that the angle between **n** and **w** will take all possible values. Now if we add geometrically all these vectors $\mathbf{E}_{rea_i}$, $i = 1,2,.....N$, where $N \to \infty$, and if we divide the resultant vector by the number N, we shall find the average value (we write the intensity of radiation reaction calculated with the advanced elements of motion)

$$\overline{\mathbf{E}_{rea}} = \frac{1}{N} \sum_{i=1}^{N} \mathbf{E}_{rea_i} = \frac{1}{N} \sum_{i=1}^{N} q\mathbf{n}_i \times (\mathbf{n}_i \times \mathbf{w})/c^3. \qquad (2.42)$$

Multiplying both sides of this equation by 4π, we get

$$4\pi\overline{\mathbf{E}_{rea}} = \sum_{i=1}^{N} \mathbf{E}_{rea_i} \frac{4\pi}{N}, \qquad (2.43)$$

and making the transition $N \to \infty$, we can write

$$\overline{\mathbf{E}_{rea}} = \frac{1}{4\pi}\int_{4\pi} \mathbf{E}_{rea}\, d\Omega = \frac{1}{4\pi}\int_0^{\pi}\int_0^{2\pi} q\frac{\mathbf{n}\times(\mathbf{n}\times\mathbf{w})}{c^3}\sin\theta\, d\theta\, d\phi = \frac{q}{4\pi c^3}\int_0^{\pi}\int_0^{2\pi}\{(\mathbf{n}.\mathbf{w})\mathbf{n} - \mathbf{w}\}\sin\theta\, d\theta\, d\phi, \quad (2.44)$$

where $n_x = \sin\theta\cos\phi$, $n_y = \sin\theta\sin\phi$, $n_z = \cos\theta$, θ and ϕ being the zenith and azimuth angles of a spherical frame of reference corresponding to the used Cartesian frame.

Thus formula (2.44) can be written

$$\overline{\mathbf{E}_{rea}} = \frac{q}{4\pi c^3}\int_0^{\pi}\int_0^{2\pi}\{(w_x\sin\theta\cos\phi + w_y\sin\theta\sin\phi + w_z\cos\theta)(\sin\theta\cos\phi\,\hat{\mathbf{x}} + \sin\theta\sin\phi\,\hat{\mathbf{y}} + \cos\theta\,\hat{\mathbf{z}}) - \mathbf{w}\}\sin\theta\, d\theta\, d\phi =$$

$$\frac{q}{4\pi c^3} w_x\hat{\mathbf{x}}\int_0^{\pi}\int_0^{2\pi}\sin^3\theta\cos^2\phi\, d\theta\, d\phi + w_y\hat{\mathbf{y}}\int_0^{\pi}\int_0^{2\pi}\sin^3\theta\sin^2\phi\, d\theta\, d\phi +$$

$$w_z\hat{\mathbf{z}}\int_0^{\pi}\int_0^{2\pi}\cos^2\theta\sin\theta\, d\theta\, d\phi - \mathbf{w}\int_0^{\pi}\int_0^{2\pi}\sin\theta\, d\theta\, d\phi\} =$$

$$\frac{q}{4c^3}\{w_x\hat{\mathbf{x}}\int_0^{\pi}\sin^3\theta\, d\theta + w_y\hat{\mathbf{y}}\int_0^{\pi}\sin^3\theta\, d\theta + w_z\hat{\mathbf{z}}\int_0^{\pi}2\cos^2\theta\sin\theta\, d\theta - \mathbf{w}\int_0^{\pi}2\sin\theta\, d\theta\} =$$

$$\frac{q}{4c^3}\left(\frac{4}{3}w_x\hat{\mathbf{x}} + \frac{4}{3}w_y\hat{\mathbf{y}} + \frac{4}{3}w_z\hat{\mathbf{z}} - 4\mathbf{w}\right) = \frac{q}{4c^3}\left(\frac{4}{3}\mathbf{w} - 4\mathbf{w}\right) = -\frac{2q}{3c^3}\mathbf{w}. \quad (2.45)$$

The magnetic intensities of radiation reaction are the same when calculated with the help of the advanced and retarded elements. But the averaging of the magnetic intensity of radiation reaction over all angles gives zero. Indeed,

$$\overline{\mathbf{B}_{rea}} = \frac{1}{4\pi}\int_{4\pi}\mathbf{B}_{rea}\, d\Omega = -\frac{q}{4\pi c^3}\int_0^{\pi}\int_0^{2\pi}\mathbf{n}\times\mathbf{w}\sin\theta\, d\theta\, d\phi =$$

$$-\frac{q}{4\pi c^3}\int_0^{\pi}\int_0^{2\pi}\{(w_z\sin\theta\sin\phi - w_y\cos\theta)\hat{\mathbf{x}} + (w_x\cos\theta - w_z\sin\theta\cos\phi)\hat{\mathbf{y}} +$$

$$(w_y\sin\theta\cos\phi - w_x\sin\theta\sin\phi)\hat{\mathbf{z}}\}\sin\theta\, d\theta\, d\phi = 0. \quad (2.46)$$

Thus formulas (2.38) are to be written in the form

$$\mathbf{E} = \mathbf{E}_{pot} + \mathbf{E}_{rad} + \mathbf{E}_{rea} = q\frac{\mathbf{n}}{r^2} + q\frac{\mathbf{n}\times(\mathbf{n}\times\mathbf{u})}{c^2 r} - \frac{2q}{3c^2}\mathbf{w},$$

$$\mathbf{B} = \mathbf{B}_{pot} + \mathbf{B}_{rad} = -q\frac{\mathbf{n}\times\mathbf{v}}{cr^2} - q\frac{\mathbf{n}\times\mathbf{u}}{c^2 r}, \quad (2.47)$$

where we have taken these signs which correspond to the calculation with the advanced elements of motion, i.e., to the real course of time from the past to the future.

3. ELECTROMAGNETIC POTENTIALS OF PERIODIC SYSTEMS

Let us suppose that the charge and current densities of the considered system of electric charges are simple periodic (i.e., monoperiodic or trigonometric) functions of time

$$Q = Q_{max}\cos(\frac{2\pi}{T}t + \alpha), \qquad \mathbf{J} = \mathbf{J}_{max}\cos(\frac{2\pi}{T}t + \alpha), \tag{3.1}$$

where Q_{max} and $\mathbf{J}_{max}$ are the amplitudes of the charge and current densities and represent their values for times $t = nT - (\alpha/2\pi)T$, where n is an integer.

The quantity T is the period of the charge and current fluctuations; this is the time after whose expiration the charge and current densities obtain again the same values. The argument $2\pi t/T + \alpha$ of the trigonometric function is the phase and the quantity α is the initial phase which usually, when considering the charge and current densities only at a given space point, can be taken equal to zero. The quantity $\omega = 2\pi/T$ is called (circular) frequency and the quantity $k = \omega/c = 2\pi/cT$ is called (circular) wave number. Such an electromagnetic system is called monoperiodic.

It is mathematically more convenient to write the real trigonometric relations as complex exponential relations. Thus we can present the expressions (3.1) in the form

$$\begin{aligned} Q &= \mathrm{Re}\{Q_{max}e^{i(\omega t+\alpha)}\} = \mathrm{Re}\{Q_{max}e^{-i(\omega t+\alpha)}\}, \\ \mathbf{J} &= \mathrm{Re}\{\mathbf{J}_{max}e^{i(\omega t+\alpha)}\} = \mathrm{Re}\{\mathbf{J}_{max}e^{-i(\omega t+\alpha)}\}, \end{aligned} \tag{3.2}$$

where Re{ } means that we must take only the real part of the complex expression in the braces. The real parts of both expressions in (3.2) are equal but usually the second forms are used, i.e., those with the negative exponents.

If we introduce the notations

$$Q_\omega = Q_{max}e^{-i\alpha}, \qquad \mathbf{J}_\omega = \mathbf{J}_{max}e^{-i\alpha}, \tag{3.3}$$

we can write (3.2), omitting the sign Re{ }, in the form

$$Q = Q_\omega e^{-i\omega t}, \qquad \mathbf{J} = \mathbf{J}_\omega e^{-i\omega t}, \tag{3.4}$$

where the new amplitudes Q_ω, $\mathbf{J}_\omega$ must be considered as complex numbers which become real only under the condition $\alpha = 0$. The complex forms (3.2) are called short exponential forms and the complex forms (3.4) are called lapidary exponential forms. The long ex-

ponential forms are the following

$$Q = (1/2)\{Q_\omega e^{-i\omega t} + Q^*_\omega e^{i\omega t}\}, \quad J = (1/2)\{J_\omega e^{-i\omega t} + J^*_\omega e^{i\omega t}\}, \tag{3.5}$$

where Q^*_ω, J^*_ω are the quantities complex conjugated to Q_ω, J_ω.

The use of the complex forms turns out to be very convenient when we perform linear operations (say, adding, differentiation, integration) over the trigonometric functions. By using the complex exponential forms, all linear operations are to be applied not to trigonometric but to much simpler exponential expressions. However, when we have to perform non-linear operations (say, multiplication), we have always to take them in their long exponential forms.

Let us find the electric and magnetic potentials originated by a monoperiodic system at an arbitrary reference point.

Following the concept that the potential electric and magnetic intensities appear "momentarily" in whole space, while the radiated intensities propagate with the velocity c, we shall preserve the following rules when calculating the intensities from the potentials:

1) When we calculate the potential intensities, we have to use the observation potentials (refer to formula (2.7)).

2) When we calculate the radiation intensities, we have to use the advanced potentials (refer to formula (2.6)).

3) When we calculate both the potential and radiation intensities, we have to use the advanced potentials (see formulas (10.3) in Ref. 1), omitting here the primes for the advanced quantities

$$\Phi = \int_V \frac{Q(t - R/c)}{R} dV, \qquad \mathbf{A} = \int_V \frac{\mathbf{J}(t - R/c)}{cR} dV, \tag{3.6}$$

where R is the distance to the elementary volume dV, but in the final result we have to put $c = \infty$ in all non-radiation intensities if this c appears as a result of manipulation with advanced time. The execution of this program will become clear in sect. 5.

Thus if the charge and current densities at every elementary volume of the considered system are simple periodic functions of time, with equal periods of fluctuation, the electric and magnetic potentials will be also simple periodic functions of time with the same period and by putting (3.4) into (3.6) we obtain

$$\Phi(t) = \Phi_\omega e^{-i\omega t} = \int_V \frac{Q_\omega}{R} e^{-i(\omega t - kR)} dV, \qquad A(t) = A_\omega e^{-i\omega t} = \int_V \frac{\mathbf{J}_\omega}{R} e^{-i(\omega t - kR)} dV, \tag{3.7}$$

where

$$\Phi_\omega = \int_V \frac{Q_\omega}{R} e^{ikR} dV, \qquad A_\omega = \int_V \frac{\mathbf{J}_\omega}{R} e^{ikR} dV \tag{3.8}$$

are the complex amplitudes of the advanced electric and magnetic potentials.

Let us now suppose that the charge and current densities are periodic, but not trigonometric, functions of time. As it is known, any periodic function can be presented as a Fourier series, i.e., as a superposition of trigonometric functions with different periods. We shall call such systems polyperiodic and their potentials will be superposition of the potentials of monoperiodic systems.

If the charge and current densities are arbitrary functions of time, then, as it is known, they can be presented by a Fourier integral as a superposition of monoperiodic functions and such will be also the potentials. We call such systems aperiodic.

4. THE POTENTIALS AT LARGE DISTANCES FROM THE GENERATING SYSTEM

Let us consider the potentials generated by an electromagnetic system of arbitrarily moving charges at large distances from the system, that is at distances which are large compared with the dimensions of the system.

We choose (Fig. 2) the origin O of the reference frame somewhere in the interior of the system of charges using the following notations: the radius vector of the reference point P is denoted by $\mathbf{r}$ and the unit vector along it by $\mathbf{n}$; the radius vector of the charges in the differential volume dV around point Q (where the charge and current densities are Q(t) and $\mathbf{J}(t)$, respectively) is denoted by $\mathbf{r}'$; the radius vector from the volume dV to the reference point P is denoted by R.

Denoting by L the largest dimension of the system, we thus assume

$$r \gg L, \tag{4.1}$$

and therefore

$$r \gg r'. \tag{4.2}$$

From Fig. 2 we have $\mathbf{R} = \mathbf{r} - \mathbf{r}'$, and thus we can write approximately

$$R = |\mathbf{r} - \mathbf{r}'| \cong (r^2 - 2\mathbf{r}.\mathbf{r}')^{1/2} = r(1 - \mathbf{n}.\mathbf{r}'/r)^{1/2} \cong r - \mathbf{n}.\mathbf{r}', \tag{4.3}$$

and with a larger inaccuracy

$$R \cong r. \tag{4.4}$$

In addition to the condition (4.1) we shall sometimes assume also that the shortest period of oscillation T of the charge and current densities at the different elementary volumes of the system is much larger than the time in which light covers the largest dimension of the system, i.e.,

$$T \gg L/c\,. \tag{4.5}$$

Let us now consider the advanced magnetic potential of a monoperiodic system. Substituting (4.3) into the second formula (3.8), we shall have at this approximation

$$A_\omega = \frac{1}{c}\int_V \frac{J_\omega}{r - \mathbf{n}.\mathbf{r}'}\, e^{ik(r - \mathbf{n}.\mathbf{r}')}\,dV. \tag{4.6}$$

Taking into account assumption (4.2), we can neglect $\mathbf{n}.\mathbf{r}'$ with respect to r in the denominator. However, only this condiction is not enough to make the same neglection in the exponent of the nominator. Indeed, we have

$$\mathrm{Re}\{e^{ik(r - \mathbf{n}.\mathbf{r}')}\} = \cos\{\frac{2\pi}{cT}(r - \mathbf{n}.\mathbf{r}')\} = \cos[2\pi\{\frac{r}{cT} - \frac{r'}{cT}\cos(\mathbf{n}.\mathbf{r}')\}]. \tag{4.7}$$

Thus we can neglect in this expression $(r'/cT)\cos(\mathbf{n}.\mathbf{r}')$ only if $r'/cT < L/cT \ll 1$, i.e., if also condition (4.5) is fulfilled.

Thus, assuming that only condition (4.1) is fulfilled but condition (4.5) is not, we can write (4.6) in the form

$$\mathbf{A}_\omega = \frac{e^{ikR}}{cr}\int_V \mathbf{J}_\omega e^{-\mathbf{n}.\mathbf{r}'}\,dV. \tag{4.8}$$

Assuming that both conditions (4.1) and (4.5) are fulfilled, we can write (4.6) in the form

$$\mathbf{A}_\omega = \frac{e^{ikr}}{cr}\int_V \mathbf{J}_\omega\,dV. \tag{4.9}$$

These results can be applied to the first formula (3.8) and then to the electromagnetic potentials of polyperiodic and aperiodic systems.

Let us consider now the advanced magnetic potential of an arbitrary system written in the general form (3.6). Substituting (4.3) into (3.6), we shall have

$$A = \frac{1}{c}\int_V \frac{\mathbf{J}(t - r/c + \mathbf{n}.\mathbf{r}'/c)}{r - \mathbf{n}.\mathbf{r}'}\,dV. \tag{4.10}$$

Assuming that only condition (4.1) is fulfilled but condition (4.5)is not, we can write

$$\mathbf{A} = \frac{1}{cr}\int_V \mathbf{J}(t' + \frac{\mathbf{n}.\mathbf{r}'}{c})\,dV, \tag{4.11}$$

where $t' = t - r/c$ is the common advanced moment for the whole system, i.e., the advanced moment taken with respect to the frame's origin.

Expanding the integrand in (4.11) as a power series of the small quantity $\mathbf{n}.\mathbf{r}'/c$, we obtain

$$\mathbf{A} = \mathbf{A}^{(o)} + \mathbf{A}^{(1)} + \ldots\ldots = \frac{1}{cr}\int_V \mathbf{J}(t')dV + \frac{1}{c^2 r}\int_V (\mathbf{n}.\mathbf{r}')\frac{d\mathbf{J}(t')}{dt'}dV + \ldots\ldots . \tag{4.12}$$

Since $\mathbf{n}$ is a constant unit vector and the vectors $\mathbf{r}'$ are integration variables which do not depend on time, we can write, taking into account that $\mathbf{J}dV$ is equal to the sum of the charges in the volume dV multiplied by their velocities

$$\mathbf{A} = \frac{1}{cr}\sum_{i=1}^{n} q_i \mathbf{v}_i(t') + \frac{1}{c^2 r}\frac{d}{dt'}\sum_{i=1}^{n} q_i(\mathbf{n}.\mathbf{r}_i')\mathbf{v}_i(t') + \ldots\ldots . \tag{4.13}$$

In zero approximation we have

$$\mathbf{A}^{(o)} = \frac{1}{cr}\sum_{i=1}^{n} q_i \mathbf{v}_i = \frac{1}{cr}\frac{d}{dt'}\sum_{i=1}^{n} q_i \mathbf{r}' = \frac{\dot{\mathbf{d}}}{cr}, \tag{4.14}$$

where $\mathbf{d}$ is the advanced dipole moment of the system, and the point over the symbol signifies that time derivative is taken from this quantity. We remind that the elements of motion on the right sides of the last formulas are taken at the common advanced moment.

5. POTENTIAL FIELD AND RADIATION FIELD

We establishedin sect. 2 that the field of an arbitrarily moving electric charge consists of two parts - potential part and radiation part. As formulas (2.38) show, the potential electric and magnetic intensities are inversely proportional to the second powers of the distance from the charge producing them, while the radiation electric and magnetic intensities are inversely proportional to the first power of this distance. Then we established that the potential electromagnetic intensities "appear", as the potentials, instantly in whole space, i.e., they are immaterial, while the radiation electromagnetic intensities "propagate" with the velocity of light from the charge producing them to infinity; thus we have identified the radiation field of

the charge by the photons emitted by it.

As the field of a system of arbitrarily moving charges represents a superposition of the fields of anyone of these charges, the common field of the whole system will also consist of a potential part and radiation part. intensity

Let us now find the field of a system of charges at large distances from it. As mentioned in sect. 3, for the calculation of the potential and radiation intensities we use the advanced potentials but then in all non-radiation intensity terms we have to put $c = \infty$ everywhere where this "c" appears as a result of manipulation with advanced time; non-radiation terms are all those which are not inversely proportional to the first power of the distance from the system to the reference point. The essence of this program will become clear in this section.

For simplicity sake we shall make a calculation for the potentials taken in zero approximation. Thus the advanced magnetic potential will be given by formula (4.14). The advanced electric potential can be calculated by substituting (4.14) into the equation of potential connection (see equation (7.16) in Ref. 1) .

$$\mathrm{div}\mathbf{A} = -(1/c)\partial\Phi/\partial t. \tag{5.1}$$

After integration we can determine the electric potential

$$\Phi = -\,\mathrm{div}(\mathbf{d}/r) + \mathrm{Const}, \tag{5.2}$$

where the constant of integration must have the form

$$\mathrm{Const} = \frac{1}{r}\sum_{i=1}^{n} q_i \tag{5.3}$$

because if we put the dipole moment equal to zero, we shall, at the assumption (4.1), have

$$\Phi = \frac{1}{r}\sum_{i=1}^{n} q_i, \tag{5.4}$$

where n is the number of all charges in the system.

Let us assume that the sum of all charges in the system is zero. Then the advanced electric potential will have the form (5.2) with Const = 0. Putting this and (4.14) into the fundamental definition equalities (2.1), we obtain the following expressions for the electric and magnetic intensities

$$\mathbf{E} = \mathrm{grad}(\mathrm{div}\frac{\mathbf{d}}{r}) - \frac{1}{c^2}\frac{\ddot{\mathbf{d}}}{r}, \qquad \mathbf{B} = \frac{1}{c}\,\mathrm{rot}\frac{\dot{\mathbf{d}}}{r}. \tag{5.5}$$

Now I shall calculate the monoperiodic amplitudes of the electric and magnetic intensities, assuming that the charge densities are monoperiodic functions of time; if they are polyperiodic or aperiodic functions of time, then we should assume that a suitable expansion in a Fourier series or Fourier integral is performed.

The resultant advanced dipole moment of the system can be presented as a superposition of the advanced monoperiodic moments of the form

$$\mathbf{d}(t') = \mathbf{d}_\omega e^{-i\omega t'} = \mathbf{d}_\omega e^{-i\omega(t - r/c)} = \mathbf{d}_\omega e^{-i\omega t + ikr}. \tag{5.6}$$

We see that the velocity "c" which figures in the advanced time is included in the wave number k; hence in all non-radiation intensity terms of the final result we have to put k = 0.

The electric and magnetic intensities produced by this monoperiodic dipole moment will also be periodic functions with the same frequency

$$\mathbf{E}(t) = \mathbf{E}_\omega e^{-i\omega t}, \qquad \mathbf{B}(t) = \mathbf{B}_\omega e^{-i\omega t}. \tag{5.7}$$

Substituting (5.6) and (5.7) into the first equation (5.5), and dividing the equation obtained by the factor $\exp(-i\omega t)$, we obtain for the monoperiodic amplitude of the electric intensity with frequency ω the following expression

$$\mathbf{E}_\omega = \mathrm{grad}\{\mathrm{div}(\frac{e^{ikr}}{r}\mathbf{d}_\omega)\} + \frac{\omega^2}{c^2}\frac{e^{ikr}}{r}\mathbf{d}_\omega = \mathrm{grad}(\mathbf{d}_\omega.\mathrm{grad}\frac{e^{ikr}}{r}) + \frac{k^2}{r}e^{ikr}\mathbf{d}_\omega =$$

$$(\mathbf{d}_\omega.\mathrm{grad})\mathrm{grad}\frac{e^{ikr}}{r} + \frac{k^2}{r}e^{ikr}\mathbf{d}_\omega = (\mathbf{d}_\omega.\mathrm{grad})\{(\frac{ik}{r^2} - \frac{1}{r^3})e^{ikr}\mathbf{r}\} + \frac{k^2}{r}e^{ikr}\mathbf{d}_\omega =$$

$$\{\mathbf{d}_\omega.(-\frac{2ik}{r^3} + \frac{3}{r^4} - \frac{k^2}{r^2} - \frac{ik}{r^3})e^{ikr}\mathbf{n}\}\mathbf{r} + (\frac{ik}{r^2} - \frac{1}{r^3})e^{ikr}\mathbf{d}_\omega + \frac{k^2}{r}e^{ikr}\mathbf{d}_\omega =$$

$$(-\frac{k^2}{r} - \frac{3ik}{r^2} + \frac{3}{r^3})e^{ikr}(\mathbf{d}_\omega.\mathbf{n})\mathbf{n} + (\frac{ik}{r^2} - \frac{1}{r^3})e^{ikr}\mathbf{d}_\omega + \frac{k^2}{r}e^{ikr}\mathbf{d}_\omega =$$

$$\frac{k^2}{r}e^{ikr}\{\mathbf{d}_\omega - (\mathbf{d}_\omega.\mathbf{n})\mathbf{n}\} - \frac{ik}{r^2}e^{ikr}\{3(\mathbf{d}_\omega.\mathbf{n})\mathbf{n} - \mathbf{d}_\omega\} + \frac{1}{r^3}e^{ikr}\{3(\mathbf{d}_\omega.\mathbf{n})\mathbf{n} - \mathbf{d}_\omega\}. \tag{5.8}$$

The amplitude of the radiation electric intensity is the one which is inversely proportional to the first power of r; thus we can write

$$E_{\omega rad} = \frac{k^2}{r} e^{ikr} \mathbf{n}\times(\mathbf{d}_\omega\times\mathbf{n}). \tag{5.9}$$

In all other terms we have to put k = 0 and these terms which remain will represent the amplitude of the potential electric intensity

$$E_{\omega pot} = \frac{1}{r^3}\{3(\mathbf{d}_\omega.\mathbf{n})\mathbf{n} - \mathbf{d}_\omega\}. \tag{5.10}$$

It can be easily shown[3] that this is the electric intensity generated by a static electric system with a total charge equal to zero and dipole moment

$$\mathbf{d} = \sum_{i=1}^{n} q_i \mathbf{r}_i \tag{5.11}$$

different from zero. The difference from the static system is only this that in the general dynamic monoperiodic case the potential electric intensity, according to formula (5.7) is a monoperiodic function of time.

The second term on the right side of (5.8) appears only as a result of the computation and when putting k = 0 disappears, i.e., has no physical meaning.

Which are the errors of conventional physics which assumes that the "interaction "propagates" with the velocity c? First it has to consider the second term on the right side of (5.8) as a real electric intensity. However nobody has measured such an intensity. Secondly, conventional physics considers the third term on the right side of (5.8) together with the factor e^{ikr}, i.e., it assumes that the potential electric intensity of a monoperiodic system has a "wave character". It is extremely easy to show experimentally that this assertion of conventional physics is not true, as I shall do it beneath.

Let us now see which are the radiation and potential magnetic intensities of a system with monoperiodic dipole moment different from zero. Substituting (5.6) and (5.7) into the second equation(5.5), and dividing the equation obtained by the factor $\exp(-i\omega t)$, we obtain for the monoperiodic amplitude of the magnetic intensity with frequency ω the following expression

$$\mathbf{B}_\omega = -i\frac{\omega}{c}\,\mathrm{rot}\left(\frac{e^{ikr}}{r}\mathbf{d}_\omega\right) = i\frac{\omega}{c}\mathbf{d}_\omega\times\mathrm{grad}\frac{e^{ikr}}{r} = i\frac{\omega}{c}\mathbf{d}_\omega\times\left\{\left(\frac{ik}{r} - \frac{1}{r^2}\right)e^{ikr}\mathbf{n}\right\} =$$

$$\frac{k^2}{r} e^{ikr}\,\mathbf{d}_\omega\times\mathbf{n} - \frac{i\omega}{cr^2} e^{ikr}\,\mathbf{d}_\omega\times\mathbf{n}. \tag{5.12}$$

The amplitude of the radiation magnetic intensity is the one which is inversely proportional to the first power of r; thus we can write

$$\mathbf{B}_{\omega rad} = \frac{k^2}{r} e^{ikr} \mathbf{n}\times\mathbf{d}_\omega. \tag{5.13}$$

In the other term representing the amplitude of the potential magnetic intensity we have to put k = 0; so we obtain

$$\mathbf{B}_{\omega pot} = \frac{i\omega}{cr^2} \mathbf{n}\times\mathbf{d}_\omega = \frac{ik}{r^2} \mathbf{n}\times\mathbf{d}_\omega. \tag{5.14}$$

Having in mind (5.7) and (5.14), we can write the time depending potential magnetic intensity corresponding to the frequency ω in the form

$$\mathbf{B}_{pot}(t) = \frac{i\omega}{cr^2} \mathbf{n}\times\mathbf{d}_\omega e^{-i\omega t} = -\frac{\mathbf{n}}{cr^2}\times\frac{d}{dt}(\mathbf{d}_\omega e^{-i\omega t}) = -\frac{\mathbf{n}}{cr^2}\times\dot{\mathbf{d}}(t). \tag{5.15}$$

Using now formula (4.14), we get

$$\mathbf{B}_{pot}(t) = -\frac{\mathbf{n}}{r}\times\mathbf{A}(t) = -\frac{\mathbf{n}}{r}\times\int_V \frac{\mathbf{J}(t)}{r}dV = \int_V \frac{\mathbf{J}(t)\times\mathbf{n}}{r^2}dV. \tag{5.16}$$

Cancelling the common factor $\exp(-i\omega t)$, we obtain the same relation for the amplitude of the potential magnetic intensity

$$\mathbf{B}_{\omega pot} = \int_V \frac{\mathbf{J}_\omega\times\mathbf{n}}{r^2}dV. \tag{5.17}$$

This is the magnetic potential of a stationary (quasi-static) system of electric charges and is known as the Biot-Savart law.

The radiation electric and magnetic intensities (5.9) and (5.13) can be immediately obtained from formulas (2.35), which we can write in the form

$$\mathbf{E}_{rad} = \mathbf{n}\times(\mathbf{n}\times\dot{\mathbf{A}}/c), \qquad \mathbf{B}_{rad} = -\mathbf{n}\times\dot{\mathbf{A}}/c, \tag{5.18}$$

in which form they are valid if **A** is the advanced magnetic potential not only of a single charge but of a whole system. Ideed, if we put here (4.14), using (5.6) and (5.7), we easily obtain (5.9) and (5.13).

As said above, conventional physics has to consider the last terms on the right sides of (5.8) and (5.12) together with the factor e^{ikr}. This will give to the potential electric and magnetic intensities a "wave character". A very easy experiment showing that this is <u>not</u> true, i.e., that the potential electromagnetic intensities

have no "wave character" is the following one: Take two big coils put aside at a certain distance L and feeded by strong currents with the same high enough frequency, so that $c/\omega < L/2\pi$. Take another small coil closed shortly by an amperemeter in which current will be induced and so it will serve as an indicator of the potential electric fields produced by the big coils. If moving the indicator-coil between both powerful coils, we shall see that the induced current is the largest when the small coil is near the one or the other big coils and gradually diminishes, being the smallest at the middle point. If the potential electric field (I calculate it beneath) would have a "wave character", the induced current will not diminish gradually at the above motion of the small coil, as both potential fields will interfere and the indicator has to show "nodes" and "anti-nodes" of the produced standing waves. Nobody nowhere has observed such an effect. This effect, however, can be very easily observed exactly in the above manner for the radiation electric and magnetic intensities of two antennas.

Now the big question is to be posed, how can we, by measuring a certain electric intensity **E** and a certain magnetic intensity **B**, discern which is potential and which radiation (or which parts in **E** and **B** are potential and which parts radiation). This is a very important question to which conventional physics cannot give a clear answer.

The distinctions which I make are the following: **E** and **B** are radiation electric and magnetic intensities if and only if they are produced by the same charges, have equal magnitudes, are mutually perpendicular, and the vector $\mathbf{E}\times\mathbf{B}$ points away from the system producing them. Note that the requirement "produced by the same charges" is very important. So if we have a parallel plates condenser producing the electric intensity **E** and a current cylindrical coil whose axis is perpendicular to **E** producing a magnetic intensity B such that $B = E$, then the requirements of calling them radiation electromagnetic intensities are fulfilled except the requirement to be produced by the same charges. Thus these electric and magnetic intensities are potential.

The requirement "produced by the same charges" in the above definition can be replaced by the following one: On a unit surface placed perpendicularly to the vector $\mathbf{E}\times\mathbf{B}$, a pressure must act equal to the pressure which a gas with mass density $\mu = E^2/4\pi c$ moving with a velocity 1 cm/sec exerts on a wall placed perpendicularly to its flow. Thus

the radiation electric and magnetic intensities must transfer energy (mass). (I beg the reader to not forget that in my theory there is no substantial difference between the notions "energy" and "mass"[1]).

In Fig. 3 I have sketched another experiment which demonstrates the substantial characteristics and the difference between potential and radiation intensities.

Let us have an oscillating circuit consisting of an induction coil L, a condenser C, and a generator G which maintains undamped electromagnetic oscillations in the circuit. As it is known, the period of oscillations and the circular frequency are given by the formulas

$$T = 2\pi(LC)^{1/2}, \qquad \omega = 2\pi/T = (LC)^{-1/2}. \tag{5.19}$$

Let us suppose that the condenser and the generator are enclosed in a screen-box S, so that this oscillating circuit cannot radiate electromagnetic waves into free space, where only its potential electromagnetic field will exist.

Let us put another induction coil L' at a distance R from the coil L. If coil L is enough long and its windings enough dense, we can assume that its potential magnetic intensity will be concentrated in the coil pointing along its axis and having the value[4] $B = (4\pi nI/c)\cos(\omega t)$, where n is the number of the windings on a unit of length and I is the amplitude of the current flowing in the windings. The magnetic potential of L at the space domain where L' is placed is[4] $A = (2\pi nI\rho^2/cR)\cos(\omega t)$, where R is the distance from L' to the axis of coil L whose radius is ρ. The magnetic potential A is tangential to a cylinder with radius R having the same axis as the axis of coil L. According to the first formula (2.1), the electric intensity at the domain where L' is placed will be also tangential to the mentioned cylinder with radius R and have the magnitude $E = (2\pi nI\rho^2\omega/cR)\sin(\omega t)$. As in the windings' halves of L' which are nearer to L the potential electric intensity will be bigger than in the halves which are farther, a resultant sinusoidal tension will be induced in L'. This tension, however, is small (if L is infinitely long it disappears), and it is better to make L' with a radius R encircling L.

Let us now suppose that the condition

$$R > cT \tag{5.20}$$

is fulfilled. According to conventional physics, for the time of one period of the os-

cillations the potential electric field propagating from coil L to coil L' cannot reach the latter. But,on the other hand, we know that at the beginning and the end of every half period the whole electromagnetic energy of the circuit is concentrated in the electric field of the condenser C (suppose for simplicity sake that the circuit L-C is without losses which, as a matter of fact, are covered by the energy coming from the generator G). Thus we have to conclude that under the condition (5.20) no electromagnetic energy can be transferred from the circuit L-C to the coil L'.

According to my absolute conceptions, the potential electric and magnetic fields do not "propagate" with velocity c but "appear" instantly in whole space. Thus even under the condition (5.20) electromagnetic energy will be transferred from the circuit L-C to the circuit of coil L', and the amperemeter will show the existence of induction current. As the field in the outer space is potential, at open circuit L' no energy will be absorbed from the potential field and the generator will cover only the inevitable losses in the circuit L-C. However, if the circuit of L' will be closed, induced current will flow in it, energy will be absorbed and the generator must increase its power, otherwise the energy consumed by L' will damp the oscillations of the oscillating circuit L-C. This experiment is very easy and, as a matter of fact, it has been thousands of times carried out by the electrical engineers.

Let us now put the screen box S away and let us begin to make the distance between the condenser's plates bigger and bigger, until the whole circuit will become a straight line with a condenser's plate at any of its ends and the coil L in the middle. If the coil will remain further very long and having the whole its magnetic field inside, this system will again have only potential fields in the outer space and both fields (of the condenser and of the coil) will be electric. If, however, we shall beging to diminish the windings of the coil reducing it at the end to a straight wire, in the outer space will exist both the electric and magnetic intensities of the L-C circuit. The parts of them which will be with equal magnitudes and mutually perpendicular, and for which the product $\mathbf{E}\times\mathbf{B}$ will point away from the system, will be their radiation electric and magnetic intensities. The coil L' will react both to the potential and radiation electric and magnetic intensities and induction current under their common

action will flow. The relation between the potential and radiation parts of the fields depend on many different factors.

Here it is to be mentioned that if the predominant part of the energy induced in L' will have a radiation character, then the fact whether L' is closed (absorbes energy) or is open (does not absorb energy) has no influence on the work of the generator G which continuously covers the inevitable losses in the circuit and the energy radiated in the form of electromagnetic waves (photons).

All these experiments are enough simple for execution and their explanation is also extremely simple and clear. Nevertheless conventional physics years and years defends the wrong concept that also the potential electric and magnetic intensities "propagate" with the velocity of light.

At the end of this section I should like once more to emphasize that the potential electric and magnetic intensities are determined by the values of the charge and current densities at the different elementary volumes of the system, while the radiation electric and magnetic intensities are determined by the rate of change of these densities.

6. DIPOLE RADIATION

In zero approximation at large distances from the generating system the magnetic potential can be expressed by the dipole moment of the system according to formula (4.14). Substituting this expression for the advanced magnetic potential into the general formula (5.18) for the radiated electric and magnetic intensities, we obtain

$$\mathbf{E}_{rad} = \frac{1}{cr}\,\mathbf{n}\times(\mathbf{n}\times\ddot{\mathbf{d}}), \qquad \mathbf{B}_{rad} = \frac{1}{c^2 r}\,\ddot{\mathbf{d}}\times\mathbf{n}. \tag{6.1}$$

The radiation described by the formulas (6.1) is called dipole radiation because the electric and magnetic radiation intensities depend only on the dipole moment of the system (on its second time derivative).

As already said, the radiated electromagnetic waves (photons) are carrying away a definite amount of energy from the radiating system. The intensity of the radiated energy flux is given by formula (2.39). Taking into account the relations (see formulas (2.35)) $\mathbf{B}_{rad} = \mathbf{n}\times\mathbf{E}_{rad}$, $\mathbf{E}_{rad}\cdot\mathbf{n} = 0$, $E_{rad} = B_{rad}$, we can write

$$\mathbf{I} = \frac{c}{4\pi} \mathbf{E}_{rad} \times \mathbf{B}_{rad} = \frac{c}{4\pi} \mathbf{E}_{rad} \times (\mathbf{n} \times \mathbf{E}_{rad}) = \frac{c}{4\pi} E_{rad}^2 \mathbf{n} = \frac{c}{4\pi} B_{rad}^2 \mathbf{n}. \tag{6.2}$$

Taking into account our third axiom[1], we have to understand the above equation always in the following form

$$I = \frac{c}{T} \int_{-T/2}^{T/2} (E_{rad}^2/4\pi) dt = \frac{c}{T} \int_{-T/2}^{T/2} (B_{rad}^2/4\pi) dt, \tag{6.3}$$

where T is the period of the electromagnetic wave (the period of the photon). Indeed, according to my third axiom[1], only when time equal to the period of a particle has elapsed can we affirm that the particle has crossed a given surface. For times smaller than the period we cannot say on which side of the surface is the particle.

It is more convenient to express $\mathbf{I}$ by $\mathbf{B}_{rad}$ (see the right-hand expression in (6.2)) as $\mathbf{B}_{rad}$ can be expressed by $\ddot{\mathbf{d}}$ more simply than $\mathbf{E}_{rad}$ (see (6.1)).

The energy flux of radiation in a unit of time dP into the element of a solid angle $d\Omega$ is defined as the amount of energy passing in a unit of time through the element $dS = r^2 d\Omega$ of the spherical surface with center at the frame's origin and radius r (see fig. 1). This quantity is clearly equal to the intensity of the energy flux I multiplied by dS, so that using (6.1) we obtain

$$dP = I dS = \frac{c}{4\pi} B^2 r^2 d\Omega = \frac{1}{4\pi c^3} (\mathbf{n} \times \ddot{\mathbf{d}})^2 d\Omega. \tag{6.4}$$

The whole energy flux can be obtained if we integrate (6.4) over a sphere containing the radiating system at its center. Let us introduce spherical coordinates with polar axis along the vector $\ddot{\mathbf{d}}$. Let the zenith angle and the azimuth angle of the unit vector $\mathbf{n}$ be θ and ϕ; θ is consequently the angle between $\ddot{\mathbf{d}}$ and $\mathbf{n}$. As $d\Omega = \sin\theta \, d\theta \, d\phi$, the whole energy flux becomes

$$P = \int_{4\pi} \frac{(\mathbf{n} \times \ddot{\mathbf{d}})^2}{4\pi c^3} d\Omega = \int_0^{\pi} \int_0^{2\pi} \frac{\ddot{d}^2}{4\pi c^3} \sin^3\theta \, d\theta \, d\phi = \frac{2}{3c^3} \ddot{d}^2. \tag{6.5}$$

If we have just one charge moving in an external field, we shall have, keeping in mind (5.11) $\ddot{\mathbf{d}} = q\ddot{\mathbf{r}} = q\mathbf{u}$, so that the total energy radiated in a unit of time by this charge will be

$$P = \frac{2q^2}{3c^3} u^2. \tag{6.6}$$

We note that a system of particles, for all of which the ratio of charge to mass

is the same, cannot radiate (by dipole radiation). Indeed, for such a system we have

$$\mathbf{d} = \sum_{i=1}^{n} (q_i/m_i) m_i \mathbf{r}_i = \text{Const} \sum_{i=1}^{n} m_i \mathbf{r}_i = \text{Const}\, \mathbf{R} \sum_{i=1}^{n} m_i , \tag{6.7}$$

where Const is charge-to-mass ratio common for all charges and $\mathbf{R}$ is the radius vector of the center of inertia of the system. As the center of inertia moves uniformly, its acceleration is zero and consequently the second time derivative of $\mathbf{d}$ is also zero.

If the particle performs such a motion that its dipole moment is a simple periodic function of time with a period $T = 2\pi/\omega$, we shall have

$$\mathbf{d}(t) = \mathbf{d}_\omega e^{-i\omega t}, \tag{6.8}$$

where $\mathbf{d}_\omega$ is the complex amplitude of the dipole moment (which, at a suitable choice of the initial moment, can be taken real and equal to the maximum value of the dipole moment - see sect. 3).

Hence, substituting (6.8) into (6.5), we obtain for the total energy flux

$$P = \frac{2}{3c^3} |\ddot{\mathbf{d}}(t)|^2 = \frac{2}{3c^3} \omega^4 |\mathbf{d}_\omega|^2 . \tag{6.9}$$

7. RADIATION REACTION

As formulas (2.47) show, the radiation reaction electric and magnetic intensities are as follows

$$\mathbf{E}_{rea} = - (2q/3c^3)\, \mathbf{w}, \qquad \mathbf{B}_{rea} = 0. \tag{7.1}$$

Let us calculate the change of the energy of a system of n charges due only to the action of the electric intensities of radiation reaction $\mathbf{E}_{rea_i}$. On each charge of the system the "kinetic" force

$$\mathbf{f}_i = q_i\, \mathbf{E}_{rea_i} = - (2q_i^2/3c^3) \mathbf{w}_i , \quad i=1,2,\ldots,n \tag{7.2}$$

will act, called radiation reaction force (or radiation damping force, or Lorentz frictional force). The power of these forces acting on all charges of the system, i.e., the work done by the radiation reaction forces in a unit of time, is (see formula (7.14) in Ref. 1)

$$P = \sum_{i=1}^{n} \mathbf{f}_i . \mathbf{v}_i . \tag{7.3}$$

Substituting here (7.1), we get

$$P = -\frac{2}{3c^3}\sum_{i=1}^{n} q_i^2 \mathbf{w}_i \cdot \mathbf{v}_i = -\frac{2}{3c^3}\sum_{i=1}^{n} q_i^2 \{\frac{d}{dt}(\mathbf{u}_i \cdot \mathbf{v}_i) - u_i^2\}. \qquad (7.4)$$

Let us average this equation over time. At the averaging the first term on the right side will vanish as total time derivative of a bounded function. Thus the average work performed in a unit of time by the dampling forces will be

$$\bar{P} = \frac{2}{3c^2}\sum_{i=1}^{n} q_i^2 \bar{u}_i^2 = \frac{2}{3c^3}\bar{\ddot{d}}^2, \qquad (7.5)$$

where **d** is the dipole moment of the whole system of charges.

Comparing this formula with formula (6.5), we conclude that the average work done in a unit of time by the radiaction reaction forces over the charges (i.e., the power of the radiation reaction) is just equal to the total energy flux of radiation (i.e., to the power of radiation). This conclusion gives a firm ground of considering the radiation reaction as an energetic balance to the energy radiated by the charges in the form of electromagnetic waves (photons).

In a frame of reference in which the velocity of the particle is low, the equation of motion, when we include the radiation reaction, has the form (see eq. (8.2) in Ref. 1)

$$m\mathbf{u} = qE + \frac{q}{c}\mathbf{v}\times\mathbf{B} + \frac{2q^2}{3c^3}\mathbf{w}, \qquad (7.6)$$

where the first two terms on the right side represent the potential electromagnetic force of the external field and the third term represent the radiation reaction force. This radiation reaction force has the character of <u>"kinetic" force</u> and must be written on the <u>left</u> side of the equation of motion (8.2) in Ref. 1, so that on the <u>right</u> side of equation (7.6) it figures with opposite sign.

The charge can obtain an acceleration only when an external potential force acts on it. The accelerated charge will radiate electromagnetic waves and the radiation reaction will diminish its acceleration. Therefore the change (positive or negative) of the potential energy which the charge has with the external system will lead to a change in the kinetic energy of the charge (respectively, negative or positive) but will also lead to radiation; this radiation must always be considered as a positive

change because the radiated photons have zero potential energy with the external system and carry away only energy. Therefore radiation damping can exist only when the charge moves in an external field and the radiation reaction force (at $v \ll c$) is always small with respect to the potential electromagnetic force.

Let consider the motion of the charge in a frame where it is at rest, i.e., where $\mathbf{v} = 0$. Neglecting the radiation reaction force with respect to the potential electromagnetic force, we can write equation (7.6) in this frame as follows

$$\mathbf{u} = (q/m)\mathbf{E}, \tag{7.7}$$

and the super-acceleration must be written, when putting into (7.6) $\mathbf{v} = 0$ but $\mathbf{u} \neq 0$,

$$\mathbf{w} = (q/m)\dot{\mathbf{E}} + (q/mc)\,\mathbf{u}\times\mathbf{B}. \tag{7.8}$$

Substituting (7.7) into (7.8), we obtain

$$\mathbf{w} = (q/m)\dot{\mathbf{E}} + (q^2/m^2c)\mathbf{E}\times\mathbf{B}. \tag{7.9}$$

Thus, after the substitution of (7.9) into (7.2), the radiation reaction force can be expressed by the external electric and magnetic intensities as follows

$$\mathbf{f} = -(2q^3/3mc^3)\dot{\mathbf{E}} - (2q^4/3m^2c^4)\mathbf{E}\times\mathbf{B}. \tag{7.10}$$

xxxxx

In Ref. 3 I give the fundamental formulas for the radiation of polyperiodic and aperiodic systems and I consider the higher than zero approximations which lead to quadrupole and magnetic dipole radiations. Then I consider the effects which appear when the velocity of the radiating charge is comparable with light velocity and I give the most detailed calculations of the synchrotron radiation.

8. GRAVIMAGRETIC WAVES

My mathematical apparatus in electromagnetism and gravimagretism are almost totally identical[1,3]. Thus, if taking into account the fundamental Newton-Marinov equation (7.11) in Ref. 1, by analogy with the electric and magnetic intensities (2.24) and (2.25), we can introduce the gravitational and magretic intensities produced by an arbitrarily moving mass m

$$\mathbf{G} = -\gamma m_o \frac{(1 - v'^2/c^2)(\mathbf{n}' - \mathbf{v}'/c)}{r'^2(1 - \mathbf{n}'.\mathbf{v}'/c)^3} - \gamma\frac{m_o}{c^2}\frac{\mathbf{n}'\times\{(\mathbf{n}' - \mathbf{v}'/c)\times\mathbf{u}'\}}{r'(1 - \mathbf{n}'.\mathbf{v}'/c)^3} - \gamma\frac{m_o}{c^3}\,\mathbf{n}'\times(\mathbf{n}'\times\mathbf{w}'), \tag{8.1}$$

$$\mathbf{B} = \gamma\frac{m_0}{c}\frac{(1-v'^2/c^2)\mathbf{n}'\times\mathbf{v}'}{r'^2(1-\mathbf{n}'.\mathbf{v}'/c)^3} - \gamma\frac{m_0}{c^2}\frac{\mathbf{n}'\times[\mathbf{n}'\times\{(\mathbf{n}'-\mathbf{v}'/c)\times\mathbf{u}'\}]}{r'(1-\mathbf{n}'.\mathbf{v}'/c)^3} + \gamma\frac{m_0}{c^3}\mathbf{n}'\times\mathbf{w}', \qquad (8.2)$$

where γ is the gravitational constant, m_0 is the proper mass of the particle, and $\mathbf{v}'$, $\mathbf{u}'$, $\mathbf{w}'$ are its velocity, acceleration, and super-acceleration at the advanced moment $t' = t - r'/c$, t being the observation moment and r' the advanced distance.

The calculation of **G** and **B** can also be made with the retarded elements of motion, according to formulas analogous to (2.26) and (2.27).

We attribute the first terms in the above equations to the potential gravimagretic intensities, $\mathbf{G}_{pot}$, $\mathbf{B}_{pot}$, the second terms to the radiation gravimagretic intensities, $\mathbf{G}_{rad}$, $\mathbf{B}_{rad}$, and the thrid terms to the radiation reaction gravimagretic intensities $\mathbf{G}_{rea}$, $\mathbf{B}_{rea}$. We call the radiation gravimagretic field also gravimagretic waves. By analogy with the photons, we can introduce the gravitons as quanta of gravimagretic radiation.

The gravimagretic waves are extremely feeble and I am sceptical whether their existence can be detected at the present state of experimental technique. As an example I shall calculate the gravitational radiation intensity produced by a mass m = 9 g, performing oscillations with an acceleration $u = 10^6$ cm/sec (such are the accelerations of a steel ball falling from 1 m, if after the fall it must make repercussions between two steel surfaces, the distance between which is a little bit bigger than the diameter of the ball), at a distance r = 6.67 cm. Using formula (8.1) under the condition $v \ll c$, we obtain for the intensity along the direction of maximum radiation

$$G = \gamma mu/c^2 r = 10^{-22}\ \text{cm/sec}^2. \qquad (8.3)$$

This is such a feeble gravitational intensity that there are no methods for its detection. For this reason the efforts of the scientists are directed towards the detection of gravimagretic radiation produced by celestial bodies where, they hope, the intensity should be stronger.

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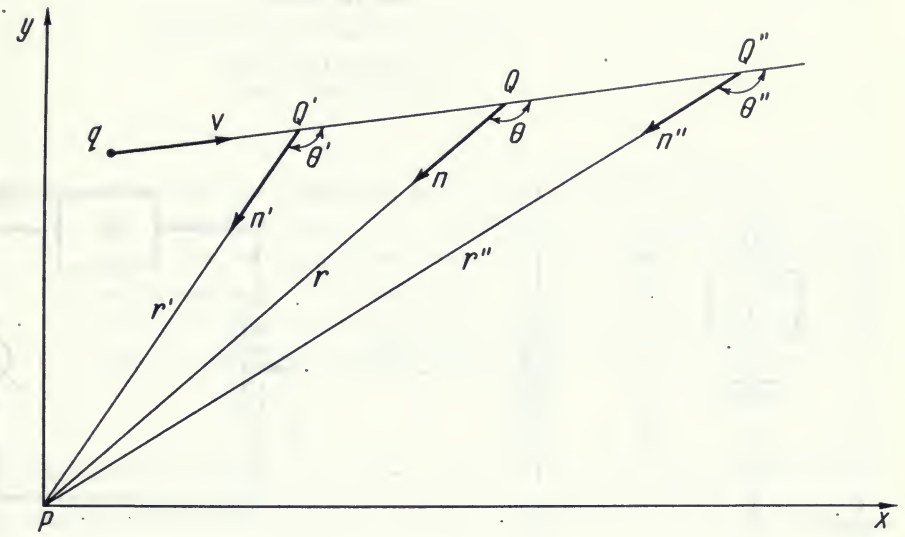

Fig. 1

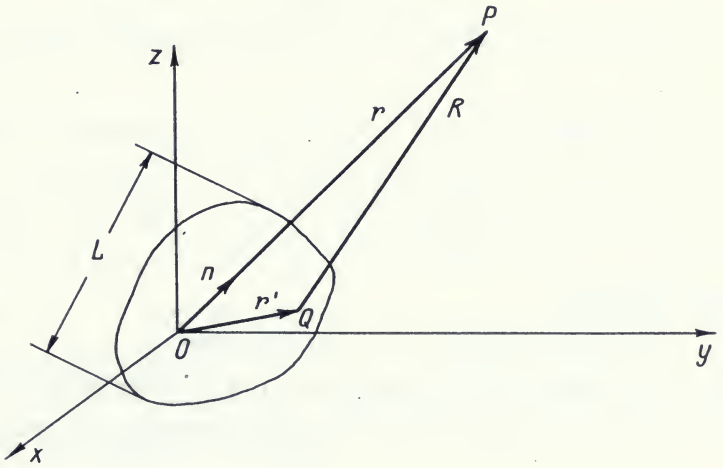

Fig. 2

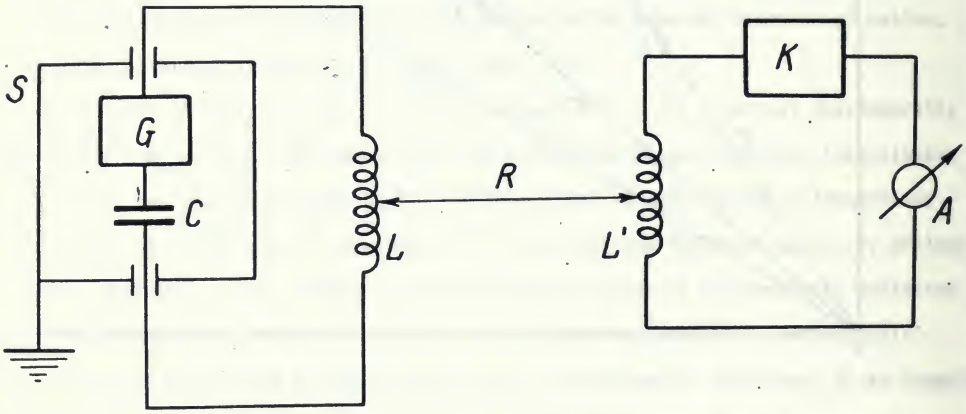

Fig. 3

FIGURE CAPTIONS:

Fig. 1. Advanced, observation, and retarded distances.

Fig. 2. Electromagnetic system and a far lying reference point.

Fig. 3. Experiment demonstrating the momentary propagation of potential intensities.

ABSOLUTE AND RELATIVE NEWTON-LORENTZ EQUATIONS

Stefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Graz, Austria

Abstract. I show that the fundamental electromagnetic Lorentz equation has its well known form (which I call the absolute Newton-Lorentz equation) only if the used reference frame rests in absolute space. If the used reference frame moves in absolute space, this equation has a different form which I call the relative Newton-Lorentz equation. Recent experiments have confirmed the validity of the relative Newton-Lorentz equation.

In electromagnetism there are only two fundamental equations which cannot be deduced from other more simple postulates. Those are the laws of Coulomb and Neumann which assert that if there are two electric charges q_1, q_2 moving with velocities $\mathbf{v}_1$, $\mathbf{v}_2$, then they have two kind of energies, called electric (space) and magnetic (space-time) energies (the itilicized words here and beneath are my terms)

$$U = q_1q_2/r, \qquad W = q_1q_2\mathbf{v}_1.\mathbf{v}_2/c^2r, \tag{1}$$

where r is the distance between the charges and the formulas are written in the CGS-system of units.

Using the law of superposition (the energies of a system of more than two charges is the sum of the energies of all its pairs) and putting (1) in the law of conservation of energy $dE_0 + dU + dW = 0$, where E_0 is the sum of the time energies $e_0 = mc^2(1 - v^2/c^2)^{-1/2}$ of any of the particles of the system, m being the respective particle's mass and $\mathbf{v}$ its velocity, I showed[1,2], by rigorous (and very simple) mathematical speculations, that one can obtain the fundamental equation in electromagnetism (called by me the Newton-Lorentz equation) and from it all electromagnetic "laws". I obtain this equation in the form

$$(d/dt)(\mathbf{p}_0 + q\mathbf{A}/c) = - q\,\mathrm{grad}(\Phi - \mathbf{v}.\mathbf{A}/c), \tag{2}$$

where $\mathbf{p}_o = m\mathbf{v}(1 - v^2/c^2)^{-1/2}$ is the momentum of a particle with electric charge q at a reference point where the electric and magnetic potentials of the surrounding system of n particles (summation form 1 to n) are

$$\Phi = \sum q_i/r_i, \qquad \mathbf{A} = \sum q_i\mathbf{v}_i/cr_i, \tag{3}$$

so that $q\Phi$ and $(q\mathbf{v}/c).\mathbf{A}$ are the electric and magnetic energies in which charge q takes part.

As $d\mathbf{A}/dt = \partial\mathbf{A}/\partial t + (\mathbf{v}.\mathrm{grad})\mathbf{A}$, we can reduce eq. (2) to its usual form (known as the Lorentz equation)

$$d\mathbf{p}_o/dt = -q(\mathrm{grad}\Phi + \partial\mathbf{A}/\partial t) + (q\mathbf{v}/c)\times\mathrm{rot}\mathbf{A}. \tag{4}$$

The above formulas are written in a reference frame attached to absolute space (the space in which light velocity is isotropic) and I call (2) and (4) the absolute Newton-Lorentz equation. Now I shall show which will be the form of the relative Newton-Lorentz equation, i.e., when working in a frame moving with a velocity $\mathbf{V}$ in absolute space. As I demonstrated with my "rotating axle" experiments[1-5], the Earth moves in absolute space with a velocity of about 350 km/sec and during a year this velocity suffers changes of about ± 30 km/sec because of the Earth's revolution around the Sun.

Thus let us suppose that the velocities of the test charge and of the charges of the surrounding system in the laboratory are respectively $\mathbf{v}'$ and $\mathbf{v}'_i$. I shall obtain the relative Newton-Lorentz equation within an accuracy of the first order in V/c, so that the Galilei formulas for velocity addition $\mathbf{v} = \mathbf{v}' + \mathbf{V}$, $\mathbf{v}_i = \mathbf{v}'_i + \mathbf{V}$ can be used. If working with a higher accuracy, the Marinov formulas for velocity addition are to be used[1,2,6]. Taking into account the Galilei formulas we shall have

$$\Phi - \frac{\mathbf{v}.\mathbf{A}}{c} = \sum\frac{q_i}{r_i} - \frac{\mathbf{v}'+\mathbf{V}}{c}.\sum\frac{q_i(\mathbf{v}'_i+\mathbf{V})}{cr_i} \cong \Phi'\left(1 - \frac{\mathbf{v}'.\mathbf{V}}{c^2}\right) - \frac{\mathbf{v}'}{c}.\mathbf{A}' - \frac{\mathbf{V}}{c}.\mathbf{A}', \tag{5}$$

where $\Phi' = \Phi$ is the relative electric potential which is equal to the absolute electric potential, as the electric potential is not velocity dependent, $\mathbf{A}' = \sum q_i\mathbf{v}'_i/cr_i$ is the relative magnetic potential, and the expression on the right side is written within an accuracy of first order in V/c.

I beg the reader to take into account two substantially different invariances[1,2]: the Lorentz invariance and the Marinov invariance. One works with the Lorentz invariance when an observer considers the motion of a particle which first moves with a velocity **v** in absolute space and then with another velocity **v'**, while one works with the Marinov invariance when the motion of a particle moving always with the same velocity **v** is considered by an observer who first is at rest in absolute space and then moves with a velocity **V**. Thus the Lorentz invariance is to be applied when the observed particle changes its character of motion with respect to distant matter, while the Marinov inariance is to be applied when the observer changes his character of motion with respect to distant matter. For the Lorentz invariance there is a change in the momentum and energy of the observed particle and it involves 4-dimensional invariants, while for the Marinov invariance there is no change in the momentum and energy of the observed particle and it involves 3-dimensional invariants. For the theory of relativity it is of no significance whether the observed particle or the observer changes its (his) character of motion, however, unfortunately, these two cases are physically substantially different, as the reader can become aware upon reading my papers and books.

The "total" time derivatives of the absolute and relative magnetic potentials must be equal, i.e., $d\mathbf{A}/dt = d\mathbf{A}'/dt$, because $d\mathbf{A}/dt$ depends only on the changes of the relative velocities of the charges of the system with respect to the test charge and on the changes of the distances between the former and the latter which are also "relative". Thus putting the above equality and (5) into (2), we obtain

$$\frac{d}{dt}\frac{m(\mathbf{v}+\mathbf{V})}{\{1-(\mathbf{v}+\mathbf{V})^2/c^2\}^{1/2}} = -q(\mathrm{grad}\Phi + \frac{1}{c}\frac{\partial \mathbf{A}}{\partial t}) + \frac{q}{c}\mathbf{v}\times\mathrm{rot}\mathbf{A} + \frac{q\mathbf{v}.\mathbf{V}}{c^2}\mathrm{grad}\Phi + \frac{q}{c}\mathbf{V}\times\mathrm{rot}\mathbf{A} + \frac{q}{c}(\mathbf{V}.\mathrm{grad})\mathbf{A}, \qquad (6)$$

where the space and time derivatives are taken with respect to the laboratory, as we work only within an accuracy of first order in V/c[1,2,6], and, for brevity, we write all laboratory quantities in the last equation (and further in this paper) without primes.

Comparing formulas (6) and (4), we see that the "potential" (right) parts of

these equations differ with the last three terms in eq. (6). As the electric (i.e., related to Φ) absolute effects are proportional to v/c, they are small if $v \ll V$ with respect to the magnetic (i.e., related to **A**) absolute effects which are not only comparable with the relative magnetic effects but, for $V \gg v$, are even much bigger.

In Ref. 5, 7 - 10, I informed the scientific community that I have discovered a third type of electromagnetic induction which I called the motional-transformer induction. The motional-transformer induction had to be discovered in the XIXth century but, strangely enough, humanity failed to notice it. I see three reasons that this fundamental kind of induction remained undiscovered until the end of XXth century:

1) The early victory of the wrong "intensity" and "flux" interaction concepts of Faraday-Maxwell (as opposed to the "potential" and "point-to-point" interaction concepts of Weber-Riemann).

2) The early victory of the wrong principle of relativity of Lorentz-Einstein (as opposed to the absolute (or aether) concepts of Newton-Ives).

3) The fact that for closed wires the motional and motional transformer inductions lead to the same induced circular tension, as I showed on Ref. 5.

I say that I have "discovered" the motional-transformer induction. Meanwhile any logically thinking child acquainted with the basic rules of mathematics must come to it when contemplating the Newton-Lorentz eq. (4).

First let me note that $d\mathbf{p}_0/dt$ is called kinetic force of the charge q. The kinetic force of a unit charge $\mathbf{E} = (d\mathbf{p}_0/dt)/q$ is called electric intensity. Considering an electrically neutral system of charges where the electric action of the positive charges is neutralized by the electric action of the negative charges (such is a system of closed wires along which direct and alternating currents flow), we shall have $\Phi = 0$ and this assumption will be held further throughout the whole paper. Let us assume that the surrounding system represents only one current loop. There are possible three fundamentally different cases:

1) The loop is at rest, the current is constant, the test charge is moving. Then eq. (4) reduces to the following one

$$c\mathbf{E}_{mot} = \mathbf{v}\times\mathrm{rot}\mathbf{A}, \qquad (7)$$

and I (as well as conventional physics) call this the motional electric intensity (motional induction).

2) The loop is at rest, the current is alternating, the test charge is at rest. Then eq. (4) reduces to the following one

$$c\mathbf{E}_{tr} = - \partial\mathbf{A}/\partial t, \tag{8}$$

and I (as well as conventional physics) call this the transformer electric intensity (transformer induction, with more precision rest-transformer induction).

3) The loop is moving, the current is constant, the test charge is at rest. Then eq. (4) reduces to the following one, if taking into account that in this case $\mathbf{A}$ is a composite function of time t through the distances r_i of the n current elements of the loop to the reference point

$$c\mathbf{E}_{mot\text{-}tr} = - \frac{\partial \mathbf{A}}{\partial t} = - \sum \frac{\partial \mathbf{A}_i\{r_i(t)\}}{\partial t} = - \sum \left(\frac{\partial \mathbf{A}_i}{\partial x_i}\frac{\partial x_i}{\partial t} + \frac{\partial \mathbf{A}_i}{\partial y_i}\frac{\partial y_i}{\partial t} + \frac{\partial \mathbf{A}_i}{\partial z_i}\frac{\partial z_i}{\partial t}\right) = \sum (\mathbf{v}_i.\mathrm{grad})\mathbf{A}_i, \tag{9}$$

where $\mathbf{v}_i = - \partial \mathbf{r}_i/\partial t$ is the velocity of the ith current element of the loop, so that $- \mathbf{v}_i$ is the velocity of the test charge in the moving inertial frame attached to the ith current element of the loop. If the whole current loop moves with the velocity $\mathbf{v}$, formula (9) reduces to the following one

$$c\mathbf{E}_{mot\text{-}tr} = (\mathbf{v}.\mathrm{grad})\mathbf{A}. \tag{10}$$

I call this the motional-transformer electric intensity (motional-transformer induction). I repeat, one must come automatically to formulas (9) and (10) if one follows the most common mathematical logic. However, although it may seem incredible and absurd, conventional physics denies the existence of formulas (9) and (10) and, proceeding from the principle of relativity, asserts that in the third case the induced electric intensity must be calculated according to the formula

$$c\mathbf{E} = - \mathbf{v}\times\mathrm{rot}\mathbf{A}, \tag{11}$$

i.e., it reduces the third case to the first one, considering them as identical.

In my paper "Late discovery of the motional-transformer induction", rejected by EUROPH. LETT., I wrote the following:

If leaving apart the discussion whether the principle of relativity is right or wrong, the first conclusion to which one comes is the following: Conventional physics is unable to calculate the induced electric intensity in the third case working in the frame in which the test charge is at rest and the loop moving. This is a comical situation. We know that very often the professors pose to the students in physics and engineering the exercise to solve a certain mechanical problem working in a definite frame of reference. The student answers: "I can solve the problem but working in another frame where the problem looks simpler." The professor replies: "No, I wish that you solve it in this frame." The student gives up. The professor gives him a bad note and the student must repeat the examination the next semester.

And now all professors in the whole world cannot solve the problem presented in case three working in the frame in which the unit test charge is at rest and the loop moving. What have I to do? - To give a bad note to all professors and to call them for a second examination next century?

But there is a very big difference between the bad students in mechanics and the bad professors in electromagnetism. In low-velocity mechanics the principle of relativity is valid and if a clever student finds a convenient reference frame where he can solve the posed problem, I, as a professor, must let him go through, as the problem is being solved. But in electromagnetism (and in high velocity mechanics) the principle of relativity is not valid[1-10], and the solutions (10) and (11) are different. Thus I cannot leave the professors go through!

The referee of EUROPH. LETT. who rejected the above paper wrote in his comments: "I'm sure that, given time, I could meet the challenge of working out the fields in the lab frame when the coil moves", although in the preceding paragraph the referee wrote: "My apologies for holding on to the paper for so long. However, I took the paper to France with me and gnowed at it for a bit."

I further affirm that no relativist is able to deduce fromula (11) for the third case. If some relativist will be successful and will publish his deduction, I shall gladly send him $ 3,000.

I should like only to note that for the third case formula (10) and NOT formula (11) is adequate to physical reality. The experiment which has verified this is the following (fig. 1): Along the rectangular loop with d much bigger than b, a constant current I flows in the indicated direction. If moving the vertical wire with a velocity v to the right, between the extremities of the wire an induced motional electric

tension will appear which, according to formula (7) will have the indicated polarity and the magnitude $U_{mot} \cong (4vI/c^2)\ln(2b/b_o)$. If, however, the vertical wire is kept at rest and the loop is moved with the same velocity to the left, an induced motional-transformer electric tension will appear which, according to formula (10), will have the same polarity and the magnitude $U_{mot\text{-}tr} \cong 8vIb^2/c^2d^2 \cong 0$.

Experiments confirming these formulas have been carried out first by Kennard[11] for rotational motion and recently by my friend F. Müller for inertial montion. Müller's experiments can be repeated by 16-years old children but all journals to which Müller submitted his reports rejected them and they can be seen only in my publications[5,8].

Now I shall show that the effects observed by Müller are to be predicted not only when working with the absolute Newton-Lorentz equation (4) but also when working with the relative Newton-Lorentz equation (6). Indeed, let us suppose that the system originating the magnetic field (the loop in fig. 1) is at rest in the laboratory and the latter moves with the constant velocity **V** in absolute space. The test charge (the vertical wire in fig. 1) is first also at rest in the laboratory and then is moved with the velocity **v** with respect to the laboratory. The induced electric intensities in these two cases, according to formula (6) will be

$$c\mathbf{E} = \mathbf{V}\times\mathrm{rot}\mathbf{A} + (\mathbf{V}.\mathrm{grad})\mathbf{A}, \qquad c\mathbf{E}' = \mathbf{v}\times\mathrm{rot}\mathbf{A} + \mathbf{V}\times\mathrm{rot}\mathbf{A} + (\mathbf{V}.\mathrm{grad})\mathbf{A}, \tag{12}$$

and for the difference $\mathbf{E}' - \mathbf{E}$ (which was the effect measured by Müller[8]) one obtains the result (7).

Let us then suppose that the test charge is always at rest in the laboratory and the loop originating the magnetic field is first also at rest in the laboratory and then is moved with the velocity **v** with respect to the laboratory. The induced electric intesity for the first case will be as above. For the second case, we have to write the relative Newton-Lorentz equation in a frame moving with a velocity **V** + **v** in absolute space as only in this frame the originated laboratory magnetic potential will be as in the first case, and as in this frame the test charge will have a velocity -**v**, we obtain

$$c\mathbf{E}'' = -\mathbf{v}\times\mathrm{rot}\mathbf{A} + (\mathbf{V}+\mathbf{v})\times\mathrm{rot}\mathbf{A} + \{(\mathbf{V}+\mathbf{v}).\mathrm{grad}\}\mathbf{A} \tag{13}$$

and for the difference $\mathbf{E}'' - \mathbf{E}$ we obtain the result (10).

The theory of electromagnetism in my absolute interpretation is so simple and clear that 16-years old children acquainted with the basic rules of vector analysis become familiar with it in a couple of days. The experiments verifying the theory can also be carried out by 16-years old children. I am wondering when the scientific community will finally understand all those childish formulas and throw over board the relativistic nonsense which, first, is complicated and, secondly, wrong.

I beg the reader to note that in this short paper proceeding from the axiomatical forms of the space, space-time and time energies of two, respectively, one, particle I deduced in a rigorous mathematical way a good deal of electromagnetic theory.

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FIGURE CAPTION

Fig. 1. - Experiment revealing the difference between the motional and motional-transformer inductions.

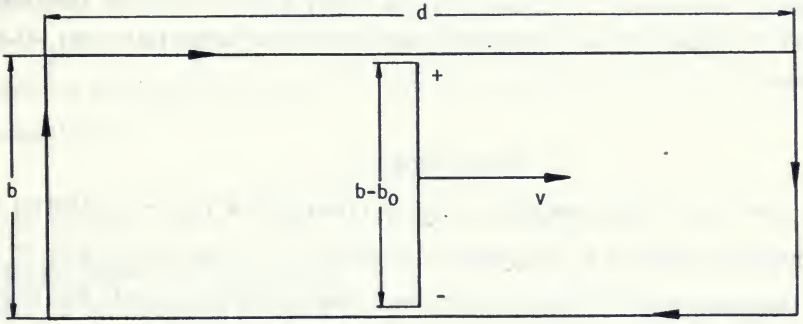

Fig. 1

ACTION OF CONSTANT ELECTRIC CURRENT ON ELECTRONS AT REST DUE TO THE ABSOLUTE VELOCITY OF THE EARTH

Stefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Graz, Austria

Abstract. A very simple electromagnetic experiment is presented which shows that the magnetic effects depend not on the relative velocities of the electric charges but on their absolute velocities. The effect observed depends on the position of the apparatus with respect to the fixed stars and thus with its help one is able to measure the magnitude of the laboratory's absolute velocity and the equatorial coordinates of its apex. As there were difficulties with the calibration of the apparatus, only the right ascension of the velocitiy's apex was determined.

1. INTRODUCTION

If there is an electromagnetic system originating the electric potential Φ and the magnetic potential $\mathbf{A}$, the electric intensity (i.e., the force acting on a unit positive electric charge), according to the well-known Lorentz equation, will be

$$\mathbf{E} = -\,\mathrm{grad}\Phi - \partial\mathbf{A}/\partial t + \mathbf{v}\times\mathrm{rot}\mathbf{A}, \qquad (1)$$

where $\mathbf{v}$ is the velocity of the test charge. If $\Phi = 0$, $\partial\mathbf{A}/\partial t = 0$, $\mathbf{v} = 0$, there will be $\mathbf{E} = 0$, even if $\mathbf{A} \neq 0$ and also $\mathrm{rot}\mathbf{A} \neq 0$.

However R. Sansbury[1] has observed an interaction between constant electric current and electric charges at rest. The experiment of Sansbury showed that a charged metal foil which was mounted on a lightly rotating torque bar changed its equilibrium position when current flowed along a U-form wire, and Sansbury concluded, after having excluded any other possible effects, that the effect is electrodynamical and thus contradicting equation (1). Such unexplainable by conventional theory effect of interaction between constant electric current and charges at rest was observed also by Edwards et al.[2]

Marinov showed[3,4] that constant electric current can make charge separation along a non-closed wire if the absolute velocity of the laboratory

is non zero. Thus the disturbance of the equilibrium in Sansbury's experiment may be due not to an "electrostatic" attraction/repulsion between the current wire and the charged foil, but to a change of the amount of electric charges on the foil due to the electromagnetic induction predicted by Marinov which leads to separation of the charges on the foil and the connected to it wires, because of the absolute velocity of the laboratory.

The experiment reported in this paper was proposed by Marinov[3,4]. It has a certain similarity with Sansbury's experiment, however the geometry of Marinov's experiment is leading to a bigger effect which, moreover, is very easily calculable. The effect observed confirms the existence of the motional-transformer induction discovered by Marinov[3,4,5] and the absolute character of the magnetic interaction.

2. THEORY

In Marinov's theory[3,6] equ. (1) is valid in absolute space and is called the absolute Newton-Lorentz equation. In the laboratory moving with a velocity $\mathbf{V}$ in absolute space Marinov obtained[3,6] the relative Newton-Lorentz equation

$$\mathbf{E} = -\operatorname{grad}\Phi - \partial\mathbf{A}/\partial t + \mathbf{v}\times\operatorname{rot}\mathbf{A} + \varepsilon_0\mu_0\mathbf{v}.\mathbf{V}\operatorname{grad}\Phi + \mathbf{V}\times\operatorname{rot}\mathbf{A} + (\mathbf{V}.\operatorname{grad})\mathbf{A}, \qquad (2)$$

where Φ and $\mathbf{A}$ are the laboratory electric and magnetic potentials, $\mathbf{v}$ is the laboratory velocity of the test charge, and ε_0, μ_0 are the electric and magnetic constants.

Let us assume that the electromagnetic system observed consists of a single current wire. Thus its electric potential will be zero and we can have the following three fundamentally different cases:

1) The loop is at rest, the current is constant, the test charge is moving. The equation (1) reduces to the following one

$$\mathbf{E}_{mot} = \mathbf{v}\times\operatorname{rot}\mathbf{A}, \qquad (3)$$

which is called the motional induction.

2) The loop is at rest, the current is alternating, the test charge is at rest. The equation (1) reduces to the following one

$$\mathbf{E}_{tr} = - \partial \mathbf{A}/\partial t, \qquad (4)$$

which is called the transformer induction, more precisely, rest-transformer induction.

3) The loop is moving, the current is constant, the test charge is at rest. Then, taking into account that in this case **A** is a composite function of the time t through the distances r_i of the n current elements of the loop to the reference point, equation (1) is to be reduced to the following one

$$\mathbf{E}_{mot\text{-}tr} = - \frac{\partial \mathbf{A}}{\partial t} = - \sum_{i=1}^{n} \frac{\partial \mathbf{A}_i\{r_i(t)\}}{\partial t} = - \sum_{i=1}^{n} \left(\frac{\partial \mathbf{A}_i}{\partial x_i} \frac{\partial x_i}{\partial t} + \frac{\partial \mathbf{A}_i}{\partial y_i} \frac{\partial y_i}{\partial t} + \frac{\partial \mathbf{A}_i}{\partial z_i} \frac{\partial z_i}{\partial t} \right) =$$

$$\sum_{i=1}^{n} (\mathbf{v}_i . \mathrm{grad}) \mathbf{A}_i , \qquad (5)$$

where $\mathbf{v}_i = - \partial \mathbf{r}_i/\partial t$ is the velocity of the ith current element of the loop, so that $- \mathbf{v}_i$ is the velocity of the test charge in the moving inertial frame attached to the ith current element of the loop. If the whole current loop moves with the velocity **v**, formula (5) reduces to the following one

$$\mathbf{E}_{mot\text{-}tr} = (\mathbf{v}.\mathrm{grad})\mathbf{A}. \qquad (6)$$

This kind of induction which is unknown to conventional physics was called by Marinov the motional-transformer induction.

There are three principal reasons which led to the strange situation that this fundamental kind of induction, which had to be discovered by Faraday or Maxwell, was discovered at the end of the XXth century:

1) The early victory of the wrong "intensity" and "flux" interaction concepts of Faraday-Maxwell (as opposed to the "potential" and "point-to-point" interaction concepts of Weber-Riemann).

2) The early victory of the wrong principle of relativity of Lorentz-Einstein (as opposed to the absolute (or aether) concepts of Newton-Ives).

3) The fact that for closed wires (loops) the motional and motional-transformer inductions lead to the same induced circular tension.

We have to consider the third reason as the most important, as it was an experimental reason. Its validity can be shown easily. Indeed, as for any constant vector **v** and arbitrary vector **A** the following mathematical relation is valid

$$\mathrm{rot}(\mathbf{v} \times \mathrm{rot}\mathbf{A}) = - \mathrm{rot}\{(\mathbf{v}.\mathrm{grad})\mathbf{A}\}, \qquad (7)$$

we shall have, comparing formulas (3) and (6),

$$\mathrm{rot}\mathbf{E}_{mot} = -\,\mathrm{rot}\mathbf{E}_{mot\text{-}tr}, \tag{8}$$

and thus along a closed loop the motional tension, U_{mot}, and the motional-transformer tension, $U_{mot\text{-}tr}$, will be equal

$$U_{mot} \equiv \oint_L \mathbf{E}_{mot}\cdot d\mathbf{l} \equiv \int_S \mathrm{rot}\mathbf{E}_{mot}\cdot d\mathbf{s} = -\int_S \mathrm{rot}\mathbf{E}_{mot\text{-}tr}\cdot d\mathbf{s} \equiv -\oint_L \mathbf{E}_{mot\text{-}tr}\cdot d\mathbf{l} \equiv -U_{mot\text{-}tr}, \tag{9}$$

where L is the contour of the loop and S is an arbitrary surface spanned on the loop. Thus the motional-transformer induction can be discerned from the motional induction only if experiments with non-closed wires should be carried out. Such experiments did first Kennard[7], although neither he nor the persons commenting on his experiments (see, for example, Ref. 8) have understood the essence of his experiments.

3. EXPERIMENT

In a rectangular loop with length d = 150 cm and breadth b = 15 cm (the effect is the biggest at $d \gg b$ and disappears at $d = b$) a metal bar with length $b - b_0 = 14.5$ cm was placed, as shown in Fig. 1. The loop had $n = 100$ windings and a current $I_1 = 3$ A was sent through the wire, so that the total current along the rectangle was $I = nI_1 \cong 300$ A. Let us assume that the magnetic intensity $\mathbf{B} = \mathrm{rot}\mathbf{A}$, generated by the horizontal wires of the loop at a point distant r from the wires is the same as of an infinitely long wire, i.e., $B = \mu_0 I/2\pi r$. If moving the bar to the right with a velocity v, then, at the indicated direction of the current along the loop, an induced motional electric tension with the indicated polarity will appear along the bar, whose magnitude will be (take into account that the horizontal current wires of the loop are two and assume $b \gg b_0$)

$$U_{mot} = \int_{b_0/2}^{b-b_0/2} 2\,v\,B\,dy = \frac{\mu_0 v I}{\pi}\int_{b_0/2}^{b-b_0/2} dy/y \cong \frac{\mu_0 v I}{\pi}\ln\frac{2b}{b_0}. \tag{10}$$

Let us now assume that the vertical bar is kept at rest and the rectangular loop is moved with the same velocity v to the left. Now the induction will be motional-transformer and the calculation is to be done by using formula (6). The x-component of the magnetic potential, A_x, will be a function only of y, the

y-component (for $d \gg |x|$),

$$A_y = \frac{\mu_0 Ib}{4\pi(d/2+x)} - \frac{\mu_0 Ib}{4\pi(d/2-x)} \cong -\frac{2\mu_0 Ibx}{\pi d^2}, \qquad (11)$$

will be a function only of x, and the z-component, A_z, will be equal to zero. Thus the unique term of the vector-gradient (6) which is different from zero gives the induced motional-transformer electric intensity

$$E_{mot\text{-}tr} = v_x \frac{\partial A_y}{\partial x}\hat{\mathbf{y}} = \frac{2\mu_0 vIb}{\pi d^2}\hat{\mathbf{y}}, \qquad (12)$$

and the induced tension will have the same polarity as shown in the figure. In formula (11) we take into account only the magnetic potential produced by the vertical wires of the rectangular loop because only their potential is directed along the y-axis. The magnetic potential is calculated from the fundamental formula for the magnetic potential, $\mathbf{A} = \mu_0 q\mathbf{v}/4\pi r$, produced by a charge q moving with a velocity $\mathbf{v}$, at a reference point distant r, assuming $\sum q_i v_i = Ib$ for all charges moving along the vertical wires of the loop. |x| is the horizontal distance between the center of the loop and the bar, and we have $v_x = -v$. From formula (12) we find the magnitude of the induced motional-transformer tension

$$U_{mot\text{-}tr} = 2\mu_0 vIb^2/\pi d^2 \cong 0. \qquad (13)$$

Thus, for $d \gg b$, U_{mot} is much bigger than $U_{mot\text{-}tr}$ which can be taken equal to zero.

If the loop and the bar will be moved <u>together</u>, then, as $U_{mot\text{-}tr} \cong 0$, we see that the tension which will remain to act along the bar will be the motional tension. But if the loop and the bar move together, the question is to be posed: <u>with respect to what</u>? The answer can be only one: with respect to absolute space. This answer gives also the relative Newton-Lorentz equation (2), as by putting there $\Phi = 0$, $\partial\mathbf{A}/\partial t = 0$, $v = 0$, we obtain for the tension acting along the bar

$$E = \mathbf{V}\times\mathrm{rot}\mathbf{A}, \qquad (14)$$

as for the geometry of the experiment (we have shown this above) $(\mathbf{V}.\mathrm{grad})\mathbf{A} \cong 0$.

Taking[3,9] for the Earth's absolute velocity <u>approximately</u> V = 300 km/sec, we obtain from formula (10) for our experiment U = 147 V.

It is clear that this tension can be not measured by a voltmeter, as in a clo-

sed loop the tension must be null. Thus, as suggested by Marinov[3], we did "electrometric" measurements by putting very thin foils of damped aluminium at the extremities of the bar, the dimensions of the bar being 14.5×1.5×0.3 cm. The one side of the foils was conducting and the other not. Thus there was not an electric contact between the bar and the Aluminium layer, and the charges on the layer were separated by electrostatic induction by the charges at the extremities of the bar, the latter being separated along the bar by electromagnetic induction. The detector showed an effect (opening of the foils) by putting on the bar tensions down to 12 V.

As in the laboratory there are many different causes which lead to an opening of the Aluminium foils (let us call them "disturbing effects"), we did not care about to try to specify and eventually eliminate them. Thus the Al-foils were always to a certain extent open and during the different days this opening was different. We could observe the effect of the absolute motion of the Earth only by mounting the set-up on a rotating platform. We observed by rotation that there were two positions when the opening of the foils was maximal and two positions when it was minimal. The difference between those positions was always about 90^0. It was difficult to make calibration of the detector, as the check tension was applied by connecting the bar with one electrode of a variable tension, while the induced tension to be measured was applied between the end points of the bar. Thus it was very difficult to fit the degree of opening of the foils to formula (10), as the geometry of the experiment was not easily calculable (the foils had to cover the smallest side of the bar and not the extremities of the largest side, as it was in our experiment) and the readings were not enough stable and repeatable.

The method for establishing the magnitude of the Earth's absolute velocity and the equatorial coordinates of its apex (if the readings of the calibrated detector were reliably corresponding to the induced along the bar tension) is given by Marinov[9]. We used this method only for establishing the right ascension of the apex. For this reason we registered the two moments when the opening of the foils was maximal for a direction of the axis of the set-up "north-south".

On the 22 January 1989 we registered in Graz ($\phi = 47^{o}$, $\lambda = 15^{o}26^{'}$) maximal openings of the leaves at the following two moments of Middle-European standard time: $(t_{st})_a = 3.8^h$, $(t_{st})_b = 15.8^h$. The local sideral times corresponding to these two moments were: $(t_{si})_a = 11.8^h$, $(t_{si})_b = 23.8^h$. One of these times was equal to the right ascension of the velocity's apex.

The right ascension of the Earth's absolute velocity which Marinov established with his interferometric "coupled mirrors" experiment[9] and with his "coupled shutters" experiment[3] were: $\alpha_{c-m} = 13.5^h \pm 0.5^h$, $\alpha_{c-s} = 12.5^h \pm 1^h$.

4. CONCLUSIONS

The above experiment is the first non-optical experiment with which the Earth's absolute velocity has been measured (for the time being this experiment has given only the right ascension of the Earth's absolute velocity). The experiment presents an inertial variation of the historical Kennard's rotational experiment[7] which was the first one where the absolute aspects of the electromagnetic interactions have been clearly demonstrated. For this reason I decided to call the above experiment the quasi-Kennard experiment.

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FIGURE CAOTION

Fig. 1. - Scheme of the experiment for measurement of the Earth's absolute velocity by the help of electromagnetic interactions (the quasi-Kennard experiment).

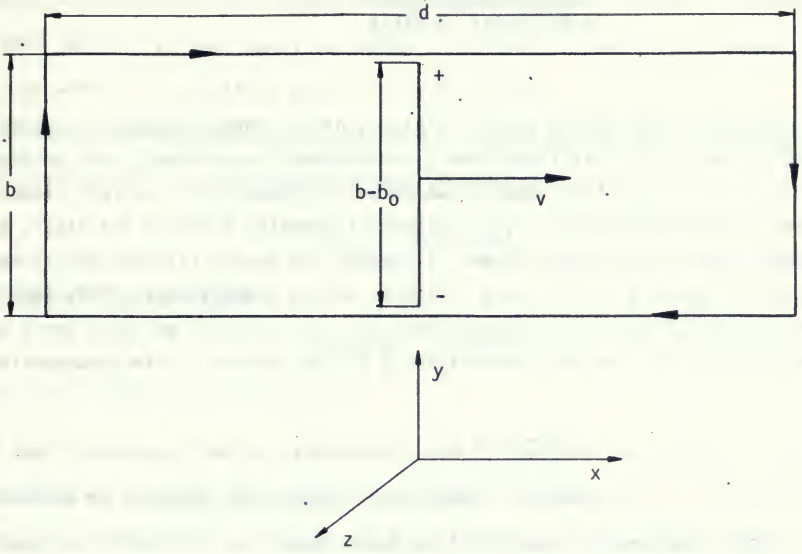

Fig. 1

THE DEMONSTRATIONAL MOLLER-MARINOV MACHINE

Stefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Graz, Austria

Abstract. After giving a brief analysis of the three fundamentals kinds of induction: motional, rest-transformer, and motional-transformer, and considering the puzzling interaction between two mutually perpendicular current elements, where the one element acts with a potential magnetic force on the other, but the latter does not act on the former, I present the demonstrational Müller-Marinov machine in which a current wire interacts with a magnetic belt. This machine and the demonstrational Faraday-Barlow machine constructed by me three years ago are indispensable for the easy understanding of the essence of electromagnetism.

My friend F. Müller has carried out many experiments throwing abundant light to the electromotive (i.e., electromagnetic induction) effects. All journals to which Müller submitted papers rejected the excellently written reports on his historical experiments which can open the eyes of everybody (as they have open my eyes) to the essence of electromagnetism. Some of Müller's papers and valuable letters can be seen only in my books[1-4] and in Wesley's collection[5].

Müller has investigated only electromotive effects. Modifying Müller's ingenious and ingenuous set-ups, I transformed them to apparatus where both electromotive and ponderomotive effects can be observed.

In Refs. 2, 3, and 6 I presented an apparatus called by me the demonstrational Faraday-Barlow machine. It is based on the effects demonstrated by a rotating disk put in the magnetic field of a cylindrical magnet, where one can observe:

a) either generation of electric current when the disk is rotated by an external torque (Faraday's historical experiment on electromagnetic induction),

b) or rotation of the disk when current is sent along the radii of the disk (Barlow's historical experiment on mechanical motion due to electromagnetic force interactions).

This machine shows that the relativistic concepts of electromagnetism are wrong, as the electromagnetic effects depend not on the relative velocities of the bodies but on their absolute velocities. In the present paper I shall assume that the laboratory is attached to absolute space (the space in which the world is at rest as a whole and where light velocity is isotropic). In Refs. 1, 2, and 4 I consider different aspects of the case where the laboratory moves in absolute space.

The Faraday-Barlow demonstrational machine splendidly confirmed my theoretical predictions that besides the well-known motional induction

$$\mathbf{E}_{mot} = (\mathbf{v}/c)\times \mathrm{rot}\mathbf{A} \qquad (1)$$

and rest-transformer induction

$$\mathbf{E}_{rest\text{-}tr} = -\partial\mathbf{A}/c\partial t, \qquad (2)$$

there is also a third kind of induction

$$\mathbf{E}_{mot\text{-}tr} = (1/c)(\mathbf{v}.\mathrm{grad})\mathbf{A} \qquad (3)$$

which I called the motional-transformer induction.

In the above formulas **E** is the induced electric intensity in a small piece of wire, **v** in (1) is the velocity of the wire,and **v** in (3) is the velocity of the magnet (a system of electric charges with total charge equal to zero) which generates the magnetic potential **A** in the domain of the wire's location. Thus in the first and second cases the magnet is at rest, while in the second and third cases the wire is at rest. Hence in the second case wire and magnet are both at rest and here induction can appear only if the magnet is not a quasi-static (stationary) system and the current in its different "current elements" can change in time. In this paper the magnet will be considered a quasi-static system and the second case will be not considered.

The demonstrational Faraday-Barlow machine showed that for the motional-transformer induction of importance is only the motion of the magnet. It is of no importance whether the wire moves or not.

Thus if the magnetic potential generated by the magnet in a certain space domain is such that $(\mathbf{v}.\mathrm{grad})\mathbf{A} \neq 0$ but $\mathrm{rot}\mathbf{A} = 0$, where **v** is a certain imaginary velocity, then by moving the magnet with the velocity **v** the same motional-transformer electric intensity

(given by formula (3)) will be induced as in the case when moving magnet and wire together.

Analogically, if in a certain space domain there is rot**A** ≠ 0 but (**v**.grad)**A** = 0, where **v** is some imaginary velocity, then by moving the wire with this velocity **v** the same motional electric intensity (given by formula (1)) will be induced as in the case when moving magnet and wire togather.

The first of these two very important effects is demonstrated by the sixth case in table 1 related to the demonstrational Faraday-Barlow machine[6]. The second effect is demonstrated in the childish experiment shown in figs. 1 and 2 in Ref. 7.

In the majority of the cases, however, there is (**v**.grad)**A** = - **v**×rot**A**, so that 0 = (**v**.grad)**A** + **v**×rot**A** ≡ grad(**v**.**A**). The last relation is written taking into account the mathematical formula for the gradient of the scalar product of two vectors remembering that with respect to space differentiations **v** is to be considered as a constant.

I repeat, according to me, the electromagnetic effects are determined by the electric and magnetic potentials (I write them for a system consisting of a single charge)

$$\Phi = q/r, \qquad \mathbf{A} = q\mathbf{v}/cr. \tag{4}$$

The electric and magnetic intensities

$$\mathbf{E} = -\,\mathrm{grad}\Phi - \partial\mathbf{A}/c\partial t, \qquad \mathbf{B} = \mathrm{rot}\mathbf{A} \tag{5}$$

which are space and time derivatives of the potentials give less information. I showed that there are cases[1] where the calculation with the intensities leads to wrong results and only the calculation with the potentials leads to right results.

The rest-transformer and motional-transformer inductions show patently (see formulas (2) and (3)) that the effects in electromagnetism are to be described by the potentials. Only the motional-transformer induction can be described both by the magnetic potential and by the magnetic intensity.

Now I shall consider a case of electromagnetic interaction which for a century and a half has remained a puzzle in physics and conventional physics, being unable to explain it, tries to conceal it from the eyes of the students.

From the fundamental Lorentz equation (I call it the Newton-Lorentz equation) one can easily deduce the formula of Grassmann (1845) for the potential force with which a

current element I'**dr**' acts on a current element I**dr**, if the vector connecting **dr**' with **dr** is **r**,

$$\mathbf{F} = (II'/c^2r^3)\{(\mathbf{r}.\mathbf{dr})\mathbf{dr}' - (\mathbf{dr}.\mathbf{dr}')\mathbf{r}\}. \qquad (6)$$

Let us assume $\mathbf{dr} \perp \mathbf{dr}'$. Then we can have the following two substantially different cases (Fig. 1):

a) $\mathbf{r} \parallel \mathbf{dr}'$, i.e., $\mathbf{r} \perp \mathbf{dr}$,.

b) $\mathbf{r} \parallel \mathbf{dr}$, i.e., $\mathbf{r} \perp \mathbf{dr}'$.

In the case (a), as formula (6) shows, there is $\mathbf{F} = 0$, while in the case (b) there is $\mathbf{F} = (II'\mathbf{dr}/c^2r^2)\mathbf{dr}'$, what is a patent violation of Newton's third law.

Now I shall make the calculation working with the potentials. In the first case the magnetic potential originated by the current element I'**dr**' is (see formula (4)) $\mathbf{A} = (I\mathbf{dr}'/cy)\hat{\mathbf{y}}$ (along the points of the y-axis, if assuming that **dr**' lies on it and points to its positive direction) and consequently $\mathrm{rot}\mathbf{A} = 0$ for the points lying on the y-axis. In the second case, however, the magnetic potential is $\mathbf{A} = (I\mathbf{dr}'/cy)\hat{\mathbf{x}}$ (again along the points of the y-axis, if assuming that **dr**' lies on the x-axis and points to its positive direction) and consequently $\mathrm{rot}\mathbf{A} = (I\mathbf{dr}'/cy^2)\hat{\mathbf{z}}$ for the points lying on the y-axis, so that $\mathbf{F} = (I\mathbf{dr}\hat{\mathbf{y}}/c)\times(I\mathbf{dr}'/cy^2)\hat{\mathbf{z}} = (II'\mathbf{dr}\mathbf{dr}'/c^2y^2)\hat{\mathbf{x}}$, which coincides with the above obtained result.

+ + + + +

This paper is dedicated to another interesting set-up based on Müller's pioneering research which was constructed recently by me. As this set-up is simply a modification of Müller's experiments with the "magnetic belt" (see the scheme of such a belt in fig. 10 on p. 250 and the photograph in fig. 28 on p. 252 of Ref. 2) made in such a way that not only electromotive but also ponderomotive effects can be observed, I call it the demonstrational Müller-Marinov machine (Fig. 2).

The scheme of the machine is as follows: On a metal axle four ball-bearings are mounted. A "magnetic belt", consisting of many slab magnets with a square cross-section and arranged tightly one to another with their negative poles pointing to the axle, is mounted on the outer races of the external bearings. The outer races of the internal bearings are connected with metal sticks. One can also connect the outer races

by a metal cylinder but the sticks are more convenient from a didactic point of view. The axle on which the ball-bearings are mounted consists of two electrically insulated pieces. The electric circuit goes to the left axle piece, crosses the left internal ball-bearing, the sticks, the right internal ball-bearing and goes out from the right axle piece. The external wires of the circuit contain an amperemeter if electromotive effects are to be observed or a battery if ponderomotive effects are to be observed. In this experiment the ball-bearing motor effect based on the current thermal dilatation effect discovered recently by me[2] will be neglected.

The machine shows the following electromotive effects:

1) When rotating the metal sticks keeping the magnetic belt at rest, an electric intensity is induced in the sticks according to formula (1) for the motional induction and current flows through the amperemeter.

2) When rotating the magnetic belt keeping the sticks at rest, no current flows through the amperemeter, as in such a case the motional-transformer induction calculated by the help of formula (2) is zero. Indeed, at the rotation of the magnetic belt no changes in the magnetic potential generated by the magnets do appear as in a cylindrical reference frame with axis along the axis of the cylindrical belt the magnetic potential does not depend on the azimuthal angle ϕ. As in such a frame the components of the velocity of the belt will be $\mathbf{v} = (v_\rho, v_\phi, v_z) = (0, v, 0)$, we obtain for the vector-gradient of the potential in cylindrical coordinates

$$(\mathbf{v}.\mathrm{grad})\mathbf{A} = \{v_\rho \partial/\partial\rho + (v_\phi/\rho)\partial/\partial\phi + v_z \partial/\partial z\}\mathbf{A}(\rho,z) = (v/\rho)\partial\mathbf{A}(\rho,z)/\partial\phi = 0. \qquad (7)$$

3) When belt and sticks rotate together, the same current as in the first case flows through the amperemeter because this case is a superposition of the cases (1) and (2).

The machine shows the following ponderomotive effects when sending current through the sticks by the help of an external battery:

1) When the external bearings are blocked and the internal are free to rotate, the sticks are set in motion. The effect is described by the formula (1) if putting there $\mathbf{v} = I\mathbf{dr}/q$, where I is the flowing current, $\mathbf{dr}$ is the current element of the stick, and q are the charges transferring current in this current element, so that $\mathbf{E}_{mot}$ is the po-

tential force acting on a unit of these charges.

2) When the internal bearings are blocked and the external are free to rotate, the magnetic belt does not come into motion. This case is rather complicated to be explained by a simple formula as one must make integration of the elementary potential forces acting on all current elements of the magnet caused by all current elements of the circuit (and not only by the current elements of the sticks). Thus I am impelled here to use the Faraday-Maxwell language with the "force lines" which I definitly consider of having no physical substance. In my conceptions, the force lines are only a mathematical model allowing an easier, if not calculation, at least evaluation. The right and exact calculation is to be done only proceeding from the current elements of the interacting systems. The consideration of the "force lines" and the "intensity fields" as physical realities was a disastrous trend in physics. But at situations where the magnetic systems are complicated and it is difficult to make an integration, one has no other choice than to search for an explanation of the observed phenomena by the help of the "force lines". For simplicity I shall consider the "outer circuit" as wires representing continuations of the sticks to the left and to the right to infinity (see Fig. 2). I have drawn in Fig. 2 one of the force lines of the magnet along which the magnetic intensity is tangential to the line. As this force line acts on the current in the stick and its continuation with a force perpendicular to the current and to the line, the force F_1 acting on the stick will point to the reader for current flowing from the left to the right and the force F_2 acting on the "continuation" will point from the reader. As the same number of lines cross the whole horizontal wire downwards and then upwards, the net moment of force acting on the whole wire with respect to the axis of rotation will be zero. According to the third law of Newton, the current in the wire acts with the equal and oppositely directed forces on the force lines. Consequently the net moment of force acting on the force lines, i.e., on the magnet will be also zero. I repeat, it is an absurdity to think that a pressure can be executed on the force lines. The forces are always acting on the current elements of the magnet. The substitution of the action over the current elements by an action over the force lines is only a "calculation trick", nothing else. Everybody who searches here something more than a

trick of calculation (or at least a trick of presentation and simplification) enters into the realm of the fictions. Any good physicist has always strictly to evade to do this. God always has been presented by the help of idols. But anyone who begins to believe in idols soon, very soon becomes a sinner.

3) When the external and internal bearings are free to rotate, the sticks come into rotation as in case (1) but the magnetic belt remains at rest. If the outer races of the external and internal bearings are solidly fixed, both sticks and belt come into rotation exactly as in case (1).

If we wish that the students and their professors understand the essence of electrmagnetism, the demonstrational Faraday-Barlow and Müller-Marinov machines must be available at any college. Otherwise the relativistic nonsense will further deform human mind.

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FIGURE CAPTIONS

Fig. 1. Interaction between perpendicular current emements.

Fig. 2. The demonstrational Müller-Marinov machine.

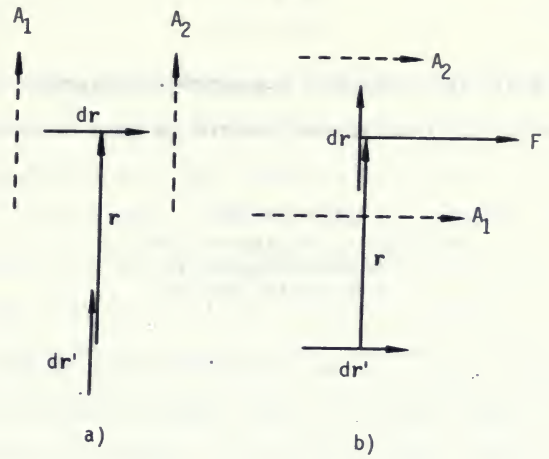

Fig. 1

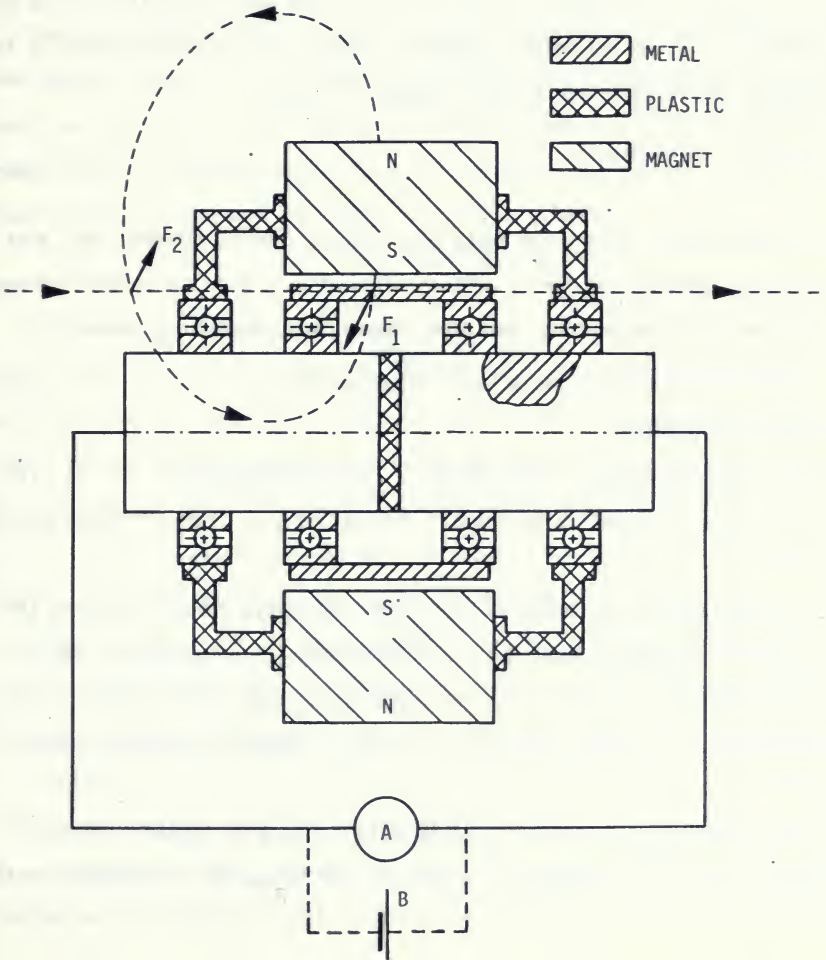

Fig. 2

EXTREMELY EASY EXPERIMENT DEMONSTRATING VIOLATION OF THE ANGULAR MOMENTUM CONSERVATION LAW

Stefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Graz, Austria

As Grassmann's formula[1] for the interaction between two current elements violates Newton's third law but for closed loops preserves it, only by replacing parts of the loop's convection current by displacement current is one able to observe violation of Newton's third law. I observed such a violation in an experiment called by me the Rotating Ampere's Bridge, as its driving force is the self-propulsing force in the historic Ampere's bridge.

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There are two formulas giving the force with which a current element I'**dr**' acts on another current element I**dr** (**dr** is a linear element in a wire along which current I flows along the direction **dr**/dr). The first formula was proposed by Ampere[2]

$$\mathbf{df} = (II'/c^2r^5)\{3(\mathbf{r}.\mathbf{dr})(\mathbf{r}.\mathbf{dr}') - 2(\mathbf{dr}.\mathbf{dr}')r^2\}\mathbf{r} \qquad (1)$$

and the second by Grassmann[1]

$$\mathbf{df} = (II'/c^2r^3)\{(\mathbf{r}.\mathbf{dr})\mathbf{dr}' - (\mathbf{dr}.\mathbf{dr}')\mathbf{r}\} = (II'/c^2r^3)\mathbf{dr}\times(\mathbf{dr}'\times\mathbf{r}), \qquad (2)$$

where **r** is the vector from **dr**' to **dr** and c is the velocity of light (in the CGS-system).

These two formulas are substantially different. The Ampere force acts along the vector **r**, while the Grassmann force acts perpendicularly to the vector **dr**. Ampere's formula preserves Newton's third law as the force df' with which I**dr** acts on I'**dr**' is equal and oppositely directed to df, while Grassmann's formula contradicts Newton's third law.

In the XIXth century priority was given to Ampere's formula (Maxwell called it the "cardinal formula in electromagnetism") but at the beginning of the XX-th century

priority was given to Grassmann's formula as it follows directly from the Lorentz equation, the fundamental equation in electromagnetism. At the second half of the XXth century one prefers to cover both formulas with silence as, first, one could not find a way to establish which is the right one and, secondly, Grassmann's formula which is theoretically more acceptable leads to the mentioned puzzling violation of a fundamental physical law. After the report of Pappas[3] on his repetition of the historic "Ampere bridge" experiment, the controversy between these two formulas was largely discussed at the International Conference on Space-Time Absoluteness (ICSTA) (see many articles in ref. 3) and then many other scientists took part in the discussion (see references in many articles in ref. 4).

There are supporters of the first, of the second, of both and of none of these two formulas. Obviously both formulas can not be valid together as two contradicting equations cannot hold good in physics. However nobody was able to carry out an experiment which can choose between these two formulas. The reason is that for two closed loops L and L' both formulas lead to the same net force[5]

$$\mathbf{f} = (II'/c^2)\oint_L\oint_{L'}(d\mathbf{r}.d\mathbf{r}'/r^3)\mathbf{r}. \qquad (3)$$

Also the force with which a part L' of a loop acts on the other part L is to be calculated according to formula (3), putting $I' = I$, as the two parts can be transformed to two closed loops $L+l$ and $L'+l'$ by the help of two wires l and l' passing infinitely close one to another along which currents I flow in mutually opposite directions. For these two closed loops formula (3) holds good and as the magnetic action of two infinitely close wires along which the same current flows in the one and in the opposite direction is null, we can exclude the common parts l and l' from both loops.

During the 170 years of electromagnetism one has observed the magnetic interaction either between closed loops or between the parts of one and the same loop and, obviously, one was not able to decide which of the two formulas is the right one.

I replaced a part of the interacting current loop by a capacitor. When in the loop alternating current flows, the so-called displacement current with density $\mathbf{J}_D = (1/4\pi)\partial\mathbf{E}/\partial t$ "flows" between the capacitor's plates, where E is the electric intensity at the reference point between those plates. I established experimentally[6]

that the displacement current neither generates nor "absorbs" magnetic forces. Thus by replacing a part of the current elements in a loop by displacement current elements, I, practically, "excluded from the game" the current wires. Thus let us suppose that a part of the closed loop L (or a part, L, of the single loop) is replaced by a displacement current element. Now it can be shown that the force with which the loop L' (or the other part, L', of the single loop) acts on L can be not calculated according to formula (3) and one has to perform the integration using the initial formulas (1) and (2). It is obvious that also in this case Ampere's formula will lead to a formula in which $\mathbf{f}' = -\mathbf{f}$, however Grassmann's formula will lead to a formula in which, in general, $\mathbf{f}' \neq -\mathbf{f}$. Thus, according to Ampere, the interaction of such "interrupted" loops will preserve Newton's third law, but, according to Grassmann, eventually, no. Thus if a violation of Newton's third law can be observed, the right formula cannot be Ampere's.

My Bul-Cub Machine Without Stator[7] represents a cylindrical coil with an iron yoke along which alternating current flows. The same current crosses twice the magnetic field in the iron yoke. If both times the current crosses the yoke in the form of conduction current (i.e., along wires), the moment of forces on both these conduction currents will be equal and oppositely directed and the whole body cannot be set in rotation, as the moment of force acting on the cylindrical coil and on the cylindrically symmetric yoke is null. This result follows from formula (3). However if the one of the currents crossing the yoke is replaced by displacement current, only the moment of force acting on the remaining conduction current remains and the whole system comes into continuous rotation, as, for a single loop, this moment is proportional to I^2, and thus, although the flowing current is alternating, the driving moment of force is unidirectional. My report[7] on this fantastic experiment which violates the angular momentum conservation law was rejected by all journals to which I submitted it, although I noted that a similar experiment was already carried out by Graham and Lahoz[8] but neither the authors nor the whole scientific community have understood the capital importance of that experiment.

Here I shall give the report on another experiment, carried out recently by me,

which also shows violation of the angular momentum conservation law. The theory of this experiment is easier than of my Bul-Cub Machine Without Stator and its construction much more easy. The basis of this experiment is the historical Ampere bridge[5]. As I consider Ampere's formula as definitely rejected, I shall use further only Grassmann's formula.

I repeated Ampere's bridge experiment in the variation shown in Fig. 1, where the sliding contacts were rotating balls. The bridge ABCD was suspended by strings on the ceiling. If the wires IJ and EF which bring current to the bridge are not as in Fig. 1 but are perpendicular to the plane ABCD, then the forces acting on the current elements of the bridge in the plane ABCD will be as shown in Fig. 2a. If the points A and D will be connected by a wire and a battery will be put between, the forces acting on the current elements of this frame will be as shown in Fig. 2b.

The calculation of the forces can be done very easily proceeding from the formula $d\mathbf{A} = Idr/cr$ for the magnetic potential generated by a current element $Id\mathbf{r}$ at a reference point distant r from it. Using a frame of reference with x-axis along AD and y-axis along AB, we obtain for the magnetic potential generated by the current in the leg AB = L at a point of the shoulder BC distant x from point B

$$\mathbf{A} = (I/c)\int_0^L (x^2+y^2)^{-1/2}\,dy\,\hat{\mathbf{y}} = (I/c)\mathrm{Arsinh}(L/x)\,\hat{\mathbf{y}}. \qquad (4)$$

As $\mathrm{rot}(d\mathbf{A}) = (I/cr^3)d\mathbf{r}\times\mathbf{r}$, we obtain for Grassmann's force acting on a current element with length dx at this reference point

$$df = (I/c)d\mathbf{r}\times\mathrm{rot}\mathbf{A} = (I^2Ldx/c^2x)(x^2+L^2)^{-1/2}\,\hat{\mathbf{y}} \cong (I^2dx/c^2x)\hat{\mathbf{y}}, \qquad (5)$$

where the result on the right side is written for $L \gg x$.

I changed the length of the legs AB and CD from zero to 80 cm with 5 cm any time, preserving the weight of the bridge the same. The bridge deviated from zero to 14 mm but after the lengths of the legs surpassed 35 - 40 cm the maximum deviation of 14 mm from the initial position of suspension did not change more.

I affirm that if now the conduction current in the wire AD in Fig. 2b will be replaced by displacement current, the bridge will begin to move upwards, as the forces acting on it will be as in Fig. 2a and I call such a machine the Flying Ampere's

Bridge. This machine will violate the momentum conservation law.

I carried out a similar experiment violating the angular momentum conservation law. To understand its principle of action, let us consider first the variation of Ampere's bridge shown in Fig. 3. The current mounts the bridge at the point B coming from the direction AB, which is perpendicular to the plane BCD, goes along the wire BCDEFG, where the wire DE is perpendicular to the planes BCD and EFG, and leaves the bridge at the point G into the direction GH collinear with AB. In Fig. 3 are drawn only the magnetic forces acting on the current elements of the bridge which are perpendicular to the axis ABGH about which the bridge can rotate. It is easy to see that the net moment of force about this axis is null. Indeed, the sum of the moments of the forces $\mathbf{f}_1$ and $\mathbf{f}_2$ is equal and opposite to the moment of the force $\mathbf{f}_3$, as $f_1 = f_2 = f_3 = f$ and thus $f_1(d - x) + f_2 x = f_3 d$. To set the bridge in rotation under the action of internal forces, the conduction current along some of its path must be replaced by displacement current. I replaced the parts BC and FG by dielectric put between the electrodes of two cylindrical capacitors, as shown in Fig. 4, which was the drawing for my turner. The legs of the "Ampere's bridges" were tangential to the big cylindrical electrodes of the capacitors. The number of the "Ampere's bridges" was four (see fig. 5) of which only one is shown in Fig. 4.

The capacitance along a length L of an infinitely long cylindrical condenser is (in the SI-system) $C = 2\pi\varepsilon_0\varepsilon L/\ln(R_{ext}/R_{int})$, where $\varepsilon_0 = 10^{-9}/36\pi$ F/m is the electric constant, ε is the permittivity of the dielectric, R_{ext} is the internal radius of the external cylinder and R_{int} is the radius of the internal cylinder. Taking into account that in my experiment L = 3 cm, R_{ext} = 1.9 cm, R_{int} = 0.3 cm, the capacitance calculated for any of my condensers according to the above idealized formula was C = 0.9 pF. To increase the capacitance I used first barium titanate as dielectric ($\varepsilon \cong 10^4$). As the production technology is rather complicated, the results obtained in my laboratory were poor and I ordered the production of the capacitors to the capacitors plant Siemens in Deutschlandsberg, Austria, which delivered to me the toroidal dielectrics covered with two metal cylindrical rings representing the capacitor's electrodes and this element was put in the space between the internal and external cylinders in my apparatus.

Siemens has used as dielectric the substance Y5U 153 UL (lead-iron-tungstanate) with $\varepsilon \cong 1.5\times10^4$ which was first pressed and then sintered. The two metal rings have been etched for increasing their surface and respective condenser's capacitance, then the "holes" have been filled with powder of the dielectric Y5U 153 UL and the inner and outer rings have been pressed inside and outside on the sintered torus. This was the information which I received about the production method but it is well known that business companies do not reveal entirely the essence of their technologies.

The capacitance which I measured of any of the condensers was 580 nF, i.e., 640,000 times bigger than the one calculated for vacuum. One has, however, to take into account that the inner and outer metal rings had a certain thickness, so that the distance between the electrodes was less than 1.6 cm.

The capacitance of the whole circuit was C = 290 nF. For the frequency 50 Hz of the current used, I balanced this capacitance with coils with thick enough wires whose common inductance was L = 34 H (thus the own frequency of the circuit was $f = 1/2\pi(LC)^{1/2} = 50.7$ Hz) and the ohmic resistance R = 24 Ω. The alternating current which I measured applying tension 220 V was I = 9 A. With this current I was able to set the bridge in slow motion of one rotation in a couple of seconds. The photograph of the apparatus which I called the Rotating Ampere Bridge with Displacement Current is shown in Fig. 5.

Obviously the flying Ampere bridge (which I also call Propulsive Ampere Bridge with Displacement Current) will be the basis of the whole future aero- and cosmo-nautics. Here the objection can be raised that the forces in the Ampere's bridge are too feeble. This is not true! Deis et al.[9] have accelerated a mass of 317 g to a velocity 4.2 km/s with a classical Ampere's bridge using very high currents. Humanity does not know an explosive which can accelerate such a mass to such a high velocity. Thus the impulse which acts on a mass (piece of metal), without destroying it, in the Ampere's bridge is the biggest one reached in human history. With the Ampere's bridge one can set artificial satellites in orbit about a planet without atmosphere "shooting them from a canon". In the flying Ampere bridge, however, the driving force can act during the whole flight and the force which is needed has only to overwhelm the Earth's gravi-

tational attraction.

The energetic aspects of the flying and rotating Ampere's bridges need additional investigations.

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FIGURE CAPTIONS

Fig. 1. Marinov's variation of Ampere's bridge.

Fig. 2. The forces acting on the current elements of the Ampere's bridge.

Fig. 3. The forces acting on the current elements of the Rotating Ampere's Bridge.

Fig. 4. Scheme of the Rotating Ampere's Bridge.

Fig. 5. Photograph of the Rotating Ampere's Bridge.

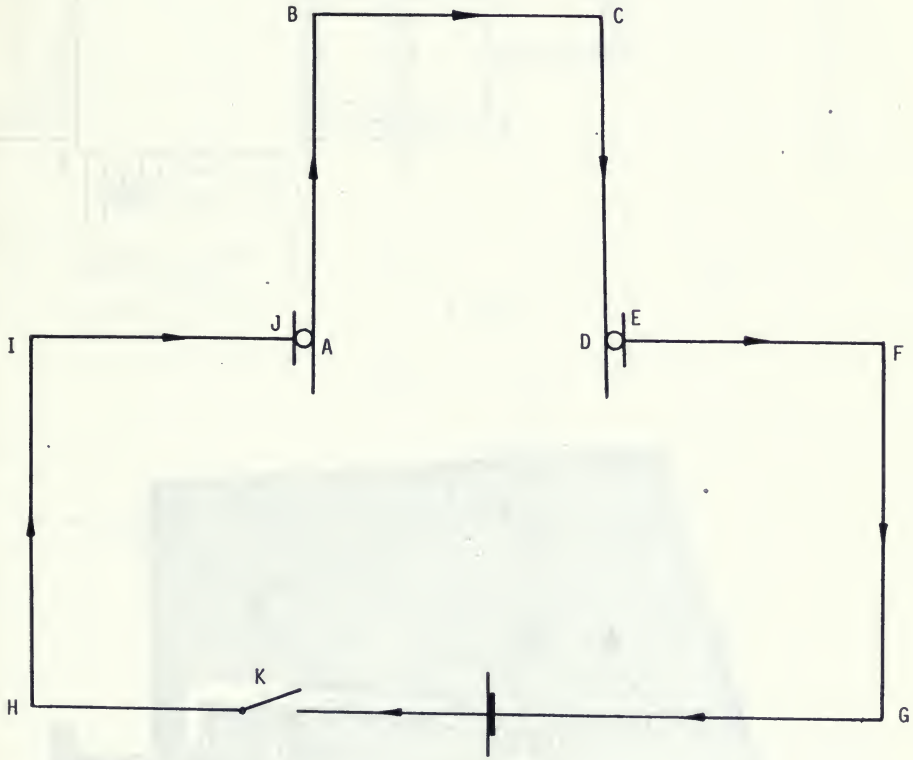
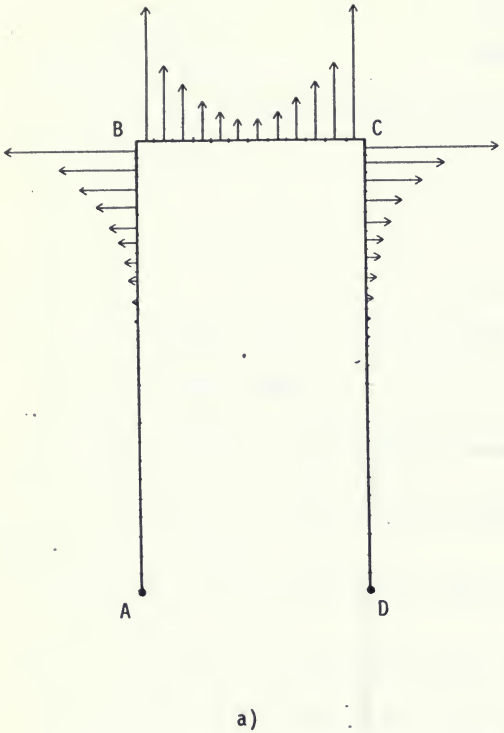


Fig. 1



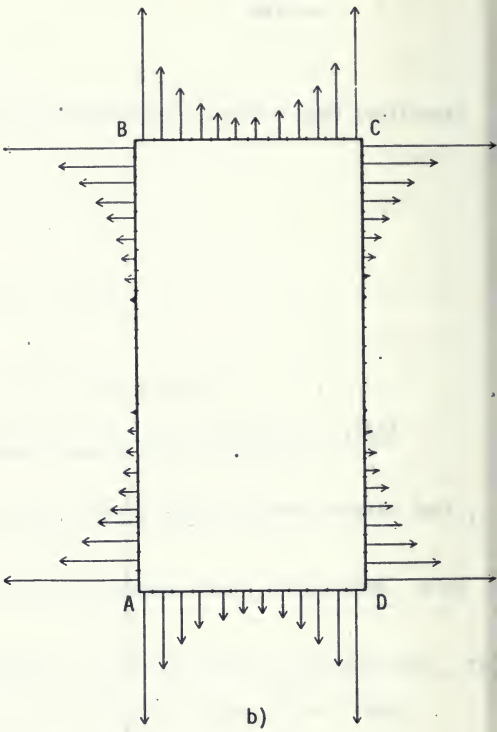


Fig. 2

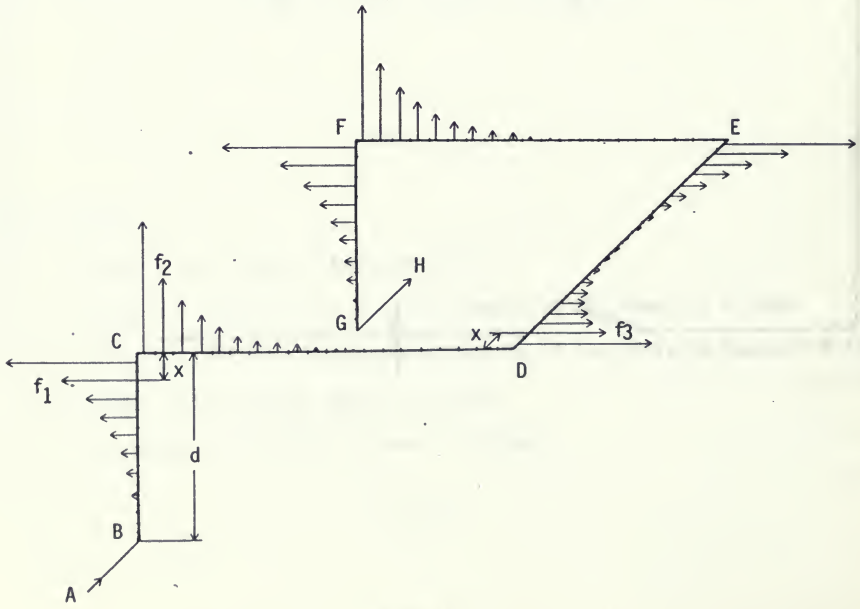


Fig. 3

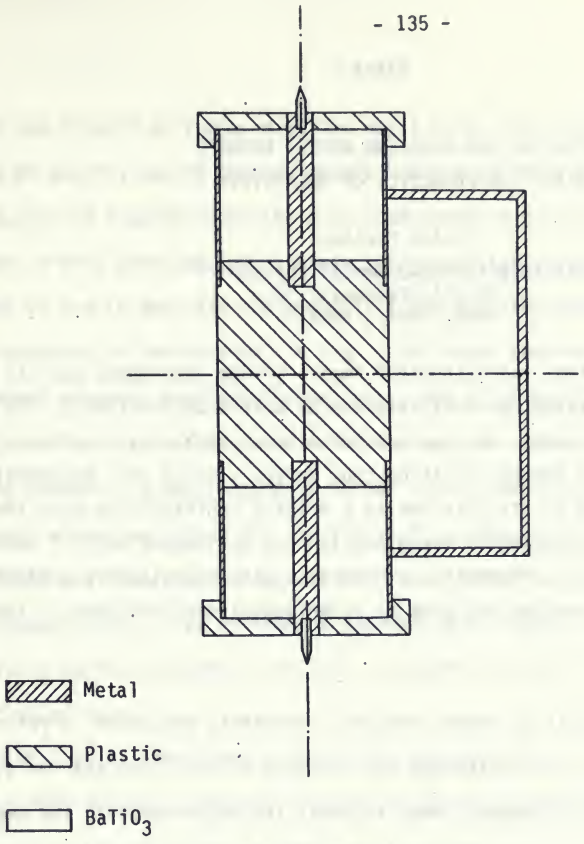


Fig. 4

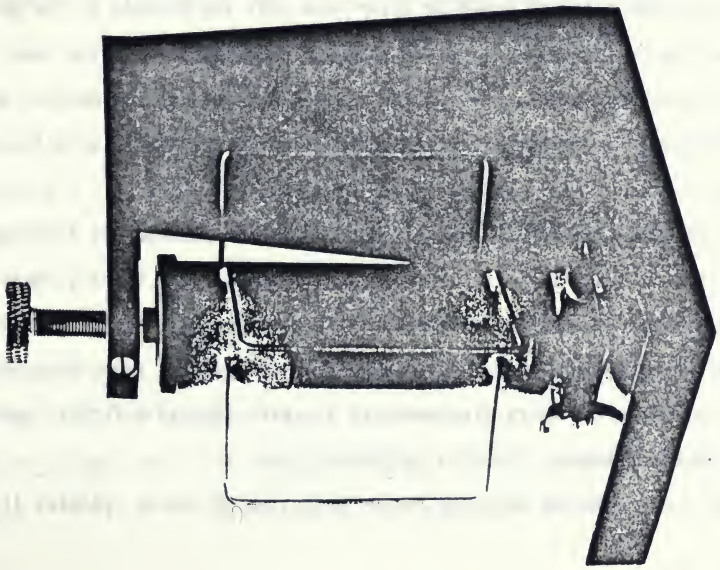


Fig. 5

PROPULSIVE AND ROTATING AMPERE BRIDGES VIOLATE THE PRINCIPLE OF RELATIVITY

Stefan Marinov

Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Graz, Austria

Abstract. I show that the historical Ampere bridge experiment and its rotational variation realized by me violate the principle of relativity. The Rotating Ampere Bridge represents an electromotor without stator as it rotates under the action of internal forces violating thus Newton's third law. Nevertheless back tension is induced at its rotation in a drastic contradiction with the relativistic concepts according to which tension can be induced only if there is mutual motion between a "magnet" and "wire". I make quantitative predictions of the induced back tension and give my experimental confirmations of those predictions.

Every electromotor built by human hands has inevitably two parts: a rotor and a stator. Usually current is sent through the windings of the rotor and the stator has a few permanent or electro magnets. When in work, the rotor moves in the magnetic field of the stator and back tension is induced (I dislike the term "back electromotive force" which is confusing and must be abandoned). The calculations and the experimental measurements for any known to humanity motor show that the product of the back induced tension and the current flowing in the rotor is exactly equal to the power "lost" by the source of electric energy supplying the driving tension and "gained" as mechanical power of the rotor. Thus every electromotor works in conformity with the energy conservation law.

But in my variation of the Ampere bridge shown in fig. 1 the magnetic field generated by the current in the wire CDEF (assuming that at the points C and F there are sliding contacts and the wire CDEF can move rectilinearly) sets this very wire in motion and the magnetic field generated by the wires of the "stator" (the wires ABC and FGH) doesnot act at all on the current elements of the wire CDEF with forces supporting the propulsion. Thus the Ampere bridge is selfpropulsing.

Similar is the story with the Rotating Ampere Bridge which can be realized if the

wires BC and FG will be replaced by two metal disks with axes AB and GH and radii equal to BC and FG, and if the end points C and F of the wire CDEF which has a rotational degree of freedom about the axis ABGH slide on the rims of these two disks. The rotor of this electromotor is again selfpropulsing, as only the currents along the wires CD and EF generate the magnetic field exerting propulsive forces on the current elements of the wire DE. In fig. 1 are shown the forces acting on the different current elements exerting torques about the rotational axis ABGH. The forces f_1 which act on the stator are generated by the current along the wire CD. The forces f_2 producing a small opposite torque (their levers are small) are generated by the current along the radius BC. The forces f_3 producing the big driving torque (their lever is BC) are generated by the current in the wire CD.

All these forces are calculated by the Grassmann (1845) formula giving the force with which a current element I'dr' acts on another current element Idr if the vector from dr' to dr is **r**

$$\mathbf{df} = (\mu_0 II'/4\pi r^3)\mathbf{dr}\times(\mathbf{dr}'\times\mathbf{r}) = I\mathbf{dr}\times\mathrm{rot}(\mu_0 I'\mathbf{dr}'/4\pi r) = I\mathbf{dr}\times\mathrm{rot}\mathbf{A}, \qquad (1)$$

where **A** is the magnetic potential originated by the current elemnt I'dr' at the reference point where the current element Idr is located.

This formula is a simple result from the famous Newton-Lorentz equation (the name of Newton is attached by me[1]) giving the global electric intensity

$$\mathbf{E}_g = -\mathrm{grad}\Phi - \partial\mathbf{A}/\partial t + \mathbf{v}\times\mathrm{rot}\mathbf{A}, \qquad (2)$$

i.e., the force acting on a charge unit crossing with a velocity **v** the reference point where the electric and magnetic potentials of the surrounding system are Φ and **A**, assuming $\Phi = 0$, $\partial\mathbf{A}/\partial t = 0$, and taking into account that if the current conducting charges in a wire element dr are q when the current flowing through this element is I, then $q\mathbf{v} = I\mathbf{dr}$.

Here I shall make certain classification in the terminology of the Ampere bridges introduced by me, so that misunderstandings should be avoided. The classical Ampere bridge (see, for example, figs. 3 and 5 in Ref. 2, p. 322) will be called Propulsive Ampere Bridge, and, with more precisation, Propulsive Ampere Bridge with Sliding Contacts (PABSC), while to the Flying Ampere Bridge proposed by me (fig. 2a in Ref. 2,

p. 126), which will violate the momentum conservation law, also the name Propulsive Ampere Bridge with Displacement Current (PABDC) will be given. The rotating Ampere bridge with the two discs on whose rims the end points of the wire CDEF slide (fig. 1) will be called Rotating Ampere Bridge with Sliding Contacts (RABSC), while the rotating bridge in figs. 4 and 5 in Ref. 2, p. 126, i.e., when the currents along the wires BC and FG in fig. 1 will be replaced by displacement current, will be called Rotating Ampere Bridge with Displacement Current (RABDC). The RABDC constructed by me[2] (p. 126) has already violated the angular momentum conservation law; after my Bul-Cub machine without stator[3] this was the second experiment in human history which violated the angular momentum conservation law.

As the rotation of the Rotating Ampere Bridge with Displacement Current shown in fig. 5 of Ref. 2, p. 126 was very feeble, it was not possible to make energetic measurements to verify whether back tension is induced in it and consequently whether the energy conservation law is preserved. For this reason I constructed the Rotating Ampere Bridge with Sliding Contacts shown in figs 2 and 3 where big current could be sent and the enough powerful rotation gave possibility to make energetic measurements. To make the measurement of the expected (by me) or not expected (by the relativists) back tension easier, the rotating Ampere bridge was coupled with a cemented Faraday disk generator which delivered the driving tension and I called this the RAF-machine (Rotating Ampere bridge with sliding contacts coupled with a cemented Faraday disk generator).

The cemented Faraday disk consisting of two (neodymium) ring magnets and a copper disk sandwitched between them is on the left of figs. 2 and 3. At rotation by an external torque, a tension, U_F, is induced between the center of the disk and its periphery. The induced current goes from the mercury trough in which the disk's rim is immersed to the trough in which the left disk of the rotating Ampere bridge is immersed, traverses the bridge and, exiting from the mercury trough in which the right bridge's disk is immersed, goes to the trough where the small copper disk at the right end of the thick copper axle is immersed. The syringe at the right side which can be seen only in fig. 2 serves to switch the circuit "off" and "on".

First, dismounting the Faraday disk, I established how the Ampere bridge rotates supplying current from a battery along two thick wires fixed to the left and right screws. The current was measured by a non-contact amperemeter attached to one of those wires and the tension over the bridge was measured by a voltmeter whose exit plugs were inserted into the two holes on the front side. At current I = 1200 A the machine rotated with about 5 rev/sec. As the tension over the bridge was 30 mV, the measured ohmic resistance was 25 μΩ, a figure coinciding well with the one obtained from the geometry of the bridge (the length of the machine was 26 cm) and the resistivity of copper. The resistance of the mercury troughs and of the massive copper could be neglected with respect to the resistance of the bridge.

Measuring in this way the resistance of the whole circuit (including that of the axle and of both disks at its ends) I found R = 40 μΩ. At rate of 7 rev/sec the tension generated by the Faraday disk was U_F = 20 mV. Thus at this rate of rotation the current flowing in the circuit was I = 500 A and I could verify this by measuring the tension over the bridge which was ΔU = 12 mV.

The tension induced in the cemented Faraday disk when it is rotated by an external torque is to be calculated from formula (2), at the assumptiob Φ = 0, $\partial\mathbf{A}/\partial t = 0$, and is

$$U_F = \int_{R_{int}}^{R_{ext}} \Omega(\mathbf{r}\times\mathbf{B}).d\mathbf{r} = \int_{R_{int}}^{R_{est}} \Omega r B dr = (1/2)\Omega(R_{ext}^2 - R_{int}^2)B, \qquad (3)$$

where R_{int} = 3.2 cm and R_{ext} = 6 cm are the external and internal radii of the ring magnets, Ω is the angular velocity, and B = |rot**A**| = 0.35 T is the magnetic intensity generated by both magnets and measured with a Hall sond at a distance of 4 mm between them equal to the thickness of the Faraday disk.

When current I flows along the radius of the Faraday disk, it rotates as a motor as the appearing torque (moment of force) is

$$M_F = \left| \int_{R_{int}}^{R_{ext}} \mathbf{r}\times(I d\mathbf{r}\times\mathbf{B}) \right| = \int_{R_{int}}^{R_{ext}} IBr\,dr = (1/2)I(R_{ext}^2 - R_{int}^2)B, \qquad (4)$$

taking into account that according to formula (2) the force acting on q current conducting charges in a current element with length dr is $\mathbf{f} = q\mathbf{v}\times\mathbf{B} = Id\mathbf{r}\times\mathbf{B}$.

Let us now turn our attention to the rotating Ampere bridge which can be only motor but no generator. I shall call, as usual, the wires CD and EF (fig. 1) "legs",

denoting their length with L, and the wire DE "shoulder", denoting its length by a. Let us attach a reference frame to this Ampere bridge with origin at point D, with abscissa along DF and ordinate along the continuation of the wire CD. At a point on the shoulder distant x from the origin, the current in the wire CD (which we assume flowing from C to D) will generate the following magnetic potential (see for reference equation (1))

$$\mathbf{A} = \int_0^L (\mu_0 I dr/4\pi r)\hat{\mathbf{y}} = (\mu_0 I/4\pi)\int_0^L (x^2+y^2)^{-1/2} dy\hat{\mathbf{y}} = (\mu_0 I/4\pi)\text{Arsinh}(L/x)\hat{\mathbf{y}}. \qquad (5)$$

Putting this in (1), we obtain the force with which the current in the wire CD acts on the current element $Id\mathbf{x}$. After integration we obtain for the force acting on the whole shoulder, taking into account also the action of the other leg EF,

$$\mathbf{f}_A = 2\int_{a_0}^{a} Id\mathbf{x}\hat{\mathbf{x}}\times\text{rot}\mathbf{A} = (\mu_0 I^2/2\pi)\int_{a_0}^{a} L(x^2+L^2)^{-1/2}(dx/x)\hat{\mathbf{y}} \cong (\mu_0 I^2/2\pi)\int_{a_0}^{a}(dx/x)\hat{\mathbf{y}} = (\mu_0 I^2/2\pi)\ln(a/a_0) \qquad (6)$$

where a_0 is a very small distance but nevertheless different from zero because for $a_0 = 0$, as it must be for the idealized mathematical case, the force becomes infinitely big, a case which, of course, in physics cannot exist (beneath I shall establish the value of a_0). For a bridge with $a/L < 0.33$, the approximation in (6) leads to an error no bigger than 5%. Indeed, we have $1 > L(x^2+L^2)^{-1/2} > L(a^2+L^2)^{-1/2} = 0.95$. Consequently the approximate integral on the right side of (6) is enough good for calculating the force acting on the Ampere bridge.

With my experiment presented in fig. 7 of Ref. 3, p. 59, I established that if the current flowing in an Ampere bridge is 1 A, the pushing force is 5×10^{-6} N/A^2 with an incertitude of 50%, thus the force is $(2.5 - 7.5)\times10^{-6}$ N/A^2 and depends on many factors: length of the shoulder, relation a/L, cross-section of the wire, form of the curvature at the angles. I decided thus to call this Ampere bridge for which the propulsive force is 5×10^{-6} N/A^2 a normal Ampere bridge, and I called the number $\alpha = 5\times10^{-6}$ N/A^2 force-factor of the normal Ampere bridge. As $\mu_0 = 4\pi10^{-7} = 1.26\times10^{-6}$ N/A^2, we see that the number μ_0 is very near to the force-factor of the normal Ampere bridge. For any specific Ampere bridge I introduce a geometry factor G, such that αG will be the propulsive force acting on this specific bridge when the flowing current is 1 A.

Now from (6) we can easily find the value of a_o for a normal Ampere bridge, as

$$5\times10^{-6} \equiv \alpha = (\mu_o/2\pi)\ln(a/a_o) \equiv 2\times10^{-7}\ln(a/a_o), \qquad (7)$$

and from the equation $\ln(a/a_o) = 25$ we find $a_o = e^{-25}a = 1.4\times10^{-11}a$.

If there are n normal Ampere bridges connected in parallel, the force, for the same current, will be n times smaller, as the pushing force in the Ampere bridge is proportional to the square of the current. Thus taking the geometry factor for n normal parallel Ampere bridges $G_n = 1/n$, we can operate as if there is only one bridge.

The moment of force of the rotating Ampere bridge will be (for G = 1)

$$M_A = R_A f_A = R_A I^2 \alpha, \qquad (8)$$

where R_A is the lever of the bridge, i.e., the radius of the disks on which the bridge slides (R_A = BC = FG). Putting here (7), we obtain

$$M_A = (\mu_o/2\pi)R_A I^2 \ln(a/a_o). \qquad (9)$$

According to the energy conservation law, at the rotation of this motor such a back tension U_A must be induced that the gained mechanical power $P_{mech} = M_A\Omega$ must be equal to the lost electrical power $P_{el} = IU_A$. So we can establish the value of the induced tension

$$U_A = M_A\Omega/I = R_A I\Omega\alpha = (\mu_o/2\pi)R_A I\Omega\ln(a/a_o). \qquad (10)$$

In the Ampere bridge the "magnet" (the legs) and the "coil" (the shoulder) move with the same velocity. Thus according to the principle of relativity in such a machine tension cannot be induced, moreover, according to Newton's third law such a machine cannot move at all. But the fact that the propulsive Ampere bridge moves was established by Ampere at the dawn of electromagnetism. Recently Deis et al.[4] sending current of 2 MA through an Ampere bridge with mass 0.3 kg have accelerated it to 4.2 km/sec. There is no explosive on the earth with which such a big mass can be accelerated to a velocity almost equal to the first cosmic velocity (which is 7.9 km/sec). However nobody has bothered whether in the Ampere bridge back tension will be induced, although the measurements for establishing the availability or non-availability of such back tesnion in the rotating Ampere bridge is a very simple problem.

Formula (10) was deduced proceeding from the law of energy conservation. One must,

however, be able to calculate this tension proceeding only from electromagnetic formulas. Conventional physics which accepts the principle of relativity as unshakable dogma cannot make electromagnetic calculations for this tension, as there is no relative motion between "magnet" and "wires". Thus the conclusion of conventional physics must be that back tension cannot be induced in the Ampere bridge what leads, as noted above, to violation of the law of energy conservation.

My absolute space-time theory shows immediately that in the Ampere bridge back tension must be induced. I noted this and made the relevant calculation first in Ref. 3, p. 95 (the paper was written in Russian). Here I shall repeat these calculations:

The Newton-Lorentz equation (2) is valid only in a laboratory attached to absolute space and I call it the absolute Newton-Lorentz equation. I have shown[5] that in a laboratory moving with a velocity $\mathbf{V}$ in absolute space the relative Newton-Lorentz equation is the valid one, i.e., that in the moving laboratory the global electric intensity is

$$\mathbf{E}_g = -\operatorname{grad}\Phi - \partial\mathbf{A}/\partial t + \mathbf{v}\times\operatorname{rot}\mathbf{A} + \varepsilon_o\mu_o\mathbf{v}.\mathbf{V}\operatorname{grad}\Phi + \mathbf{V}\times\operatorname{rot}\mathbf{A} + (\mathbf{V}.\operatorname{grad})\mathbf{A}, \qquad (11)$$

where $\mathbf{v}$ is the laboratory velocity of the test charge, Φ is the laboratory electric potential which is equal to the absolute electric potential Φ_a, as the electric potential depends only on the distances from the charges generating it to the reference point, and $\mathbf{A}$ is the laboratory magnetic potential which depends on the laboratory velocities of the charges generating it and which is not equal to the absolute magnetic potential $\mathbf{A}_a$ depending on their velocities with respect to absolute space.

Assuming that the machine from figs. 2 and 3 is attached to absolute space and considering the above introduced reference frame which was attached to the Ampere bridge moving with velocity $\mathbf{V}$ in absolute space (for short time intervals this velocity can be considered rectilinear), we shall have for the global electric intensity acting on the charges in the shoulder

$$\mathbf{E}_g = \mathbf{V}\times\operatorname{rot}\mathbf{A} + (\mathbf{V}.\operatorname{grad})\mathbf{A} = R_A\Omega\hat{\mathbf{x}}\times\operatorname{rot}\mathbf{A} + R_A\Omega(\hat{\mathbf{x}}.\operatorname{grad})\mathbf{A}, \qquad (12)$$

as all other terms in equation (11) are equal to zero. Putting (5) into (12), taking into account that the second term on the right side gives zero, and integrating in the

limits from $a_o \neq 0$ (for $a_o = 0$ the intensity E_g becomes infinitely big) to a, we obtain in the above 5% approximation

$$U_A = \left|\int_{a_o}^{a} E_g.\hat{x}\, dx\right| = (\mu_o/2\pi)R_A\Omega I \ln(a/a_o). \qquad (13)$$

We see thus that the "energy conservation" formula (10) and the "electromagnetic" formula (13) lead to the same numerical result.

To make more clear the absolute space-time aspects of this problem, let us connect points C and F in fig. 1 with a wire and insert there the source of electric tension which sends the current I in the rectangular loop CDEF. If this loops is in our Earth's laboratory which moves with V = 300 km/sec in absolute space (let us suppose that the laboratory's absolute velocity is parallel to the wire CD), then along the wire DE a tension

$$U = (\mu_o/2\pi)VI \ln(a/a_o) \qquad (14)$$

will be induced and along the wire FC the same but oppositely directed tension will be induced. For this reason the net tension induced in the whole rectilinear loop due to its velocity with respect to absolute space will be zero and thus only tensions due to the motion of one part of the loop to the other will appear.

However, if in parallel to the wire DE we shall put another wire which does not make ohmic contact with the rectilinear loop CDEF, between its end points the tension (14) will be induced, if we assume that this wire is very near to the wire DE. If this wire, parallel to DE, will be put in the middle of the rectilinear loop CDEF, the induced tension will be twice the tension (14). Kennard[6] first has measured such induced tensions for rotational motion and has shown the untenability of the principle of relativity, in the years when Einstein has not become an idol but humanity has not understood (or noticed) Kennard's experiments. In my quasi-Kennard experiment[2] (p. 110) I observed such induced tensions for inertial motion and in this way I succeeded to measure the Earth's absolute velocity for the first time with an electromagnetic apparatus.

My Rotating Ampere Bridge with Displacement Current[2] (p. 126) has violated the angular momentum conservation law and it gives firm certitude to expect that a Propulsive Ampere Bridge with Displacement Current[2] (p. 126) will violate the momentum conservation law. I shall, however, not analyze here the problem about the induced tension

in these two bridges as the treatment here is more complicated and one can even expect that here not only the angular momentum conservation law but also the energy conservation law will be violated.

Before presenting my experimental measurements, let me note that as the force in the Ampere bridge is proportional to the square of the current, the torque in the rotating Ampere bridge has the same direction at any direction of the current. If the RAF-machine is rotated by an external motor, then for the case when the torque of the rotating Ampere bridge supports the rotation I shall call this supported rotation and for the case when it opposes the rotation - opposed rotation.

I made two series of experiments with my RAF-machine. In the first series the Ampere bridge was not solid to the axle of the apparatus and I kept it at rest dismounting both plastic rings with which the bridge was fixed to the axle. In the second series the Ampere bridge was fixed to the axle and rotated with it (as it is shown in figs. 2 and 3). The axle of an external electromotor at the end with a disk encircled by rubber ring contacted the left magnet of the Faraday disk and set thus the machine in rotation with a constant velocity. The results of the measurements are presented in table 1.

Table 1

Rotational velocity $\Omega/2\pi$ rev/sec	Tension induced in the Faraday disk: U_F mV		Tension over the bridge measured at closed circuit: ΔU mV				Tension induced in the bridge U_A mV
	calculated according to (3)	measured at open circuit	Bridge disconnected from the axle right rot.	Bridge disconnected from the axle left rot.	Bridge connected to the axle supp. rot.	Bridge connected to the axle opp. rot.	calculated according to (10)
1	2.8	2.8	1.7	1.7	1.7	1.7	0.016
2	5.7	5.7	3.6	3.6	3.6	3.7	0.067
3	8.5	8.5	5.3	5.3	5.2	5.4	0.150
4	11.3	11.4	7.1	7.1	6.9	7.2	0.268
5	14.1	14.2	8.8	8.9	8.7	9.2	0.418
6	17.0	17.1	10.7	10.7	10.3	11.0	0.604
7	19.8	20.0	12.4	12.5	12.0	13.0	0.824

The columns 6, 7, and 8 show clearly that tension is induced in the rotating Ampere bridge, as the tensions over the bridge for supported and opposed rotations are equal

to $\Delta U_{supp} = (U_F - U_A)R_{br}/R$ and $\Delta U_{opp} = (U_F + U_A)R_{br}/R$, where $R_{br} = 25\ \mu\Omega$ was the ohmic resistance of the bridge and $R = 40\ \mu\Omega$ was the resistance of the whole circuit. I repeat, the theory of relativity cannot explain these effects as here tension is induced when "magnet" (wires CD and EF in fig. 1) and "coil" (wire DE in fig. 1) move with the same velocity.

The energetic measurememts which I did with the RAF-machine were the following:

I set the machine with a certain velocity (= 7 rev/sec) and measured its coasting down times. They were as follows:

1. At Ampere bridge disconnected from the axle.

   a) At open circuit: $T_{1a} = 56$ sec.

   b) At closed circuit and right rotation: $T_{1b} = 35$ sec.

   c) At closed circuit and left rotation: $T_{1c} = 35$ sec.

2. At Ampere bridge connected to the axle.

   a) At open circuit: $T_{2a} = 65$ sec.

   b) At closed circuit and supported rotation: $T_{2b} = 47$ sec.

   c) At closed circuit and opposed rotation: $T_{2c} = 43$ sec.

If J is the moment of inertia of the rotor, then the energy which is put in the machine by setting it in rotation with angular velocity Ω is the kinetic energy of the rotor

$$E_{kin} = (1/2)J\Omega^2. \tag{15}$$

In the cases 1a and 2a the whole kinetic energy of the rotor transforms into heat because of the friction in the ball bearings and in the troughs with mercury. As J_1 is smaller than J_2 the time T_{1a} is smaller than the time T_{2a}.

In the cases 1b and 1c there is induced current, the Faraday disk brakes the rotation and an energy

$$(E_F)_{heat} = \int_0^T (U_F^2/R)dt \tag{16}$$

transforms as Joule heat in the copper of the machine.

In the cases 2b and 2c the energy which transforms in Joule heat is

$$(E_{F+A})_{heat} = \int_0^T \{(U_F \mp U_A)^2/R\}dt, \tag{17}$$

where the sign "-" is for the case 2b and the sign "+" is for the case 2c. The times T_{2b} = 47 sec and T_{2c} = 43 sec correspond to these cases as in case 2b the thermal power is less than in the case 2c.

If, however, we should have $U_A = 0$, as should be the prediction of the relativists, then the tension in the machine will be always U_F, but the braking moment will be, respectively for supported and opposed rotation, $M_{RAF} = M_F \mp M_A$. Thus if we could make $M_A > M_F$ the braking moment will become driving moment and the machine will begin to move with self-acceleration. In my RAF-machine at 7 rev/sec I had U_F = 20 mV and, since R = 40 μΩ, the current at this velocity should be I = 500 A. Thus, for this current, according to formulas (4) and (8) M_F = 0.225 Nm and M_A = 0.009 Nm. We see that M_A is more than 20 times weaker than M_F. But if we should make R = 0.4 μΩ, we should obtain I = 50 kA and thus M_F = 22.5 Nm and M_A = 90 Nm. Unfortunately, the concepts of the relativists are not true and in the rotating Ampere bridge there is back induced tension, so that, as far as $U_F > U_A$, also $M_F > M_A$ (to verify these inequalities, substitute U_F and U_F from (3) and (10), and M_F and M_A from (4) and (8)).

Being unable to explain the induction of back tension in the rotating Ampere bridge and seeing that this motor is self-propulsing, violating thus the angular momentum conservation law (the angular momentum conservation law is violated in the RABSC only for the rotor but not for the whole system, but in the RABDC both for the rotor and for the whole system), the relativists jump to the absurdity to affirm that a rotating Ampere bridge cannot rotate at all. With this objection NATURE (Dr. Maddox) refused to publish my report on the RAF-machine[2] (p. 20).

The comical in the whole story is that checking experiments can be constructed by 15-years old children in a couple of hours. Suspend, for example, the Ampere bridge from figs. 3 (better executed in the light variation shown in fig. 5 of Ref. 2, p. 126) with a string on the ceiling and conduct to it current of some ten amperes through thin wires (about 0.3 mm in diameter), so that the system can freely enough rotate. Sending the current with the own frequency of the torsion oscillations of the system, one can set it in pretty large oscillations.

Another verification which can be done also by 15-years old children is the follow-

ing: The rotating Ampere bridge from fig. 3 (better executed in the light variation shown in fig. 5 of Ref. 2, p. 126) is to be put on two rails taken from a train-toy. If the bridge is enough light, it will begin to roll when current of some ten amperes will be sent through the rails. In fig. 4 is shown a variation of the rotating Ampere bridge with sliding contacts which has many "bridges" and thus the same torque can be obtained at lower current. The sliding contacts in this machine are realized by the help of ball-bearings, so that the bearings and the contacts represent the same element. However, here sparking will appear when the balls will contact the insulator between the lamellas. Thus it will be more convenient to make the lamellas of the rotor sliding over the lamellas of the stator. If the lamellas are wider than the strips of insulator, in such a machine no sparking will appear.

I wish to call this kind of rotating Ampere bridge the MARPAP machine (from MARinov - PAPpas), as my friend Prof. P. Pappas with his report[7] (p. 123) at the International Conference on Space-Time Absoluteness(ICSTA) concerning his repetition of the classical Ampere bridge experiment stirred up my attention to this amazing effect. In 1983 I visited Prof. Pappas' laboratory in Athens and he demonstrated to me his ingenious experiment which left an unerasible impression on me.

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FIGURE CAPTIONS

Fig. 1. Propulsive and rotating Ampere bridges.
Fig. 2. Scheme of the RAF-machine.
Fig. 3. Photograph of the RAF-machine.
Fig. 4. The machine MARPAP.

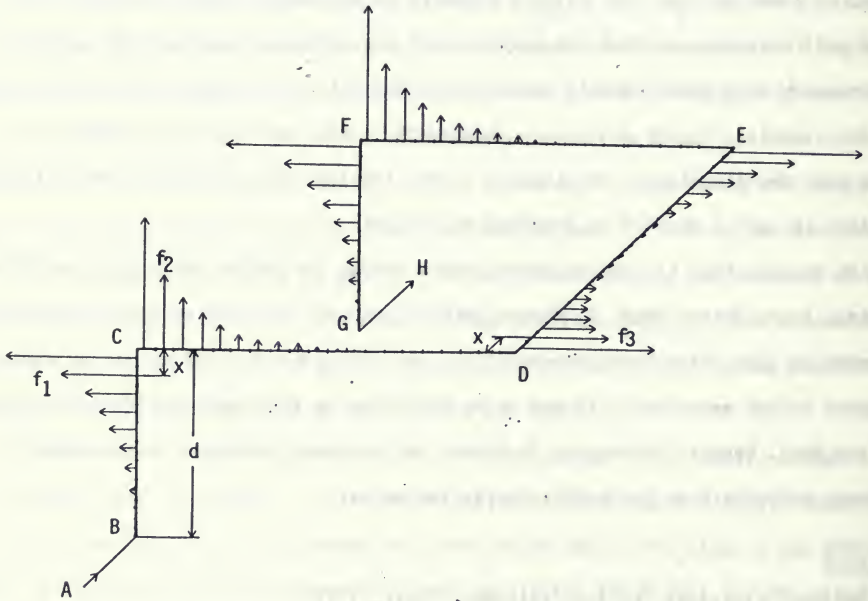

Fig. 1

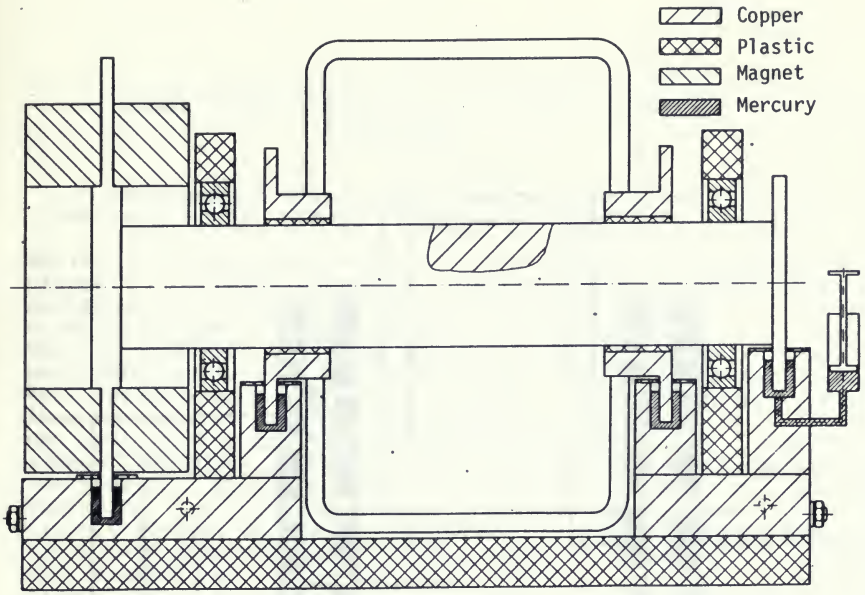

Fig. 2

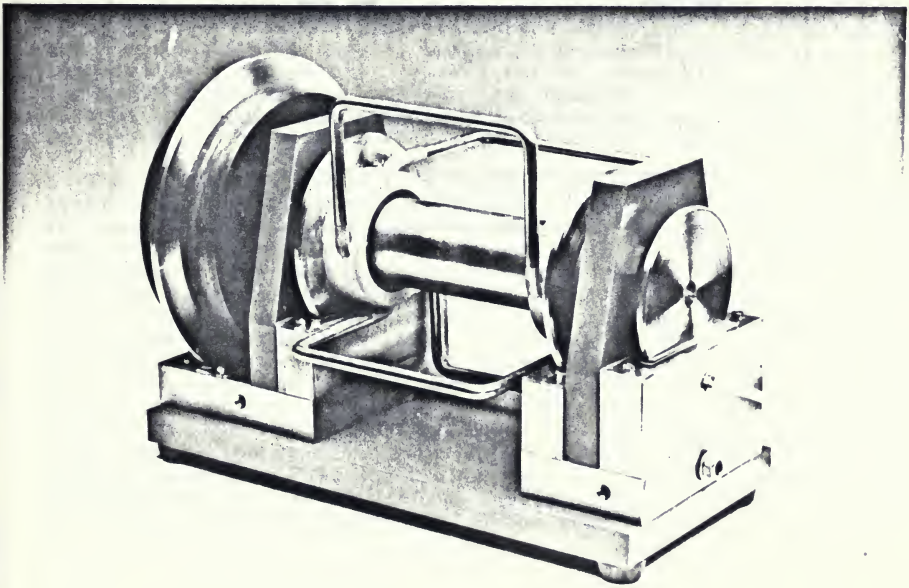

Fig. 3

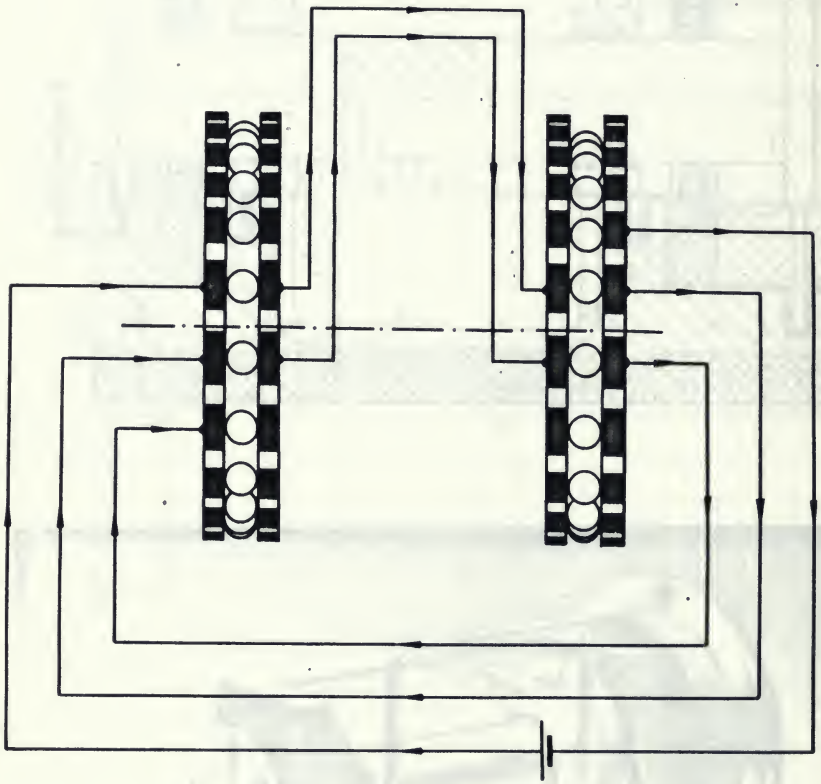

Fig. 4

SUBMITTED TO TWT-IV

FLAWS OF THE MARINOV FLYING AMPERE BRIDGE EXPERIMENT

P. T. P A P P A S
Professor of Mathematics, Doctor of Physics.
Marcopulioti 26, Athens 11744, Greece, tel. 00301-8623278

Marinov[1] in an experiment he calls the Flying Ampere Bridge, claims to have observed violation of angular momentum, confirmation of relativistic self forces of Lorentz and the same time falsification of the Cardinal force of Ampere.
The flying Ampere bridge of Marinov is an open circuit. As it has been stressed by the Author[2,3] over the last 10 years, about the Realativistic force of Lorentz and the Caridnal force of Ampere, contrary to what was suggested by Maxwell[4] and it is now believed in the established physics, the two laws are not always equivalent. Briefly, the present Author's mathematical analysis[3], proves that 1) the two classes of laws are equivalent for all separated circuits with at least the source circuit closed. 2) The two classes of laws are <u>non-equivalent</u> for non closed source circuit and any other separate circuit. 3) The two classes are <u>non-equivalent</u> between two parts of the same circuit, when the mobility of charge carriers changes at the interface of contact of the two parts. 4) Finally, the two laws are equivalent between parts of the same circuit, provided the mobility of the charge carriers is the same every where in the circuit.

A particular case to distinguish the two laws is in principle the Marinov Flying Ampere Bridge. However, in practice, it is a technically impossible experiment, especially with the ineffective parameters chosen by Marinov. According to this author, in the Marinov experiment, the bridge was never observed to rotate by the Lorentz self forces for the following reasons.

1. The bridge according to Lorentz force will violate action and reaction and will rotate, the bigger is the free space which is required to gap the open circuit to a closed circuit. In Marinov's execution the space was filled with $BaTiO_3$, so according to Marinov the capacitance increased from 18 nf to 290 nf. This signifies that the ratio of the closed circuit current to the open circuit current which made the total current through his bridge was 290/18 or about 16 times. In other words, out of an assumed current of 9 A in the Marinov bridge, 95% flows as a material current around a closed circuit and only 5% of it does not flow through the $BaTiO_3$ filled space. So in the Marinov bridge, 95% the Newtonian reaction will be present opposing the rotation of the bridge. Filling the space with $BaTiO_3$ does not improve anything. The effective current is still the current corresponding to 18 nf, if we accept this value as correct and not too big for the dimensions of the apparatus.

2. Marinov claims to have used the main's voltage of 220 V at 50 Hz to power his circuit. In order to increase the expected current of less than 0.1 ma, he has used in series a huge coil of 34 H and 24 Ohms according to Marinov. These figures fit exactly the resonance formula:

$$f = 1/2\pi(LC)^{1/2},$$

for f= 50.7 Hz, L= 34 H, and C=290 nf. So according to Marinov resonance occurred and a current of 9 A, determined only by the ohmic resistance of the coil, flew his circuit and set his bridge into rotation. Here Marinov seems to be a good student, but does not know what every real experimentalist will have found in this case. It is impossible for any coil not to have a parasitic capacitance connected parallel to it. Particularly for the size of Marinov's coil this capacitance is in practice huge compared to the capacitance of 18 nf, however overestimated. Marinov does not mention this parasitic capacitance. Such coils together with their parasitic capacitance have a natural resonant frequency of 1 to 0.1 Hz or less. The equivalent circuit for the Marinov circuit is actually given in figure.* It is certain that when Marinov connected the 34 H coil, the circuit was far out of resonance and even worse, only a portion of the mains voltage, determined by the ratio $V_1/V_2 = C_2/C_1$, was across the resistance of 24 ohms. Thus the resulting current was the resulting current caused by a small fraction of 220 volts and for a circuit well out of resonance.

3. The Lorentz self forces are bigger the smaller is the diameter of the conductor. Marinov, connecting four parallel bridges symmetrically around instead of one, has increased considerably the diameter of the effective conductor. Thus he has diminished the expected forces by this wrong choice of four parallel bridges, instead the minimum one.

In conclusion Marinov by connecting his out of tuning coil, has worsen the experiment instead of improving it, diminishing actually the current from about less than 0.1 ma to an even less value. By choosing four bridges instead of one and by wrongly using $BaTiO_3$ effectively takes advantage of much, much less current than the actual current through his bridge, however tiny. The effective current in the bridge was of the order 0.001 ma and even less. Taking into account that a current of 100 amperes would be needed to set the bridge into rotation for a real good gap of 30 cm, Marinov was out of any expectation to have observed a rotation of the bridge by a factor $(100A/0.001ma)^2 = 10^{13}$, ** assuming in principle the Lorentz forces existed.

However, it is a loss that Marinov's experiment is so insufficient and unsuccessful, for it could have been used to show that even under ideal conditions, no rotation could be produced by the Relativistic Lorentz force, simply because this force does not exist. Effective such experiments using open radio antennas, were designed and executed by the author et al, and are

* Editorial note. There was no figure attached to Pappas' paper, but the circuit is so simple that no figure is needed.

** The right calculation gives 10^{16} instead of 10^{13}.

described in the next paper published in this volume, as well as in reference(4).

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MARINOV'S OPINION ON THE PREVIOUS PAPER BY P. T. PAPPAS

I am very glad that my friend Dr. Pappas has criticized my experiment[1] published in TWT-III, p. 59 (Pappas gives in his Ref. 1 erroneously p. 85). The report on this experiment is given in more detail in the paper "Extremely easy experiment demonstrating violation of the angular momentum conservation law" published in this volume[2]. Only by discussing all those highly interesting experiments and by doing and redoing them, we can reveal the scientific truth. I hope that other people will take part in the discussion which will be then transferred to the pages of the big journals.

First I should like to turn the reader's attention to the terminology which must be strictly preserved, so that misunderstandings do not appear. I call FLYING AMPERE BRIDGE (of PROPULSIVE AMPERE BRIDGE WITH DISPLACEMENT CURRENT) the experiment shown in fig. 2a of Ref. 2 (fig. 9a in Ref. 1). This experiment will violate the law of momentum conservation. As the construction of this experiment is rather difficult, I constructed the experiment shown in figs. 3-5 of Ref. 2 (figs. 9-11 of Ref. 1) which I called ROTATING AMPERE BRIDGE with DISPLACEMENT CURRENT (RABDC). Pappas discusses THIS experiment. The Rotating Ampere Bridge with Displacement Current represents a rotational variation of the Propulsive Ampere Bridge with Displacement Current (PABDC) and is much more easy for execution.

Pappas' criticism comes as an answer to my "call for papers" of the 13 November 1988 (see this volume) and to my letter to Pappas of the 30 November 1988 (see this volume).

Thus, according to Pappas, the right formula for the forces with which current elements act one on another is the Ampere formula (1), while, according to me, the right formula is the Grassmann formula (2) (see them in Ref. 2). Consequently according to Pappas at the interaction of non-closed current loops a violation of the momentum (or angular momentum) conservation law cannot be observed, while according to me such a violation can be observed. Pappas has done an experiment with <u>null result</u> (see the next paper) confirming his view-point. I did an experiment with a <u>positive outcome</u> (Ref. 2) confirming my view-point. One knows, however, that an experiment with null result is never a sufficient proof (as is an experiment with a positive outcome), because it is always possible (even at precise enough calculations) that the necessary accuracy has not been achieved or that some factors have not been taken into account. Beneath I present my doubts with respect to Pappas experiment.

In the above comments Pappas raises doubts whether the sensitivity in my experiment was enough for observing an effect of rotation if accepting theoretically that there must be a torque. Now I shall analyse all items of his criticism.

1. First I must say that I began my experiment taking $BaTiO_3$ as dielectric. The experiment in its final stage was done with dielectric with commercial name Y5U 153 UL (lead-iron-tungstanate) with a higher permittivity supplied by the condensors plant Siemens in Austria. As this name is highly cumbersome, I shall further use only the

name $BaTiO_3$.

The first question is: Will displacement current "flowing" between the plates of a condenser generate a magnetic intensity field and will such displacement current "absorb" magnetic forces originated by other currents, i.e., will the vacuum between the condenser's plates manifest ponderomotive forces. The answer of conventional physics to the first question is "yes" and to the second "no commet", as even for conventional physics it seems an idiotism to assert that vacuum can be set in motion and that this vacuum can exert pressure. Some conventional physicists assert that the ponderomotive forces manifested by the displacement current are "materialized" in the Poynting vector $(1/4\pi)\mathbf{E}\times\mathbf{B}$, where **E** is the electric intensity between the condenser's plates and **B** is the magnetic intensity generated by the acting system. Pappas himself (Ref. 2 in his above criticism) has shown with simple calculations that such an assertion is an idiotism. Thus both Pappas and Marinov, in contradistinction to conventional physics, or better to say to SOME representatives of conventional physics, as the majority EVADES to discuss those problems, assert that the vacuum displacement current with density $\mathbf{J}_v = (1/4\pi)\partial\mathbf{E}/\partial t$ does not generate magnetic field and cannot absorb magnetic forces.

What will, however, appear if the space between the condenser's plates will be filled with dielectric with a permittivity ε? In this case the displacement current becomes $\mathbf{J}_d = (\varepsilon/4\pi)\partial\mathbf{E}/\partial t$ and for $BaTiO_3$ this dielectric displacement current will be 10,000 times bigger than the vacuum displacement current (for the same $\partial\mathbf{E}/\partial t$). According to Pappas, at the polarization of the dielectric the positive extremities of the molecules will be shifted along the electric field E and their negative extremities against E. Pappas considers this as electric current and he concludes that the displacement current in dielectrics must generate magnetic field and must absorb magnetic forces of other currents, exactly as conventional physics assumes. According to me, the dielectric displacement current has the same character as the vacuum displacement current, i.e., the polarization of a dielectric is not equivalent to conduction current. With my experiment reported in Ref. 3 I showed that the dielectric displacement current does not generate magnetic field. With my RABDC I showed[1,2] that the displacement dielectric current does not absorb magnetic forces of other conduction currents.

As Pappas has written his criticism in a hurry, he has confounded some numbers that can disorientate the reader. Pappas thinks that the capacitance of my condensers is 18 nF for vacuum and 290 nF when filled with $BaTiO_3$. If he had read attentively my letter to him of the 30 November 1988 or if he had made the most simple calculations with the help of the formula given on p. 75 of Ref. 1 (the formula is given also in Ref. 2) for the capacitance of a cylindrical condenser, he would see that the capacitance of any of my condensers for vacuum is 0.9 pF. Filled with dielectric (I take ε = 15,000 as it is for the substance Y5U 153 UL), the capacitance becomes 13.5 nF. The actually measured capacitance was 580 nF. The increase of 580/13.5 = 43 times is to be attributed to the increase of the electrodes' surfaces after their etching. Thus without dielectric the

capacitance of any of the condensers will be C_{vac} = 0.9×43 = 38.7 pF. The vacuum displacement current is so feeble that no torque can be registered. Only at the availability of dielectric between the electrodes of the condensers sufficient current can be sent in the Ampere bridges and the action of the appearing torque can be observed. Pappas asserts (as conventional physics also does) that my RABDC should not rotate. The difference between Pappas and conventional physics is that of the current flowing between the condensers electrodes 99.99% generate magnetic field and absorb magnetic forces, according to Pappas, and 100%, according to conventional physics. Thus, according to Pappas, the effect in my experiment will be the same as in the Rotating Ampere Bridge with Sliding Contatcs (RABSC) if the sliding contacts will be put at the points B and G of fig. 3 in Ref. 2. Such a rotating Ampere bridge, of course, cannot rotate, as the forces drawn in fig. 3 show (a Rotating Ampere Bridge with Sliding Contatcs rotates only if the sliding contacts are put at the points C and F of the mentioned figure). But according to me the dielectric displacement current is not equivalent to conduction current, and consequently the RABDC must rotate, as I have actually observed.

2. Pappas thinks that the inductance L = 34 H is the pure induction of the coil and thus this coil must have some additional capacitance due to the parasitic capacitance between its turns. How have I established that the inductance of the coils (I had several coils) was 34 H? I took a condenser with a known capacitance C, put it in series with the coils, applied a tension from a signal generator and established at which circular frequency ω there was a resonance. Then I calculated $L = 1/\omega^2 C$. Thus this inductance L is not the pure inductance of the coils but some effective inductance diminished by the parasitic capacitance of the coils. Of course, this effective induction will be a function of ω. I chose, however, such a C to have ω near to the (2π)50 Hz at which the experiment was done. Consequently the "black box" called "coils" manifested in the circuit of my experiment only an inductance L = 34 H and a resistance R = 24 Ω. Nothing else.

3. Pappas writes that the Lorentz self-forces are bigger when the diameter of the bridges' conductors are smaller. This is true, although until now nobody has presented rigorous calculations nor precise measurements. Table 1 in Ref.4 (measurements done by Pappas and Moyssides) shows that this force first increases with the increase of the diameter and reaching some maximum decreases. In 1983 Moyssides spent six months calculating the forces in the Ampere bridge but, as far as I know, he has not obtained some impeccable results.

Pappas notes that by using four bridges instead of one, the driving torque should be diminished (for the same current). This is true! The most simple calculation gives that the torque for four bridges is exactly four times less than the torque for one bridge, as the torque is proportional to the square of the current. But Pappas must take into account that the experiment has not only an electromagnetic aspect but also a mechani-

cal aspect. To have a well balanced rotor suspended on the pointed ends of two clock axles, one has to use at least two bridges and four are better. I chose four bridges. Four bridges were chosen also in my RABSC-machine, but there two bridges were enough.

At the end I can suggest to Dr. Pappas only one thing: Repeat the RABDC-machine and observe the rotation. In physics man SUPPOSES but the experiment DISPOSES.

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MARINOV'S OPINION ON THE FOLLOWING PAPER BY P.T. PAPPAS

Here are my short comments on the "stigma experiment" of Dr. P. Pappas (see the next paper).

1. The experiment is done with current of very high frequency and it is no more from the domain of the physics of quasi-stationary currents. The calculations for non-quasi-stationary currents become rather complicated, and it is not easy to give a prediction whether there will be an effect at all.

2. Pappas' conclusions about the sensitivity of his set up are based on calculations but not on measurements. Maybe in the calculations he introduces errors. So Pappas takes the normal Ampere bridge force factor equal to 10^{-6} N/A^2, although it is not enough clear from the text whether this is the factor for a whole Π-form bridge or only for the half, i.e., for the one edge. According to my measurements, this factor is about 5.10^{-6} N/A^2. Well, if my factor is the true one, the sensitivity will be increased. However this is the factor for direct or quasi-stationary current. Will the factor be the same for high-frequency current, moreover when the current along the wire will have nodes and anti-nodes? Thus the sure way to check the sensitivity of the stigma experiment is the following: The extremities of the stigma "antenna" must be immersed in mercury and a closed circuit is to be made by the use of sliding contacts. The appearing torque is to be measured first by the use of direct current, then at low-frequency current, and then at high-frequency current. One has to look whether there is a decrease of the torque with the frequency. But maybe Dr. Pappas thinks that even with direct current and mercury contacts the stigma "antenna" will not rotate?

3. Pappas has done his experiment with 1 A expecting to see an effect. However, for my experiment he requires 100 A (see his previous paper). This is not fair. The moment of inertia of my cylindrical rotor was $J = (\pi/2)\mu hr^4$, where $\mu = 3$ g/cm^3 is the middle density (found from the weight of the rotor and its volume), $h = 12$ cm is its length (in fig. 4 of the above Ref. 2 the length of h is 7 cm) and $r = 2$ cm is the radius of the rotor. Thus we have $J = 9.10^{-5}$ kg m^2. Taking into account the moment of inertia of the bridges' wires, we shall come to no more than 13.10^{-5} kg m^2, i.e., his moment $J = 26.10^{-3}$ kg m^2 is 200 times bigger, while the lever of his force is only 50 times bigger than mine. In my experiment current of 1 A gives NO effect. For an effect I need 10 A.

SUBMITTED TO THE THORNY WAY OF TRUTH IV. December 15, 1988.

STIGMA ANTENNA FORCE EXPERIMENTS

P.T.Pappas[1] and Tim Vaughan[2].

ABSTRACT.

The Cardinal force law and the relativistic Lorentz force law predict identical results, for the current force interactions between separate closed circuits and for many interactions between parts of the same circuit (with no major changes in the charge mobility in the conductors). A case to distinguish the two laws, is the force interactions between physically open circuits or the forces between parts of a physically open circuit, excited by a high frequency, high power alternating current. Straight line and stigma shape (s shape with sharp corners) radio transmitter antennas were chosen, excited at frequencies of 108 MHz with 50 watts, 147 MHz with 150 watts and 2450 MHz with 500 watts. Clear attractive forces were observed to propel all pair antennas, one towards the other, or to arrange them perpendicular to each other. However, no self forces of the type predicted by the relativistic lorentz force law were seen for all the antennas standing alone, though the predicted forces were expected considerably bigger than the mutual forces between the pairs of antennas, while the sensitivity of the experiment remained the same, well in excess the required minimum. The positive results on one hand and the null results on the other, directly imply that 1) the relativistic Lorentz force is not applicable for currents in physically open circuits. This is equivalent to say, the Biot-Savart-Lorentz formula is not correct when it is not integrated around a closed circuit; 2) it appears only that the non relativistic Cardinal force of Ampere is in operation for any case; 3) what in Physics has been observed and called the Lorentz force is actually, the Cardinal force of Ampere in those cases that theoretically the two formulas for the forces are numerically identical.

[1]Permanent access address: P.T.Pappas, Math. Prof., Phys. PhD. Marcopulioti 26, Athens 11744, Greece.

[2]Tim Vaughan, Radio Engineering Laboratories, 1013 Wellsford Road, Modesto, Ca. 95351, USA.

INTRODUCTION

The Cardinal(1) law of Electrodynamics of Ampere and the law of Biot-Savart, that of Grassmann or its modern version the relativistic Lorentz force law have been those profound laws of Physics that determined the present Electromagnetic theory. The Cardinal force law on one hand and the B-S-G-L law on the other, which we shall refer to it with its modern form of the relativistic Lorentz force law, were assumed to predict identical results, since the time of Maxwell(2). Doubts(3) for the equivalence between the two profound laws of Physics were raised recently by the author since the years 1980-1982. Since then an extraordinary big number of papers(4)[5,6] appeared in press purporting to prove the complete equivalence of the two laws. After a 150 years late proofs proved that none of the previous proofs was complete and additional proofs were needed. The difficulty was mainly around the limits of convergence for simultaneously infinite number of singular points at the surface of contact between two intersecting conductors. This case of simultaneously infinite number of singular points was practically met for the first time in applied physics, and definitely the relevant mathematical theory by Cauchy, Riemann, Lebesque* and others had not been completely developed at the time of Maxwell. One of the author's mathematical analysis(3), somehow different than the recent attempted proofs, concludes that 1) the two classes of laws are equivalent for all separated circuits with at least the source circuit closed. 2) The two classes of laws are non equivalent for non closed source circuit and any other separate circuit. 3) The two classes are non equivalent between two parts of the same circuit, when the mobility of charge carriers changes at the interface of contact of the two parts. 4) Finally, the two laws are equivalent between parts of the same circuit, provided the mobility of the charge carriers is the same every where in the circuit.

In the present letter, we shall present the experimental investigation of above case 2. No where in the literature before appears such investigation of the forces between physically non closed circuits. To perform such an experiment, we looked at physically open radio transmitter antennas. Three choices were chosen a) a stigma shape (s shape with 90 degrees corners, (see Fig. 1 figure) of 3/2 wave lengths excited at 108 Mhz with 50 watts, b) various wave length antennas and various shapes at 2450 MHz with 500 watts, c) a stigma shape of 3/2 wave lengths excited at 147 MHz with 160 watts. All three cases gave similar clear results. Case c) carrying all the previous experience was the most perfected and will be described here.

*Lebesgue

DESCRIPTION OF THE EXPERIMENT.

Fig. 1
Fig. 2

The stigma shape antenna shown in figure, was chosen. The total length of this antenna was chosen 3/2 wave lengths or about 3 m designed to tune at 147 MHz. This frequency was chosen because it is in a band for radio amateur users and provides convenient dimensions for the stigma antenna. The antenna was central fed and bent at right angles at .46 cm before each end. The semi length of the central section was 0.98 cm and the wire was a stiff 14 AWG, copper clad iron suspended horizontally from the roof of the laboratory by a thin nylon thread as shown in figure. The suspension allowed the antenna to rotate around a vertical axis through the center of the antenna. An RF transformer was used to supply RF power to the center of the antenna, consisted of two coaxial coils of a few turns each, as shown in the
Fig. 3
figure. This coupling between the coils was chosen to allow free rotation of the antenna. The restoring torque, which defines an equilibrium position for the antenna was calculated as follows. The linear density of the wire was 0.017 Kg/m. The stigma shape of the antenna had a moment of inertia I, with respect to the axis of rotation, which is given to a good approximation by the formula:

$$I = (m_1/3+m_2+m_3)\times l^2 \qquad 1.$$

where m_1 is the mass of the central part of the antenna, m_2 and m_3 are the mass of the bent ends of the antenna, and l is the distance of the corner to the center. Substituting values in the above formula the moment of inertia is found numerically:

$$I = 0.0265 \text{ Kgm}^2$$

The swing period of the antenna was measured to about 2 min. From this information and the standard formula for rotary oscillations:

$$T = 2\pi\sqrt{I/k} \qquad 2,$$

it is found $k = 7.257\times10^{-5}$

From the standard theory the rotation angle f of the antenna due to a torque N is:

$$f = N/k \qquad 3.$$

For a couple of forces applied near the corners of the antenna and perpendicular to the middle section N is approximately Fx2m.* So the expected deflection angle of the antenna due to Lorentz forces applied on the middle section near the corners is:

$$f = 2xF/7.257\times10^{-5}\times(180/3.14)\text{degrees/Nt} \quad \text{or}$$

$$f = 1.58\times10^{4} \text{ degrees/Nt}$$

This was the rotation sensitivity of this stigma antenna.

The oscillating current pattern when the antenna, was excited was similar to the current pattern of a straight wire antenna of 3/2
Fig. 4
wave lengths, shown in figure. This was confirmed by inspecting the nodes of the stigma antenna with a fluorescent lamp and a neon lamp. It was found that around the 90 degrees bends the current was maximum as well as at center of the stigma antenna.

*Editor's note. It is not enough clear which is the force F and which is the "arm" m (see Fig. 5).

The current flowing at the center and the corners was estimated from the impedance of the antenna and the power supplied.
The power flowing into the antenna was continuously measured by a watt meter and a standing wave bridge which was interrupting the RF power line to the antenna. The power was between 150 and 160 watts. The impedance for a straight antenna at the center is about 70 ohms. For our stigma antenna, the impedance was less and experimentally estimated from the coupling of the RF impedance transformer to be close to 50 ohms. With these estimates the current in the antenna flowing around the corners is between 1 and 2 Amperes and exactly 1.7 Amperes corresponding to 50 ohms impedance. It can be shown by applying the right hand force rule that the Lorentz forces on each side of the corners are as shown
Fig. 5 in figure, with constant direction and independent of the change of the direction of the current. The forces are proportional to the square of the current and for the dimension of the stigma antenna are of the order of $1.2\times10^{-3}/(100A)^2$ grams of force, and located very near the corners. This implies that the forces in our case on the stigma antenna were of the order between 10^{-6} Nt for 1 Ampere and 4.8×10^{-6} Nt for 2 Amperes, and exactly 3.6×10^{-6} Nt for 1.7 Amperes. From these, the deflection of our stigma antenna was expected clearly to be minimum of 1.58 degrees or about a minimum of 2.75 cm of displacement for the corners. No detectable displacement was observed, though a deflected laser beam on a mirror attached to the antenna, was employed with a
Fig. 2 sensitivity much less than a fraction of 1 mm.

Thus, no self forces of the type predicted by the relativistic lorentz force law were observed. As an independent test to confirm that electrodynamic forces existed on the stigma antenna, but they were cancelled in pairs on the same body by Newton's third law, and that the sensitivity of our experiment was enough to detect non cancelled forces, a second straight wire antenna of 1/2 wave length was brought to the vicinity of the stigma
Fig. 6 antenna, see figure. The straight wire antenna was not powered independently. However, similar, alternating currents were induced on the straight antenna and the stigma antenna was seen immediately to undergo big swings under the influence of the induced currents on the straight antenna.

The induced currents i, by the currents of the stigma antenna I, are clearly smaller than the former currents, i.e. $i<I$. Similarly the distance D of interactions between the sections of the stigma antenna are smaller than the distances d between these sections and the straight wire antenna. This implies the Lorentz force integral for the theoretical self propelled forces of the sigma antenna are smaller than the Lorentz force integral for the mutual interaction between the two antennas, i.e.

$$\iint f(I^2/D^2)\,dv_1\,dv_2 \;>\; \iint f(Ii/d^2)\,dv_1\,dv_2$$

This means that theoretically it is,

Self force F_{12} > Mutual force F_{12}

This is an independent confirmation that the sensitivity of the experiment was enough and if the self forces on the stigma antenna, predicted by the relativistic lorentz law, existed, then these would have been observed. However, no such forces were observed, on the contrary forces which obey Newton's third law were clearly seen. According to Maxwell, the only law compatible with all the experimental evidence and Newton's third law is the Cardinal law of Ampere.

CONCLUSION

The conclusion of the present authors is, while the sensitivity of the experiment was well in excess the required minimum, the positive results on one hand and the null results on the other, directly imply that 1) the relativistic Lorentz force is not applicable for currents in physically open circuits. This is equivalent to say, the Biot-Savart-Lorentz formula is not correct when it is not integrated around a closed circuit; 2) it appears only that the non relativistic Cardinal force of Ampere is in operation for any case; 3) what in Physics has been observed and called the Lorentz force is actually, the Cardinal force of Ampere in those cases that theoretically the two formulas for the forces are numerically identical.

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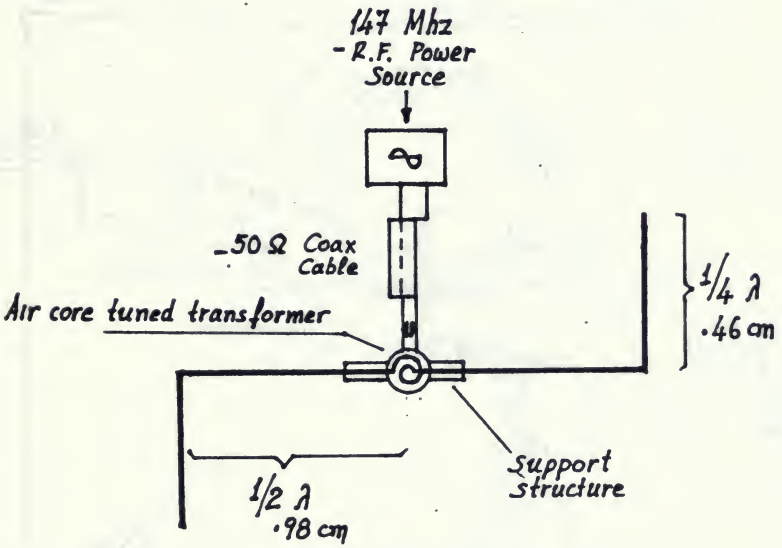
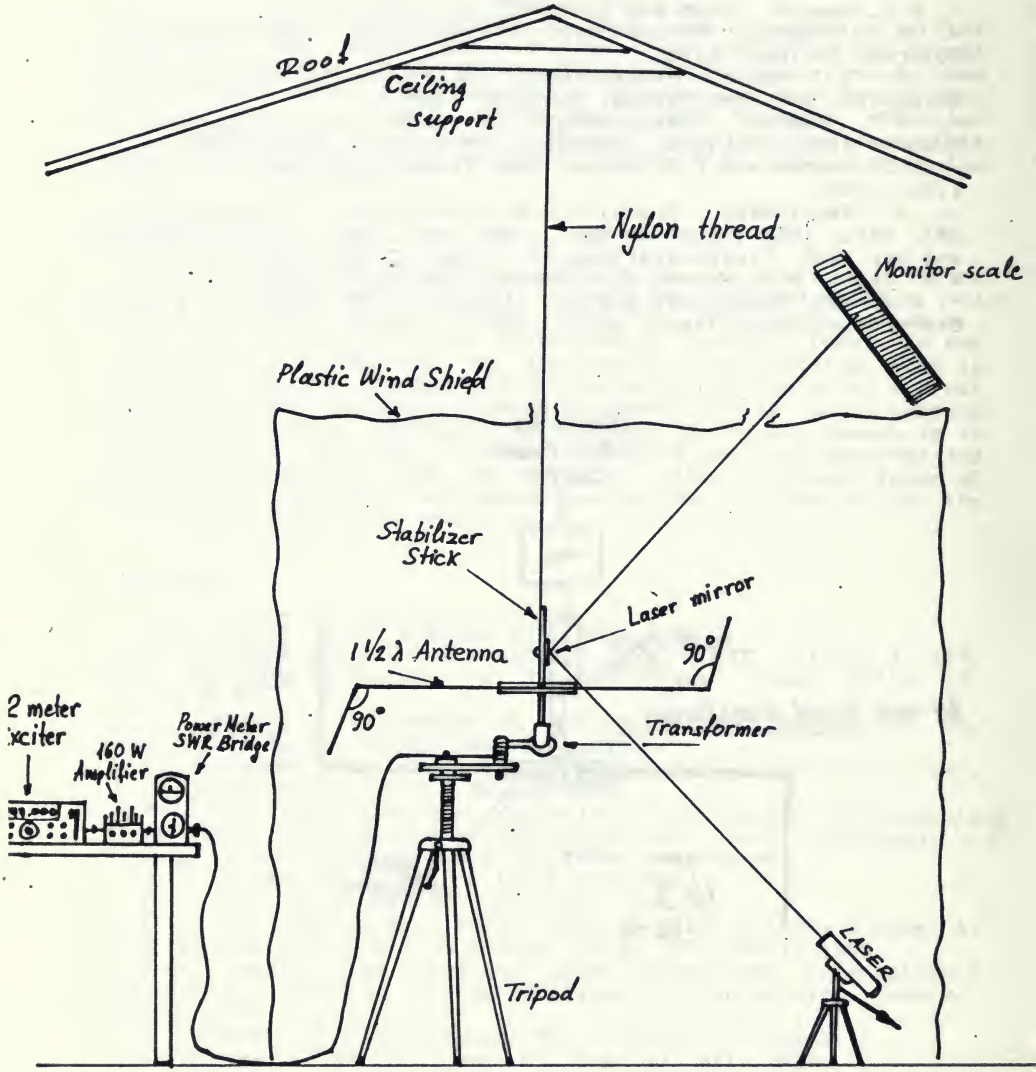


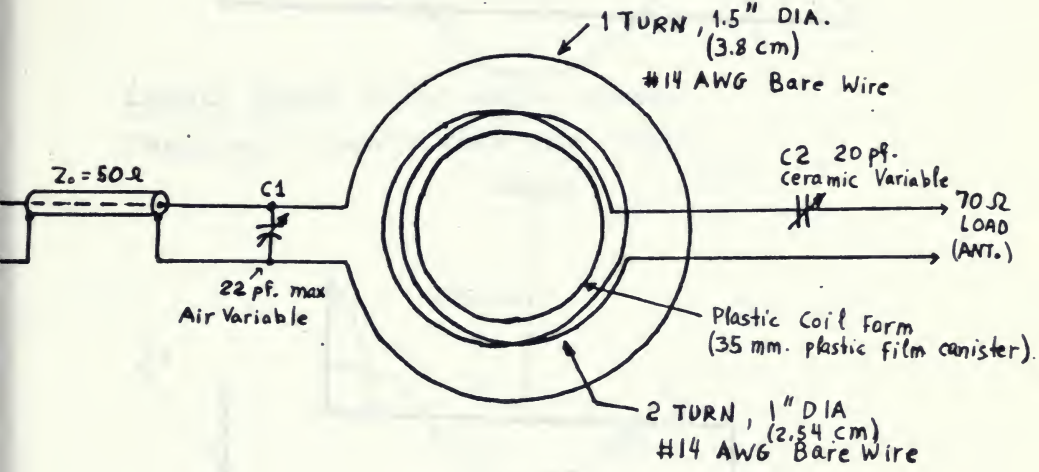
Stigma shaped antenna Top View.

Fig. 1



Experimental Setup

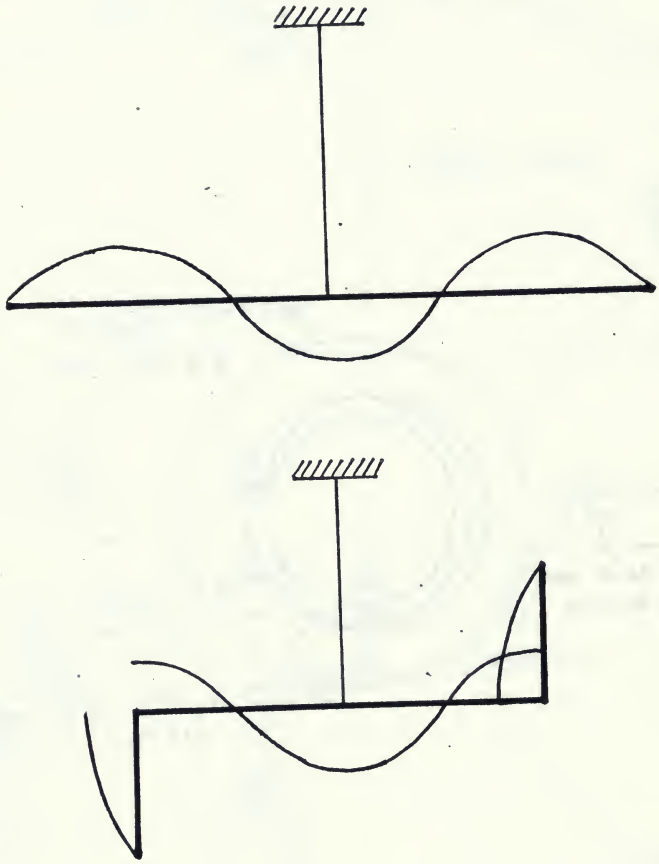
Fig. 2



f = 147 MHz

Coupling Transformer

Fig. 3

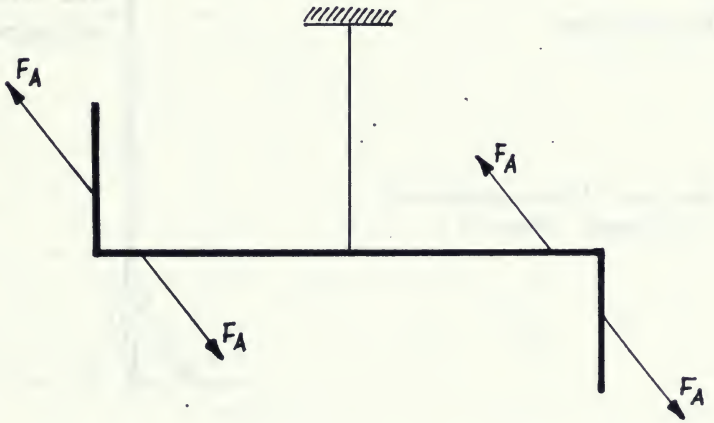


Current patern in $3/2\ \lambda$ length antenna

Fig. 4

Lorentz Forces on the stigma Antenna,
Producing a counter clock wise torque

$T \neq 0$



Cardinal Ampere Forces on the stigma Antenna,
producing no torque.

$T = 0$

Fig. 5

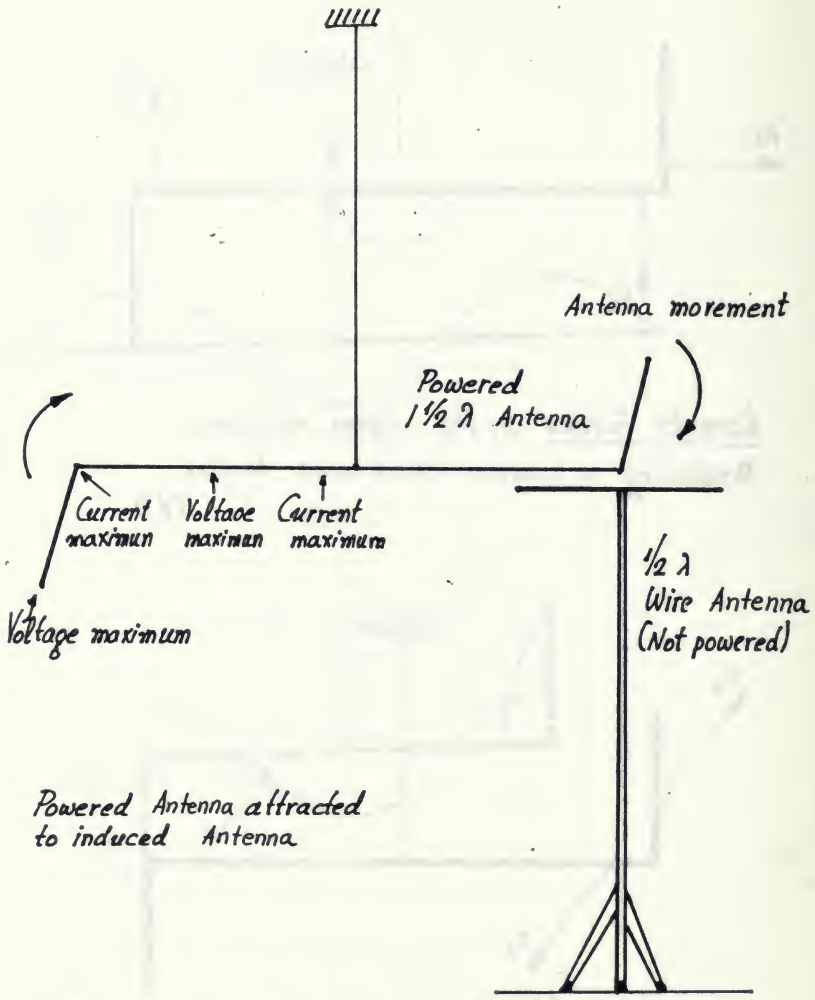

Antenna movement
Powered
1½ λ Antenna
Current maximum
Voltage maximum
Current maximum
Voltage maximum
½ λ
Wire Antenna
(Not powered)
Powered Antenna attracted
to induced Antenna

Fig. 6

SUBMITTED TO TW IV December 18, 1988.

INDUCTION IN A CIRCUIT CONTAINING A ROTATING DISC.

P. T. P A P P A S
Professor of Mathematics, Doctor of Physics
Marcopulioti 26, Athens 11744, Greece. Tel. 00301-8623278

For a period of 9 years from 1980 to today this author has been engaged in the study of the forces on a part of a circuit due to the rest of the circuit. The conclusion of this research included in the references ([1,2]), is that these forces are correctly described by the cardinal force of Ampere:

$$F = -(\mu_0/4\pi) r I_1 I_2 / r^3 (2 ds_1 \bullet ds_2 - 3/r^2 (ds_1 \bullet r)(ds_2 \bullet r)) \quad 1.$$

and partially by the Relativistic Lorentz law. The latter law describes correctly the forces only whenever it is equivalent to the Cardinal law of Ampere. The cases of equivalence as well as the cases of non-equivalence are given in references([2]).

The cardinal forces on a part of a circuit may move it and eventually produce a mechanical work. If we assume that the conservation of energy holds always true, then we may expect that a back electromotive tension is developed in the circuit to pay for the mechanical work. However, the law of BET is a direct consequence of the relativistic Lorentz force, which implies the Lenz rule, via the left and right hand symmetric rules, which describe the same time the motor and the generator effect in exactly equal and opposite quantities conserving any energy change in the system. Therefore, when the Lorentz relativistic law is not applicable and only the Cardinal law is appropriate, conservation of energy is an open question. To overcome this difficulty, Neumann as early as 1845 postulated the existence of Neumann Potential. This view rather abandoned, seems not to have been developed further by Neumann. However, it has been taken up Graneau([3]), who continued the work of Neumann and has studied the Neumann potential in his book "Ampere - Neumann Electrodynamics of Metals", limiting the study arbitrarily only to currents in metals. However, the scheme of Graneau quickly comes to contradiction on page 272 of his book, where the power exchanges are indicated between various systems. In his figure 85, we see that attraction and repulsion are not reciprocal cases and even worse in the case of repulsion in increasing distance, energy is indicated necessarily to flow from loop m to loop n. However with the same reasoning, one may argue that energy flows the other way around from n to m. Nothing distinguishes m to n. Actually, one expects no energy flow from m to n when m and n are made up from equivalent permanent magnets. So Graneau's definitions of energy exchanges between systems are completely arbitrary.

The author has taken the view given by the face value of Cardinal law. Energy may not be conserved in non closed circuits or between one part of a circuit on another. This possibility is investigated for currents consisted of charges moving in vacuum

in reference([4]). As early as three years ago the author investigated the case of energy exchanges between the interactions of one part of a circuit on another, a case of interest, as the only compatible law of Electrodynamics is the Cardinal law of Ampere and the Lenz rule, responsible for conservation of energy in electrical to mechanical energy exchanges, is not obviously applicable. This investigation will be presented here. However, the results of these experiments, as one may suspect, were naturally too feeble for all practical cases and to a certain extent inconclusive. Otherwise violation of energy conservation could have been known a hundred years ago. The presentation here will be useful to the reader who may judge better for similar experiments claiming clear conclusive results in one way or another. Besides, the indications which will be given that energy may not be conserved for such systems, the presentation will be useful for someone wishing to develop the technology to over unity energy production.

A third view taken up is that of Stefan Marinov. Marinov arbitrarily maintains that the Relativistic law is applicable in all cases, violation of action reaction occurs and all sorts of strange and improper things take place in such circuits, including the violation of energy, praising to solve the economical problem of the world and of his pocket.

The projects of investigation proposed by the author were carried by two groups([5]) of graduate students at the National Technical University of Athens in the years 1985 to 1986 and 1986 to 1987. The objective was to measure the BET developed in a circuit when one part of the circuit was moving under the action of the forces of the circuit itself, strictly consisting of one single loop.

The forces on a part of a circuit of a circuit depend on the square of the current and the logarithm of the linear dimension as well as inverse proportionally to the logarithm of the diameter of the used conductors. Therefore, the order of magnitude of these forces does not change for all medium sizes of circuits of a few tens of cm to a few meters. This order is calculated in reference([16]) to:

$$10^{-6}\ Nt/A2$$

for 1 mm to 3 mm diameter of the involved conductors.
Therefore, for a such circuit part moving with a velocity V the mechanical power produced is:

$$FxV=(10^{-6}Nt/A2)xI^2xV$$

This mechanical power should be paid by the BET, E, times the current through the circuit:

$$ExI=(10^{-6}Nt/A2)xI^2xV$$

or

$$E=(10^{-6}Nt/A2)xVxI$$

For a velocity V=2m/sec, the BET is:

$$E=2x10^{-6}OhmsxI=2\mu\Omega xI$$

This means that the BET will be a tension equal to the magnitude of a voltage drop of 2 microhm resistor! For example for 50 A

across the circuit the BET due to a fast moving part of 2 m/s is 0.1 mv!
This figure dictates the advanced technology needed for the experiment. The wiring should be of small resistance, constant to less than 1 μΩ. This is a real problem for the parts not only heat and change resistance but also make a contact between moving parts. Therefore, wiring and contacts should be extremely low resistance heavy duty ones. This implies that the diameters of the parts should increase considerably. However, increasing considerably the diameters of the conductors and the surface of contacts of the moving parts, the electrodynamic forces diminish and the expected BET also diminishes. Therefore, increasing diameters of the conductors and contacts is not a solution as the BET will be extinguished. To this contradicting factors the tension developed between different metals at different temperatures is of the same order as the expected BET for medium temperatures. Therefore thermocouple tension can mask the whole effect of BET. Similarly, the induced tension by the Earth's magnetic field or other magnetic field present is close to the BET. Therefore it becomes obvious that such an experiment requires modern high technology and this explains why such experiments had not been performed in the past.

In the two apparatus constructed at the NTUA most of these problem were solved by making the following choices for the circuit. In both experiments two copper discs were chosen connected by a copper axle as shown in the corresponding scaled drawings. The two discs of several mm thickness indicated in the scaled drawings were immersed in two long parallel troughs with mercury. The circuit was completed as shown. The power supply was a computerized predetermined constant current source, capable of delivering constant current from a fraction of an Ampere to 500 Amperes. The two symmetric discs in this way neutralized the induced tensions by external fields either due to the Earth or any other external source.

The discs slightly rotated under heavy current supply of the order of over 100 Amperes. Under these conditions excessive heating resulted changing the involved resistors and thermocouple tensions. Therefore, it was decided to diminish the current to less than 100 Amperes and to assist the rotation of the discs by an external motor connected via a belt and two pulleys. Most of the friction was overtaken like this by the motor and a fraction of the friction was overtaken by the electrodynamic forces on the discs, achieving a constant rotational speed. This became evident by turning off the current in the circuit and keeping the delivered power by the motor constant, then the speed of rotation diminished by 13 to 15%.
The same time we could counter rotate the discs causing the BET to change sign and become ET. This was again evident when turning on the current through the circuit, the speed increased by a similar amount 13 to 15%. Therefore, it becomes evident that the

electrodynamic forces were always present, no matter that the discs were assisted in rotating or forced to counter rotate. Thus the expected BET as well as ET should be considered irrelevant to the involvement of the external motor and to depend only on the speed of rotation as well as the current through the circuit.

Both BET as well as ET was measured as the potential difference between the two mercury troughs. To these tensions the voltage drops in the troughs as well as drops along the discs and their axle should be added algebraically. The voltage drop was observed of the 100 mv, i.e. three orders of magnitude bigger than the expected BET. Therefore, it was decided to apply a differential method to determine BET or a least square fitting to the data, assuming the following functions of BET and ET:

$$V_{\Delta} = K_1(\omega, I) + IR(\omega) \qquad 1.$$

$$V_{\circ} = Vdrop = IR(0) \qquad 2.$$

$$V_{\Delta} = K_2(-\omega, I) + IR(-\omega) \qquad 3.$$

Where K_1 and K_2 should be the functions of BET and ET respectively.
Assuming that

$$R(\omega) = R(0) = R(-\omega) = R \qquad 4.$$

Equations 1,2,3 become:

$$V_{\Delta} = K_1(\omega, I) + IR \qquad 5.$$

$$V_{\circ} = IR \qquad 6.$$

$$V_{\Delta} = K_2(-\omega, I) + IR \qquad 7.$$

Subtracting these equations we may determine $V_{\Delta}-V_{\circ}$ and $V_{\Delta}-V_{\circ}$, respectively equal to BET and ET.
The results of the measurements are given in the various tables and graphs at the end of the paper. These results can summarized for both experiments as follows:
1. The $V_{\circ}$ and V_{Δ} was much bigger than the expected BET and ET by a factor of 18 and 50 respectively.
2. The V's were proportional to I, as expected.
3. The V's were independent of the rotation speed, contrary to what was expected.
These results are very strange to explain. However, the huge BET as well as the huge ET suggests immediately that the assumption 4 is not correct and the rotation of the discs caused mercury to shift into two opposite directions decreasing and increasing respectively the total ohmic resistance between the two troughs. Second the independence of BET and ET from the rotation speed may be so, because BET and ET ware actually zero, or the actual small values of BET and ET were masked by the experimental errors. Therefore, the experiments, though with extremely care performed, give inconclusive results. Not proving the non existence of BET and ET nor their existence. The only thing that is conclusive is the existence of the Electrodynamic forces clearly assisting or opposing the rotation.

The author evaluating this case and appreciating that a similar circuit to the above ones was latent, imbedded in the N-

Machine(4) and unnoticed by its constructor Bruce de Palma, decided to go all the way to Santa Barbara, California in October 1987 to perform relevant experiments. Indeed, if one ignores the permanent magnets installed by Bruce in the N-Machine, one is left, in principle, with two rotating discs immersed in mercury troughs around them. Rearranging the external circuit one can simulate the above circuits of NTUA, in Bruce's N-Machine. Indeed, Bruce never paid any attention to the configuration of the external circuit, which was laying causal on the floor. The machine of Bruce was much bigger than the NTUA machines and capable to rotating to much higher speeds of the order of 6000 rpm. Clearly, the induced tension in the N-Machine will be the sum of the tension of the Cemented Faraday Disc and the tension induced by the rotating discs themselves when a current is flowing through them. The latter tension will depend on the direction of the external circuit with respect to the direction of the rotating discs, while the former will not depend on this direction. However, the former tension is expected much bigger than the later tension. Therefore, moving around the external cables of the N-Machine small variations of the output tension should be observed. Indeed, this was observed by the Author and Bruce to happen in the most celebrated way in the experiments of November 1987, in the Sunburst Laboratories in Santa Barbara California.

The following observations were made in November 1987:

1. Strong reaction forces, predicted by the Cardinal law, occurred on the external circuit of the order of few Kgr of force. This was clearly recorded by the stress of rubber strings, made to suspend horizontally and perpendicularly to the axle of the machine the heavy duty outside cables, when currying a current of the order of 1000 A, induced by the machine to a nearby load. These forces were clearly in the same direction and the same order, as expected by the Cardinal law, braking forces on the motor which was powering the N-Machine.
2. The heavy duty cables were arranged to two more positions. One position upward and tangential to the rotating discs and one downward and also tangential to the rotating discs. The author asked Bruce to set the N-Machine at medium power at half the maximum speed, about 3000 rpm. The author allowing for about 10 minutes the machine to settle at a constant speed, started to shift the outside cables from the upward position to the downward and vice versa continuously several times.

Two things clearly occurred: A. At the upper position the monitored rotational speed reached a maximum, increased by a few percent; the same time the output tension increased by about the same percentage. B. At the downward position the opposite thing occurred, the rotational speed reached a minimum decreasing by few percent and also the output tension decreased by the same amount. In any middle position the speed as well as the output tension was somewhere between the minima and the maxima. These last two results may seem not to be surprising, accepting the electrodynamic forces which may assist or oppose the rotation of

discs as it was established at the NATUA. Therefore, the increase and decrease of the rotational speed of discs may be expected accordingly the rotation of the discs was clockwise or counterclockwise relative to the external circuit. Similarly, the output tension increase or decrease may seem to be natural, since this tension is an induced tension proportional to the rotation speed. However, these results was not obvious and natural to the author who expressed his surprise with cheers, while the experiment lasted. The reasons are the following:

1. In order for the powering motor coupled to the N-Machine, to increase the rotational speed without altering the electrical power, supplied to it, the braking force from the N-Machine should decrease. This means that the net mechanical power delivered to the N-Machine decreased, however the output electrical power from the N-Machine increased! This happened because of the self forces of the circuit itself and its current, and without the direct intervene of the present magnets. This means that an extra mechanical power was delivered by a particular arrangement of the circuit itself. This mechanical power according to the conservation of energy should be at the expense of the electrical power of the circuit. Thus, a BET should have been developed by the self interactions of the circuit, compensating for the extra mechanical power delivered to the rotating discs. The same time this extra mechanical power should have caused an extra induction ET on the circuit caused by the permanent magnets. It is obvious that

$$BET = kx\text{mechanical power}$$
$$ET = -kx\text{mechanical power}$$

Therefore, according to conservation of energy, in the circuit two exactly opposite tensions should have been developed, one BET from the self interactions of the circuit and one ET from the mutual interaction of the magnet and the circuit. Therefore, no net increase of the output tension should have been observed in the Bruce machine. The only explanation available to this author is that either the BET was zero or too small relative to the expected according to the conservation of energy.

Thus the N-Machine seems to resolve the inconclusive results of the experiments of NTUA. The BET is actually too small or zero compared to what was expected. The first possibility is most probable. This can be seen from the following: The BET is exactly equal to the mechanical power when it is induced by a closed circuit or whenever the Relativistic Lorentz law, leading to the Lenz rule is applicable. Whenever, the Lorentz law is not applicable and the case is described by the Cardinal law of Ampere, the Lenz rule is also not applicable. Therefore, the bigger is the departure of the interacting parts from being closed circuits, the bigger is the inequality of BET and Mechanical power. Similar conclusions, but for completely different experiments are expressed by the Author in reference(4).

Similar, anomalous differential results for the output of the N-Machine were established by professor Kinchelo(7). However, the probable free energy merits of the N-Machine, which Bruce has not paid attention, seem to come from the interactions of one part of the circuit on another part, dictated by the Cardinal law. The Cemented Magnets seem to have the only function to provide the necessary current to excite the circuit.
The law of Ampere not only, according to Maxwell(8), is and should remain the Cardinal law of Electrodynamics, but it seems to be also the Cardinal law of the Creation of the Universe.

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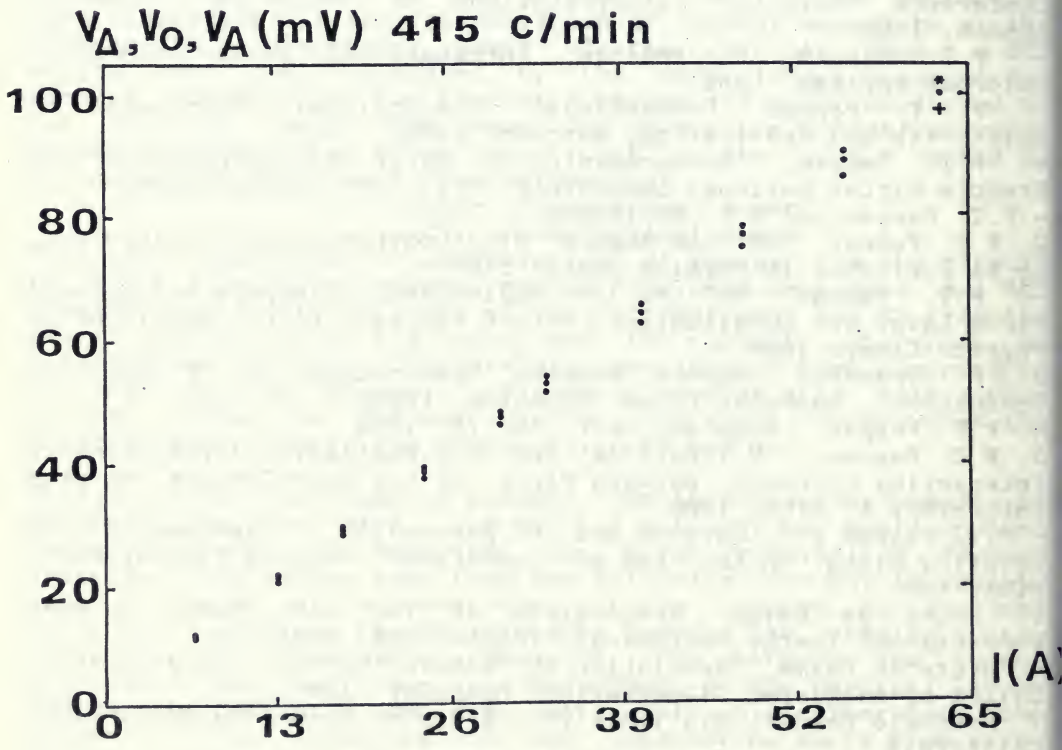

Fig. 1

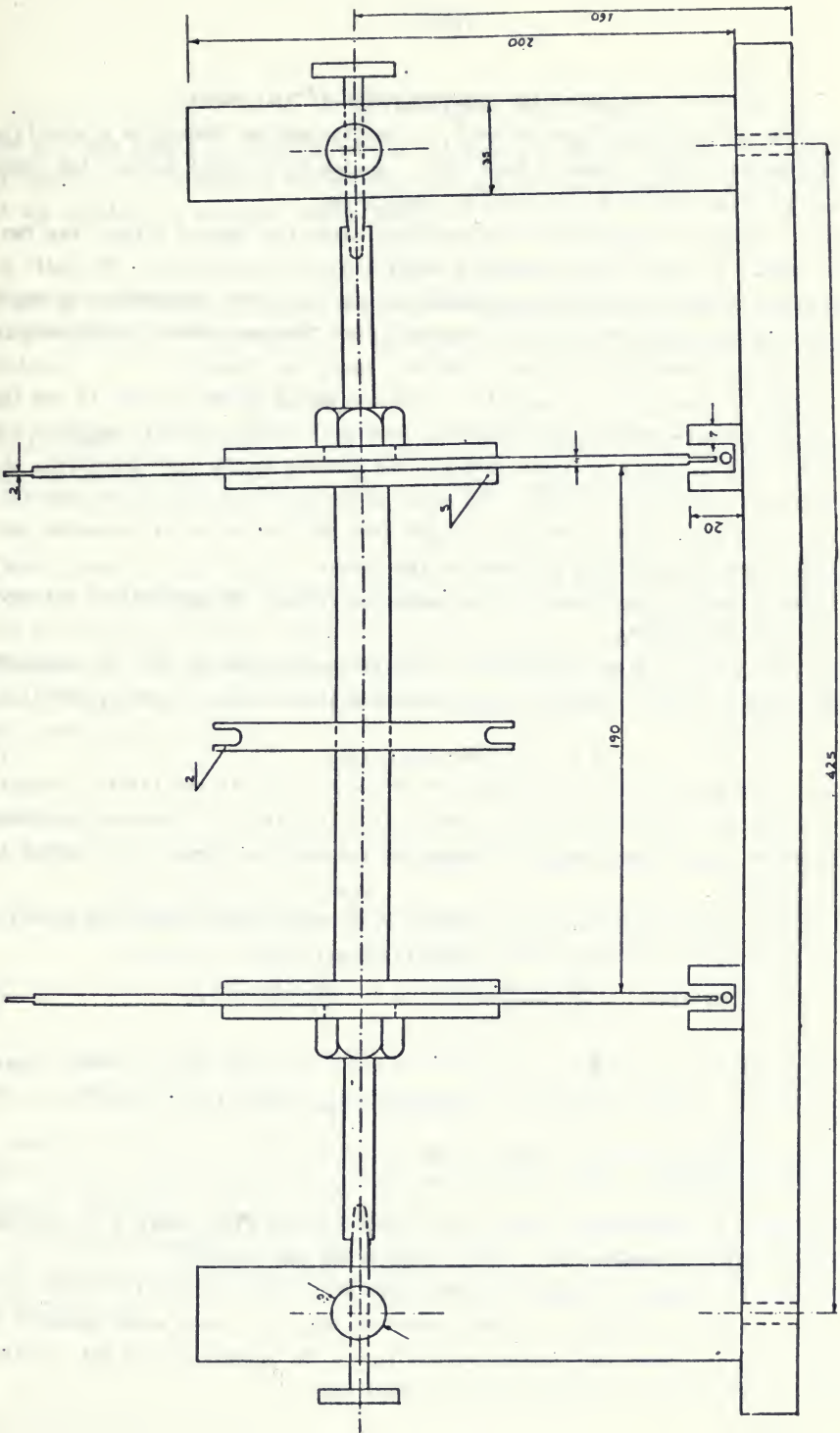

Fig. 2

MARINOV'S OPINION ON THE PREVIOUS PAPER BY P.T. PAPPAS

According to my theoretical predictions[1], tension must be induced in a propulsive or rotating Ampere bridges, even if they are moving by internal forces. The experimental data reported in Ref. 1 confirmed my predictions.

In Pappas' experiment reported in the preceding paper, the "Ampere bridge" has two legs which remain at rest in the laboratory and a shoulder consisting of the radii of two disks which rotate about an axle perpendicular to the planes determined by any of the legs and the respective half of the shoulder. This "Ampere bridge" has sliding contacts at the points where legs and half-shoulders touch one another.

Thus in Pappas' experiment the magnetic field originated by the current in the legs rests in the laboratory and the half-shoulders move with respect to this magnetic field. It is obvious that in such a case tensions will be induced in the half-shoulders, as this machine has a rotor and a stator. The observed effects confirmed these expectations, but, according to Pappas, they were much bigger than those which he had expected and Pappas thinks that these effects are due to side causes.

Now I shall give my predictions for the appearing effects. My predictions fit very well to the observed effects.

Formula (4) in Ref. 2 gives the magnetic potential originated by the one leg in Pappas experiment along the radius of one of the rotating disks; written in the system SI, this formula has the form

$$\mathbf{A} = (\mu_0/4\pi) I \operatorname{Arsinh}(L/x)\hat{\mathbf{y}}, \qquad (1)$$

where L is the length of the leg. I chose the frame's origin at the sliding contact, the x-axis along the radius of the disk, the y-axis along the line representing the continuation of the leg, and the current I flowing in the disk from the sliding conact to the disk's center.

The electric intensity which will be induced by **A** at the points along the disk's radius R_a, because of its rotation with an angular velocity $-\Omega\hat{z}$, will be

$$\mathbf{E} = (R_a - x)\,\Omega\,\hat{\mathbf{y}}\times\operatorname{rot}\mathbf{A} = -\frac{\mu_0 I}{4\pi}\frac{(R_a - x)\,\Omega\,L}{x(L^2+x^2)^{1/2}}\,\hat{\mathbf{x}} \cong -\frac{\mu_0 I}{4\pi}\frac{(R_a - x)\Omega}{x}\,\hat{\mathbf{x}}, \qquad (2)$$

and the approximation, for $L/R_a > 3$, introduces an error no bigger than 5% when integrating[1].

For the tension induced in <u>both</u> disks we obtain (a_0 is a very small quantity - see Ref. 1)

$$U = 2\int_{a_0}^{R_a}\frac{\mu_0 I\Omega}{4\pi}\left(\frac{R_a}{x} - 1\right)dx = \frac{\mu_0 I\Omega}{2\pi}R_a\left(\ln\frac{R_a}{a_0} - 1\right), \qquad (3)$$

and U is opposed to the tension $\Delta U = IR$, due to the current flow, where R is the ohmic resistance of the disks between the sliding contacts and their centers.

In Ref. 1 I introduced the normal Ampere bridge force factor $\alpha = 5\times10^{-6}$ N/A^2, assuming that such is the force acting on a normal Ampere bridge, i.e., such whose geometry factor G, is equal to unity, when the flowing current is 1 A. As formula (7) in Ref. 1 gives the analytical expression for this force, we shall have

$$5\times10^{-6} = \frac{\mu_0}{2\pi} \ln(a/a_0) \equiv 2\times10^{-7}\ln(a/a_0), \qquad (4)$$

where a is the length of the shoulder in the Ampere bridge and a_0 is a very small quantity. Thus equation (4) determines the relation between the small quantity a_0 and the length a of the shoulder in a normal Ampere bridge

$$\ln(a/a_0) = 25. \qquad (5)$$

Putting (5) into (3) - it does not matter whether a is the length or the half length of the shoulder, as the number a_0 is always with a couple of orders smaller than a - we obtain

$$U = \frac{12}{\pi} \mu_0 I \Omega R_a. \qquad (6)$$

Putting here $\mu_0 = 4\pi\times10^{-7}$, I = 63 A, $\Omega/2\pi$ = 6.9 rev/sec, R_a = 0.2 m (the figures are chosen taking into account figs. 1 and 2 in Pappas' paper), we obtain

$$U = 2.6 \text{ mV}. \qquad (7)$$

Pappas' graph in his figure 1 shows that the induced tension which he has measured for current I = 63 A was 2.7 mV at supported rotation and 2 mV at opposed rotation.

The resistance of Pappas' copper disk (with thickness 4 mm - see his fig. 2) was R = 88 mV/63 A = 1.4 mΩ. This shows that the predominant part of this resistance was at the sliding contacts. Thus either his mercury was not pure or the surface of the copper disks was not clean.

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NOTE ADDED IN PROOF

I suggest to give to the discussed here Ampere bridge the name Ampere-Faraday disk as it has many of the features of the Faraday disk motor. The difference is only in the following: The magnetic field in the Faraday disk motor is generated by a circular current (cylindrical magnet), while the magnetic field in the Ampere-Faraday bridge is generated by the current in the wire along which current is conducted to the periphery of the rotating disk.

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THE ELECTRODYNAMIC ROUTE TO ANTI-GRAVITATION

Harold Aspden

Department of Electrical Engineering
University of Southampton
Southampton SO9 5NH, England

Abstract: In order to understand the nature of gravitation and eventually harness the phenomenon in anti-gravitational machines, we need first to determine the truths of electrodynamics. This paper discusses the evidence and the history that now combine to show that we are very near to the solutions of this universal mystery.

Introduction:

Accepted physics has led us into several cul-de-sacs or 'blind alleys' over the years and each new generation has had to find its way out of these diversions and try to get back to the main highway of truth. Sadly, at the present time, some of the branches on this tree of knowledge are so long that they have to wither, die and fall away, before whatever goodness they possess is recovered by the onward growth of physics.

The orthodox physicist firmly believes that the textbooks tell the truths of physics as developed to date and that their theories built on these 'truths' can be tested by ever-onward research into the regions currently out of reach. They need bigger and more expensive particle accelerators and larger computers to probe the physics as they imagine it to be at the dawn of creation or in remote space. Their object is to find something they call 'the Higgs particle'. Undoubtedly, if they search long enough and reformulate their methods often enough a particle satisfying their need will be discovered. Whether that discovery will be meaningful, except as warranting the accolade of the Nobel prize, is debatable.

To the author, there is more purpose in giving sound theoretical basis to the existence of the proton or muon and determining the theoretical basis for the Constant of Gravitation G from what is

already known. Even then an understanding of G has little meaning to the world in general unless that knowledge leads to practical ends, such as the construction of anti-gravity machines.

Enough will be said in these few pages which follow to show the reader that these words are not founded on a shallow philosophy, but first we must review some basic principles.

Basic Principles:

The fundamental principles on which physics should be constructed are:

(1) The principle of energy conservation

(2) The principle of vacuum equilibrium: This is that there is an aether containing energy which is in a state of equilibrium vis-a-vis energy possessed by matter, but which can be a seat of fluctuations cooperating in the transfer of energy between matter in different regions of space.

(3) The principle of action at a distance: This is that electric action between charge in the Coulomb gauge propagates at infinite speed.

(4) The principle of retarded energy transfer: This is that energy in transit through the vacuum travels at a finite speed referenced on an absolute universal frame of reference.

One should be very careful in specifying laws, rules and mathematical formulae, especially where the physical picture of what is portrayed is abstract, rather than visually real. Thus the four-dimensional space model of Einstein is not favoured in this search for truth.

We next proceed in stages, endeavouring to connect the argument with certain aspects of the history of physical science.

Electrokinetic Energy:

Given Coulomb's law it is possible, from the four listed principles just recited, to deduce a formula for the electrokinetic energy of two charges in relative motion. The formula has a sound basis and is precisely that enunciated by Bernhard Riemann in his Gottingen lectures in 1861. In the electrostatic system of units the electro-

kinetic energy is $\frac{1}{2}(V/c)^2$ times the electrostatic Coulomb interaction energy, where V is the relative velocity of the charges and c is the speed at which energy transfers in the vacuum.

See Aspden[1] for the formal derivation of this formula.

The Nature of Inertia:

Concerning the property of mass, this arises from the tendency of an electric charge to conserve its intrinsic energy against radiation loss when accelerated by the action of other charge. Kinetic energy should not be seen as anything other than locally active vacuum field energy which has transiently materialized as lepton charge pairs. Within the body of charge of the primary 'mass' Coulomb's law determines a uniform energy distribution. Thus within the finite spherical bounding form of the 'mass' that energy can only adjust at the speed c. It can be shown that the Larmor energy radiation formula gives a zero rate of energy radiation from the surface of that bounding form only when the Coulomb energy of the 'mass' is precisely equal to this mass times c^2.

This is the true basis of inertia and the so-called Einstein formula. For a derivation see Aspden[2, 3]. Also note that the accepted Larmor radiation fails, as we know from quantum physics, because electrons do not radiate their electric field energy. The Coulomb gauge is an action at a distance and so c is infinite in the denominator of the Larmor energy radiation formula. Note however that the mutual interaction of electrons can promote energy transfer at speed c and this electromagnetic gauge operation is what is witnessed in radio communication.

The Obolensky Experiment:

Quantum physicists have come to realize that action at a distance superluminal speeds of interaction are occurring in their photon correlation experiments, but have not admitted that this could lead to communication of practical data at such higher speeds. The definitive experiment showing that a Coulomb signal can travel along a wire and arrive much faster than the accompanying electromagnetic wave has just been published[4]. The discovery should have been made

long ago, because the telegraph equation giving the arrival times of signals sent down a line that is resistive and capacitative but non-inductive reveal no dependence upon c. The reported experiments show speeds faster than twice light speed, but the actual speed must be much greater and could be infinite, because there is a calculable delay owing to the signal build-up in the line capacitance. The Obolensky experiment clearly disproves Einstein's theory.

Newton's Rule:

Newton's rule specifies that when two bodies collide and separate with no energy loss, they do so in such a way that their relative velocity before impact and after impact is the same in magnitude but opposite in sign. It is a proven fact of textbook physics. It is supported by the Riemann electrokinetic energy formula, because it tells us that at the point of reversed motion the mutual interaction energy of all charges in the two colliding bodies is conserved only if the square of V, the relative velocity, is conserved.

Now, in the history of Newton's mechanics, the rule is deduced from the principle of energy conservation and Newton's Third Law of Motion. We cannot have two physically independent routes to the same physical fact. Therefore, the Riemann formula which arises from energy conservation and knowledge of inertial properties gives the basic truth to Newton's rule and we can deduce Newton's Third Law rather than take it as our starting point. The problem then arises that we can only deduce that third law if we assume that no energy is transferred from the spin of the colliding bodies. Otherwise the linear momentum is not conserved in the collision and action will not equal reaction.

So, from our basic arguments we have arrived at the conclusion that action and reaction are not necessarily equal and opposite and this is a most important proposition so far as our interest in electrodynamic law is concerned, especially as we have set our sights on the gravity problem.

The author notes that the above derivation of Newton's rule and comment on Newton's Third Law of Motion features in an article to be published in January 1989 (Aspden[5]).

Ampere's Assumption:

The classical law of electrodynamics postulated by Ampere relies on balance of action and reaction. The Lorentz force law breaches this requirement. The Grassmann law does not comply with Newton's Third Law either. A law which is deduced by Whittaker[6], a version of which is found in Maxwell's treatise, admits linear balance of action and reaction but permits out of balance of turning action. Also, the law advocated by this author[7, 8], denies out of balance turning action, but permits out of balance linear action.

The point to keep in mind is that no system exists in which two charges interact in isolation from environmental charge. All we are seeking is a force law that can be used additively to deduce the true force on any charge. For this purpose the law must be of proper form. To guide us on our way, we need to know the evidence as to whether there have been any breaches of the action and reaction rule for angular motion or for linear motion.

Gore's Experiment:

In 1875 Gore[9] described an experiment using steady D.C. current in which a helically wound coil was caused to turn about its axis purely owing to its self-interaction. Professors Maxwell and Stokes traced the flaw to reaction effects in mercury cups used to carry currents at the pivot points. The doctrines of the experts on electromagnetism were firmly to the effect that no system could be caused to rotate of its own accord without pushing on something that was not rotating.

Hinde's Experiment:

The above Gore experiment was presented to the Royal Society in London, England. In 1917 the same society were confronted with an experiment that breached the linear action and reaction rule.[10] A spinning flywheel could be caused to climb up a rod without any vertical force application and would fall to the base only when the flywheel energy was spent in overcoming friction. The experiment was endorsed by being repeated by Fellows of the Royal Society, but they argued that this was a "walking gyrostat", meaning that the

vibration was causing frictional locking at the rod and that the flywheel was latching itself in a successive upward creep. The discovery was ignored, unfortunately, because Hinde had really discovered the breach of Newton's Third Law and it was in the linear mode. Furthermore, it exploited that argument already presented, namely that spin energy was getting into the act governing the linear motion.

Di Bella's Experiments:

Di Bella[11] in 1968 reported to a conference in Rome his research with the Italian Navy on gyroscopic propulsion. Very clearly here was a breach of Newton's Third Law of Motion using the same techniques as Hinde. Again, however, the professorial verdict was that a frictional creep effect had to be involved. The discovery was related to that of the "Mexican jumping bean". However, Di Bella had proved the propulsive effect by using machines suspended on threads and verifying weight loss besides showing propulsive drive on water-borne craft and on smooth surfaces of dry ice.

De Palma's Experiment:

De Palma[12] claimed to have disproved Einstein's theory when he demonstrated his experiment to Princeton professors. It involved imparting impulses to two ball bearings, one spinning and one not spinning, and tracking their upward trajectory and fall. The experiment showed that the spinning ball lost weight in that it rose further, travelled further and came to ground later than the non-spinning ball. The professors did not believe what they saw.

Kidd's Experiment:

There have been many other experiments breaching Newton's Third Law and based on the force-precessed gyroscope offset from the axis about which it precesses. They all reveal an anomalous lift force that draws on the spin energy of the flywheel. However, the one which has alerted the physicist to his problems ahead is that of Kidd[13]. Kidd has found commercial sponsors who have commissioned the independent testing of his machine to verify loss of weight when enclosed in a box and suspended on a wire. The tests were so successful that technological exploitation is now foreseen. Newton's Third Law is

therefore disproved, whether that is to the liking of the ivory towers of the science establishment or not.

Strachan's Experiment:

The Strachan gyroscopic lift machine[14] was recently demonstrated to an audience in Canada. It reveals a weight loss which Strachan argues disproves Einstein's General Theory of Relativity. It will feature in a conference, along with other such machines, to be held at Edinburgh University in Scotland in the early part of 1989, as the scientific establishment now moves to settle this issue once and for all. We are therefore on the verge of a scientific revolution affecting Einstein's theory and textbook physics at its very roots.

The Death of Relativity:

Before discussing electrodynamics, it is appropriate to comment on the final death throes of Einstein's theory.

Just as pre-relativity mechanics builds on three interdependent principles, namely energy conservation, conservation of momentum and Newton's collision rule, so relativistic mechanics demands compliance with:

(a) conservation of energy
(b) conservation of momentum
(c) the relativistic mass increase formula.

Now, in either situation, any one of the three principles can be deduced from the other two, as is well known. We have now come to realize that in the Newtonian case there is a proviso about spin energy which can explain the breach of the action-reaction law or rather the conservation of linear momentum. However, in the relativistic case the explicit proviso is more concerned with the Lorentz transformation formulae being truly valid. It is the essential link between the three principles.

Therefore, bearing in mind that we are very certain about (a) and (c), because the increase of electron mass with speed is rigorously verified by experiment and is founded in classical electron theory, we cannot admit a breach of (b) without there being a corresponding

breach of the underlying formalism of the theory of relativity.

It follows that the demonstration of the lift force which breaches Newton's Third Law of Motion is a clear invalidation of Einstein's theory.

Unquestionably, the Australian laboratory tests which gave the commercial seal of approval to the Kidd machine have shown that Einstein's theory is invalid. It can therefore play no further role in our efforts to understand electrodynamics and gravitation.

Retarded Potential Theory:

The concept of the retarded potential is at the heart of electromagnetic theory based on relativity. However, with the action at a distance theme applicable to the Coulomb interaction and retarded energy transfer involving energy borrowed from the vacuum or aether background, the analysis of electromagnetic action is very greatly simplified.

Electrodynamic theory has to be based on instantaneous potential allowing for deployment of material energy in transit between the Coulomb state and the kinetic state, the transit energy being a measure of that electrokinetic energy already mentioned.

To progress from that energy formula to the Lorentz force law one needs to develop classical electromagnetic theory in the light of lepton theory. Thus the Fechner hypothesis which bridges this gap has to be interpreted as signalling electric current flow as due to electron-positron creation in the forward field followed by annihilation occasionally involving the basic electron and leaving the created electron at a forward position.

Research advancing this argument then depends upon how protons advance in their current carrying role and, connected with this, there are the questions about the local electromagnetic reference frame.

The latter issue raises the Michelson-Morley question and all that this author wishes to say about that is that it does involve standing wave conditions, which are not strictly concerned with vacuum field energy moving at speed c with the waves. By definition

a standing wave condition is one in which the wave energy is 'standing' in the sense that it is carried along by the apparatus in which the wave nodes are located. The energy travels at the speed of the apparatus through space. Hence the fourth listed principle discussed earlier is not applicable. The speed c is not then the energy speed, but some other similar speed, referenced on the frame of the apparatus, does apply to the wave velocities forming the standing wave.

The author's views on this subject are expressed elsewhere[15]. Also, concerning the proton electrodynamics, much depends upon further theoretical work as to the seat of electron-positron creation and even the possibility that a proton might, in effect, become a neutron when making its quantum steps forward and have some beta reverse motion rather than beta decay in its statistical migration as a current carrier. This issue is most important from the viewpoint of the author's electrodynamic law, as its derivation is best based on interactions between charges of identical rest mass. It would greatly facilitate the analysis if protons were to have their electrodynamic actions seated in the electron-positron field.

Gravitation:

The author's electrodynamic law is a law which satisfies full action and reaction balance as between charges moving mutually parallel. The Third Law of Newton is breached by the law for charges moving in non-parallel motion. These are conditions involving third body interactions, characteristic of current flow in practical circuits involving other electrons.

However, the root of the author's theoretical research is a vacuum model in which Heisenberg's Uncertainty Principle is a physical statement of a synchronous oscillatory motion shared by all matter. This is possible with action at a distance and an equi-spaced sequence of system motion which involves no ongoing energy transfer. It is a system satisfying the parallel motion condition and so gives basis for gravitation theory in electrodynamic terms. The theory cannot be accepted, however, unless the reader accepts the basic electrodynamic law and admits that it can breach Newton's Third Law of Motion. This is the way forward.

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MARINOV'S OPINION TO THE PREVIOUS PAPER BY H. ASPDEN

Dr. Aspden begins his route to anti-gravitation from electromagnetism but ends it at mechanics.

I wish to draw a clear line between the violation of Newton's third law in electromagnetism and in mechanics.

In electromagnetism the potential energy is of TWO kinds: space potential energy (electric energy) and space-time potential energy (magentic energy). The fundamental equation of motion in electromagnetism, the Newton-Lorentz equation, shows that in electromagnetism Newton's third law is valid only for the full kinetic forces, $m\mathbf{u} + qd\mathbf{A}/dt$, where m is the mass of a particle with electric charge q, **u** is its acceleration and **A** is the magnetic potential of the surrounding system of charged particles (or of another single charged particle). However, for the simple kinetic force, $m\mathbf{u}$, Newton's third law is not valid.

In gravitation and mechanics, where the potential energy is only space energy (gravitational energy, elastic energy), Newton's third law is valid, as shown by the fundamental equation of motion in gravitation and mechanics, the Newton equation.

Dr. Aspden hopes that violations of Newton's third law can be observed in mechanics. I am not as optimistic. According to me, if such violations should be observed, they will manifest themselves in very tiny effects, due to the appearance of frictional forces and to the effects proceeding from the collisions between solid bodies where the times of interaction (of the appearance of potential forces) are very short and the forces very big.

In my "small but many beat one big" experiment (fig. 1), I observed[1,2] some violation of the energy conservation law but the experimental results were very unsure (I obtained an energy gain of 6% at a measuring error 13%).

In the early sixties, the Dean's apparatus (fig. 2), reported in detail in Ref. 2, was discussed on a whole page even in the biggest world journal IZVESTIJA. There were many reports (even in SCIENCE ET VIE) that this machine losed weight and moved reactionless. I gathered any available information on Dean's apparatus and came to the conclusion that all those reports were LIES.

The most amazing self-propulsing machine of which I gathered information is the one of Robert Cook called CIP (Cook Inertial Propulsion). To any person interested into the problem about the violation of Newton's third law in mechanics, I suggest the book "The Death of Rocketry" by Joel Dickinson with the collaboration of Robert Cook, dedicated entirely to Cook's machine (CIP Systems, Inc., P.O.Box 2997, San Rafael, CA 94901, USA). This is a very well written book, however, after reading it, one has not the feeling that Cook's machine has indeed moved without the expected Newtonian reaction.

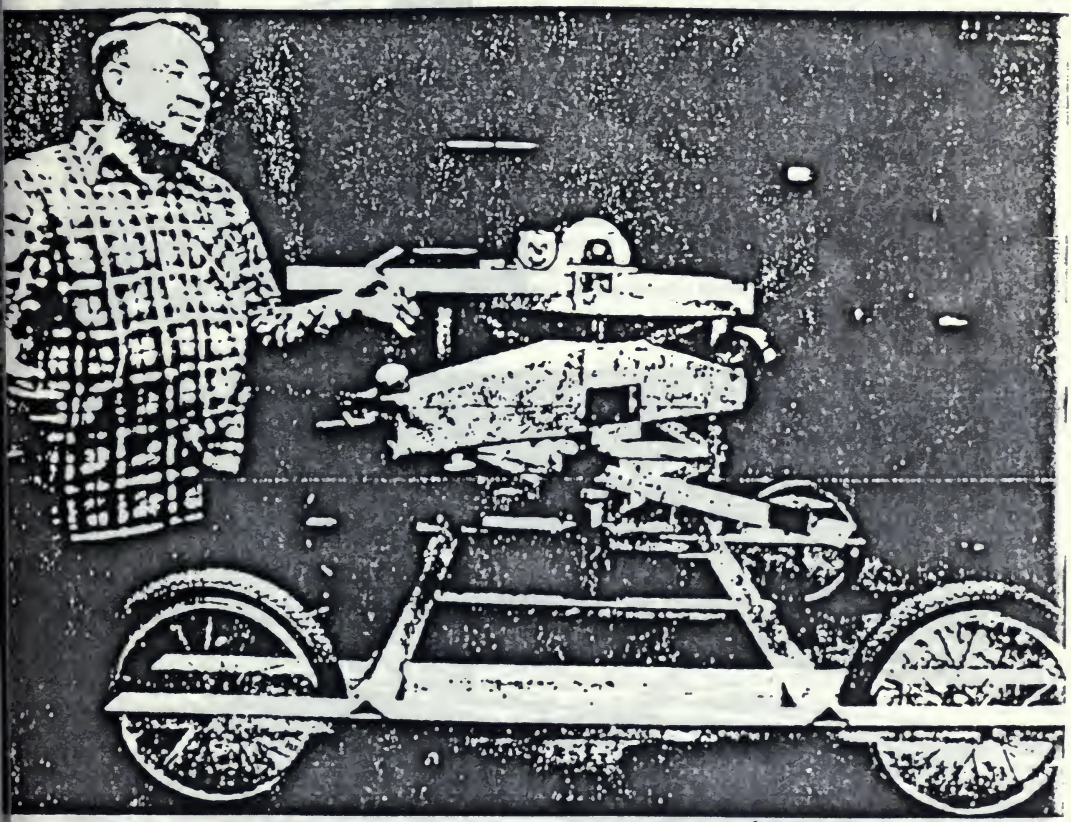
Here I reproduce pp. 118, 120 and 121 of the book "The Death of Rocketry".

Vallejo-Benicia edition

Times-Herald

Solano and Napa counties' morning newspaper

Vol. No. 34 | 76 Pages + Sections | Sunday, February 3, 1980 | Vallejo, California | 35¢ Sunday



Times-Herald Joe Krons

Bob Cook with an invention he hopes may one day power space crafts and submarines.

Inventor propelled by engine

By SEAN McVEY
Times-Herald Staff Writer

VALLEJO — It looks more like a Rube Goldberg fantasy than the engine of the future. It is a concoction of gears, machined metal parts and wire. When switched on, it shakes its frame as a massive arm with weights on both ends turns.

But Vallejo inventor Bob Cook predicts it will efficiently hurtle space craft through space at or near the speed of light, propel nuclear submarines through the world's oceans and speed cars and trucks along highways.

The invention is called the CIP (Cook inertial propulsion) engine. Cook explains that the engine harnesses centrifugal force.

Imagine whirling a stone on the end of a string. A tremendous amount of centrifugal force is created with very little use of energy.

But problems occur if this unconverted power is to be used. As long as the stone keeps whirling in a circle, the forces cancel themselves out with each revolution.

Cook explains the CIP engine captures these forces. At one point in the cycle, an imbalance in the centrifugal force is made, creating a forward thrust.

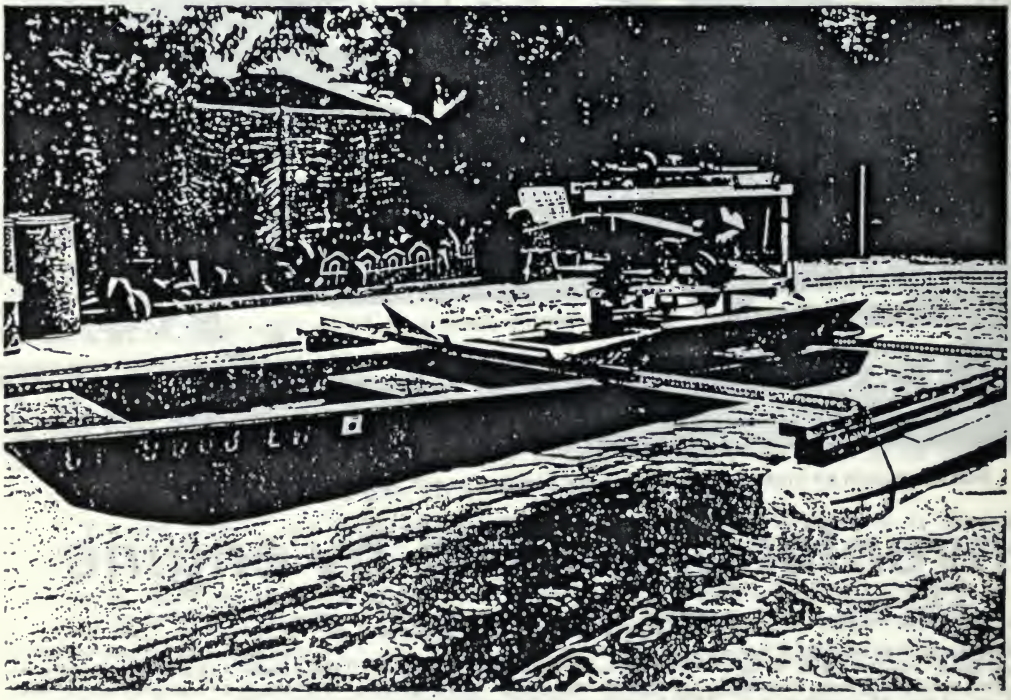
The internal combustion engine in a car turns the wheels and the car moves forward because the turning wheels move against the ground. This is called two dimensional force.

With the CIP engine, there is one dimensional force because the engine is

By early June all the necessary adjustments to the CIP had been made to complete a special experiment with the model mounted on a boat. As usual, the experts had predicted that on water this new mechanism would produce bounded motion. This time—on June 9, 1980—the machine not only propelled the length of the pool in a continuous motion, but for the very first time actually accelerated. These amazing results further reinforced Cook's contention of the existence of an internal propulsive force.

Robert Cook has earned an unprejudiced analysis of his theories and his working models.

BOB COOK
"...Newton's third law was a blunder"



On June 9, 1980 the latest CIP engine accelerated this boat across a pool.

9. Epilogue

How does an inventor with a great breakthrough invention get a fair hearing from the scientific community or the institutions of higher learning?

Cook has done his research openly and honestly. His models have at all times been available for inspection, testing, and evaluation. We have contacted dozens of scientists and professors in an effort to obtain fully honest evaluations of the models. We have desperately tried to get the proper fundings and make the needed business arrangements to build a flying prototype. So far we have succeeded in getting only limited funding. The idea has been presented to NASA, United Airlines, and many universities. As a result of dealing with United Airlines, Cook has been provided with both a dynamic analysis and accelerometer test report, both of which agree that the machine works. We also have a written analysis by the chairman of a physics department at a major university concluding that the latest principle works. We have conducted every test that scientists and professors have suggested—with positive results—and those results have been rejected in most cases. What does it take to get acceptance of a desperately needed breakthrough idea?

We have been very careful in presenting the truth. Every effort has been made to document Cook's legitimate struggle and substantiate the authenticity of his work. This book is about real people and real events. Anyone can confirm its contents by examining public documents.

The public should demand that accurate models be built to prove or disprove Cook's ideas. Professional research in this "forbidden" area should begin in earnest immediately.* Cook deserves a just evaluation. Most of those who examined his models have agreed that whether they work or not, they deserve proper study. But who in the areas of science or big business has helped?

It has been a struggle. Cook has survived 12 years of frustrations, unnecessary detours, and terrible disappointments. Recklessness and underhanded chicanery by certain professors and "experts" have already ruined several promising business relationships, as you have witnessed.

*Cook is concerned that the United States will be slow in recognizing the enormous military and social value of the CIP. Cook's attorneys have already filed the CIP patent specifications and claims in several countries.

Fuel saving ideas such as the CIP engine should be given top priority by all countries of the world for speedy development. We need to embrace new and original ideas. Slowly improving "accepted and proven technology" is only temporary medication for a potentially fatal wound.

One of the major delaying factors in our case has been the world's attitude toward evaluating and accepting new and controversial ideas. Remember just this century the Wright brothers flew for years before the world's experts thought it was "possible to fly." In this day and age, it is predominately "teams" that develop ideas; we seem to have forgotten how to encourage the freedom necessary for pure creation (which has in almost all cases required individual thought and sacrifice). Modern education has created an atmosphere of fear that tends to strangle individual creative thoughts. Listen to the words of John Steinbeck:

How does an inventor with a great breakthrough invention get a fair hearing from the scientific community or the institutions of higher learning?

Our species is the only creative species, and it has only one creative instrument, the individual mind and spirit of man. Nothing was ever created by two men. There is no good collaborations, whether in music, in art, in poetry, in mathematics, in philosophy. Once the miracle of creation has taken place, the groups can build and extend it, but the group never invents anything. The preciousness lies in the lonely mind of man.

And now the forces marshalled around the concept of the group have declared a war of extermination on that preciousness, the mind of man. By disparagement, by starvation, by repressions, forced direction and stunning hammer-blows of conditioning, the free roving mind is being pursued, roped, blunted, drugged. It is a sad suicidal course our species seems to have taken. And this I believe: that the free exploring mind of the individual human is the most valuable thing in the world. And this I would fight for: the freedom of the mind to take any direction it wishes, undirected. And this I must fight against: any idea, religion, or government which limits or destroys the individual.[1]

Now Sandy Kidd comes with similar amazing reports, to which Dr. Aspden pays credibility. I reproduce here the article on Kidd published in "Observer Scotland".

Observer Scotland Sunday 6 November 1988 13

SCIENCE

The flying saucer is brought to earth

INVENTORS who claim that their 'anti-gravity' machines challenge the laws of physics will be asked to submit their controversial devices to a stiff examination at a special scientific meeting to be held in Edinburgh early next year.

The machines, powered by high speed gyroscopes, will be tested for levitation, vertical thrust, and even dropped to the floor in a series of exacting tests to determine their resistance to gravitational forces.

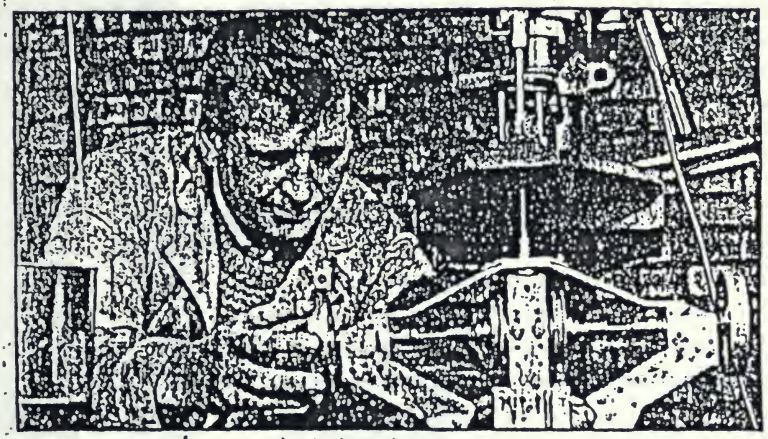
According to textbook theory laid down more than 300 years ago by Isaac Newton, every action must have an equal and opposite reaction. But these so-called 'flying saucer' machines appear to achieve the impossible by developing their thrust without having to react on air, water or solid surface.

Dundee inventor Sandy Kidd is the only person so far to have had his anti-gravity machine proved genuine in a series of strict laboratory tests carried out recently at a technology centre in Australia. It is largely his success, already causing controversy within scientific circles, that has led to next year's showdown demonstration being organised by Stephen Salter, professor of engineering design at Edinburgh University, in conjunction with the Advanced Energy Research Institute in London.

Professor Salter, who is well known for his wave energy experiments, told me: 'It is time that this highly contentious issue was settled once and for all, and what better way of doing that than by getting as many of these inventors together under one roof and submitting their devices to an agreed set of tests? There will be an invited audience of gyro experts and the media will also be present. With so much at stake it should be a most exciting project.'

There are about 35 patents held worldwide for various designs of gyroscopic drives, one third of them in the United Kingdom, but not all have machines that could be demonstrated, and those that do have never had them tested under the proposed Edinburgh conditions.

'I intend to stage the meeting at Edinburgh University, where the inventors will have access to technical help should they need it in



Sandy Kidd with his anti-gravity machine. Nobel Prize material?

setting up their equipment beforehand,' explained Professor Salter. 'Any machine which can come through the tests we envisage will certainly be of Nobel Prize material.'

Leonard Hollihan, director of the Advanced Energy Research Institute, which matches up technological innovation with venture capital, is hopeful that an award scheme to stimulate inertial flight development can be set up through private sponsorship as a follow-up to the Edinburgh meeting.

A gyroscopic machine fully proved and developed would revolutionise space travel and change transportation systems on earth beyond recognition. By generating their own energy without having to process huge quantities of fuel, the gyroscopes would produce the rapid acceleration required to carry a vehicle over vast distances in a matter of hours. Mars, 60 million miles away, could be reached in a day and a half.

Such a prospect is deemed impossible by many academics, but not by people like Dr Harold Aspden, a senior research fellow at Southampton University who specialises in astrophysics. 'I welcome the Edinburgh meeting,' he told me, 'because it is important that there is general confirmation of what has already been proved by people like Sandy Kidd. I've studied his laboratory report very carefully, and there is no doubt his machine is genuine.'

Sandy Kidd himself may not be able to take part in the Edinburgh experiment. The Dundee engineer who spent four years developing his machine in his garden shed before being taken to Melbourne by an Australian hi-tech company 15 months ago will shortly be moving to California to start work on a commercial prototype. 'I think the meeting is a very exciting prospect,' he said. 'I have no doubt that at least one machine will go the distance and that will be bad news for all these closed minds in the academic world who are scared stiff to admit that something like this is possible after all.'

RON THOMSON

At a meeting in Edinbourgh at the beginning of 1989, supported by the Advanced Energy Research Institute in London, such self-propulsing machines will be demonstrated.

During our conversations in December 1988, Dr. Maddox said to me that this meeting will not take place because of the lack of money for its organization. I am accustomed, however, to take any information proceeding from Dr. Maddox with suspicion.

In the early 1982 I constructed my "pulse mobile" (figs. 3,4,5). The pulse mobile has a very heavy platform (I put on the platform an anvil weighing 40 kg) which could slide back and forth with respect to the car, as in Dean's apparatus (see fig. 2). I wished to see whether if the forwrad push is hard (short time of impact) and the back push soft (long time of impact), as in Dean's apparatus, there will be a resultant propulsion forwardly. The answer of the experiment was: NO.

I did the experiment first for the case where the car was at rest. My forth and back pushes (see fig. 4) led to the result that the car oscillated about the neutral position. Thus I could not bring the center of mass of the system in motion.

Then I did the experiment in the following way: On a very even and smooth road I brought the car to a certain velocity and looked which way will it cover until coming to rest because of the friction when I remained on the car without doing pushes with the platform. Then I repeated the experiment when doing pushes. The covered road remained in both cases the same.

Thus I am higly pessimistic whether one can violate Newton's third law remaining in the realm of mechanics. However, I am very interested to see and check the experiments of Cook, Kidd and any other who claims of having succeeded to construct a self-prolulsing machine because man SUPPOSES but the experiment DISPOSES.

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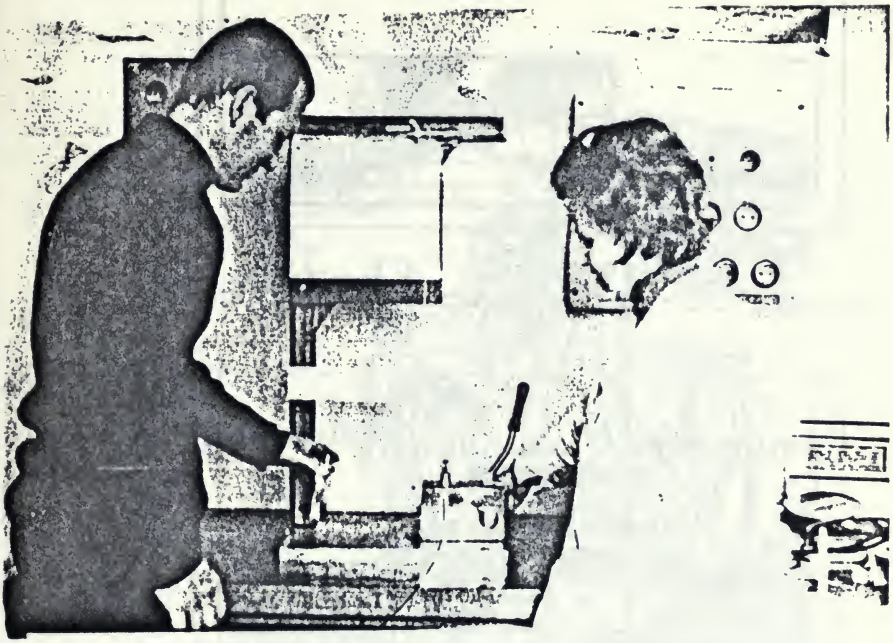

Fig. 1

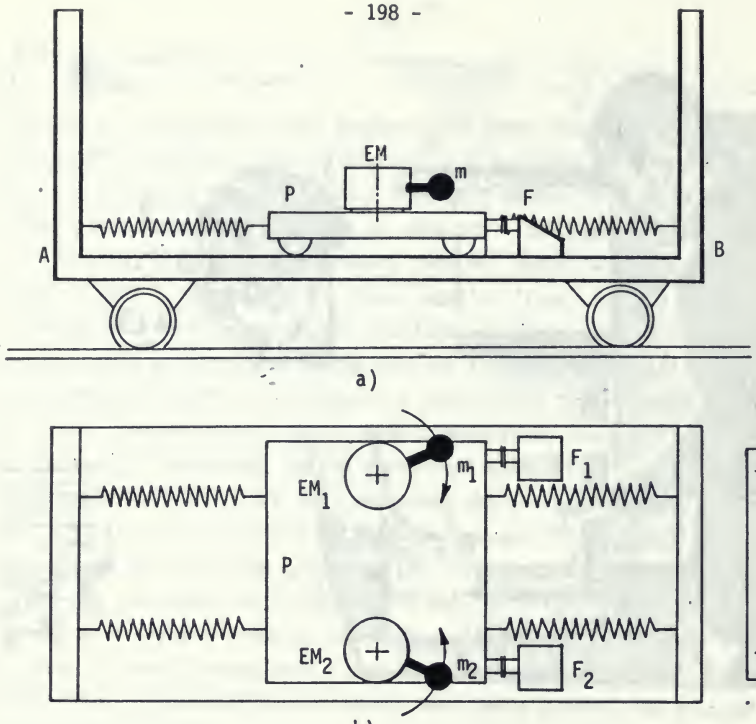

Fig. 2

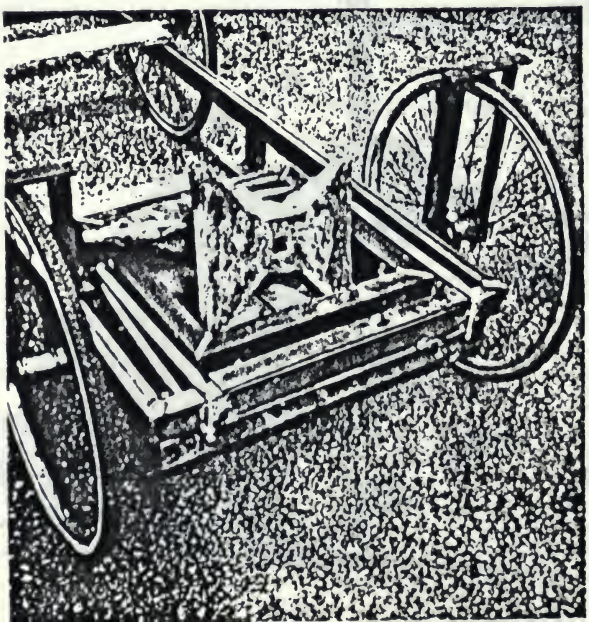

Fig. 3

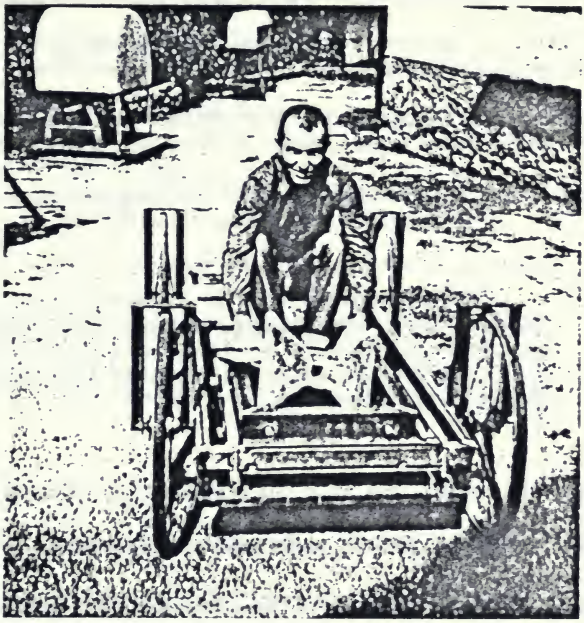

Fig. 4

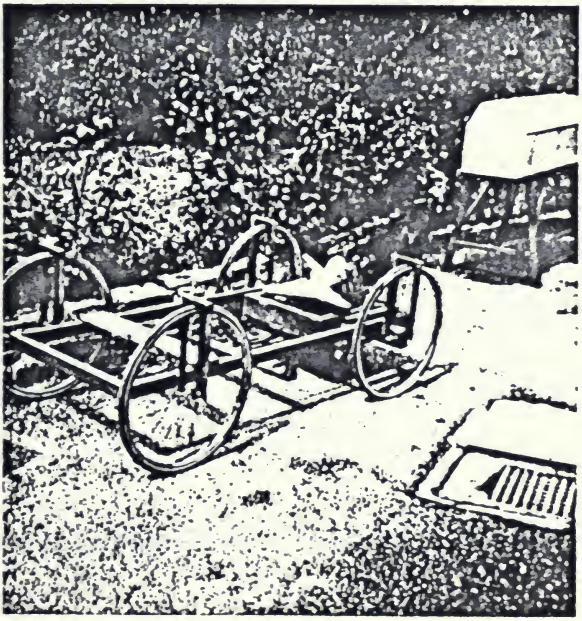

Fig. 5

The Force Between Moving Charges and the Edwards Effect

Domina Eberle Spencer, Department of Mathematics and Electrical Engineering, University of Connecticut, Storrs, Conn. 06268

Shama Y. Uma, Department of Mathematics and Computer Science, Bridgewater State College, Bridgewater, Mass. 02325

Philip J. Mann, Department of Electrical Engineering, University of Connecticut, Storrs, Conn. 06268.

The Edwards effect can be explained by any equation for the force between moving charges in which both the force and the vector potential are defined in terms of relative velocity of the interacting charges rather than velocity with respect to the laboratory.

A previous paper[1] has shown that all of the mathematical formulations of electromagnetic theory which have hitherto been suggested can be expressed as special cases of a general theory based on four fundamental postulates. In all of these formulations the electric field $\vec{E}$ and the magnetic filed $\vec{B}$ are defined in terms of scalar and vector potentials φ and $\vec{A}$ by the equations

$$\vec{E} = -\operatorname{grad} \varphi - \frac{\partial \vec{A}}{\partial t} \tag{1}$$

and

$$\vec{B} = \operatorname{curl} \vec{A} . \tag{2}$$

The force per unit charge $\vec{\mathcal{F}}$ on a test charge is defined as

$$\vec{\mathcal{F}} = \vec{E} + \vec{w} \times \vec{B} . \tag{3}$$

To determine the expressions for $\vec{E}$, $\vec{B}$ and $\vec{\mathcal{F}}$, it is necessary to introduce postulates on

1) the velocity of light.

2) the definition of the scalar potential φ

3) the definition of the vector potential $\vec{A}$

4) the definition of the velocity $\vec{w}$.

In a previous paper[2], we have considered three postulates on the velocity of light, two stulates for the scalar potential φ, five postulates for the vector potential $\vec{A}$ and four stulates for the velocity $\vec{w}$. Thus we have 120 possible formulations for the force $\vec{J}$ on a charge an electromagnetic field.

However, for the very important special case of experiments in which velocities are small mpared to the velocity of light and retardation has a negligible effect it has been shown[3] that all the 120 possible formulations of electromagnetic theory reduce to only two.

The first form of the force equation is that employed in classical electromagnetic theory in ich it is postulated that at low velocities and with negligible retardation

$$\varphi = \frac{Q}{4\pi\epsilon_0 r}, \quad \vec{A} = \frac{Q\,\vec{v}(t)}{4\pi\epsilon_0 c^2 r}, \quad \vec{w}(t) = \vec{u}(t)\,. \tag{4 e}$$

re the velocities $\vec{u}(t)$ and $\vec{v}(t)$ are velocities of receiver and source relative to the coordinate stem in which the field vectors $\vec{E}$, $\vec{B}$ and $\vec{J}$ are defined (Fig.1). Introduction of Eq.(4 e) into .(3) gives

$$\vec{\mathcal{F}}_{\mathcal{G}} = \frac{Q}{4\pi\epsilon_0 r^2}\left[\vec{a}_r + \frac{\vec{u}(t) \times (\vec{v}(t) \times \vec{a}_r)}{c^2}\right]$$

$$-\frac{Q}{4\pi\epsilon_0 c^2 r}\left[\frac{d\vec{v}(t)}{dt} - \frac{\vec{u}(t)}{c} \times \left[\frac{d\vec{v}(t)}{dt} \times \vec{a}_r\right]\right]. \qquad (5\,\mathcal{G})$$

The second form follows a suggestion first made by Riemann[4], that potentials and field vectors should be defined in terms of relative velocities of the interacting charges. Then the low velocity and negligible retardation form of the postulates becomes

$$\varphi = \frac{Q}{4\pi\epsilon_0 r}, \quad \vec{A} = \frac{Q\{\vec{v}(t)-\vec{u}(t)\}}{8\pi\epsilon_0 c^2 r}, \quad \vec{w}(t) = \vec{u}(t)-\vec{v}(t). \qquad (4\,\mathcal{R})$$

Only the relative velocity of the test charge on which the force $\vec{\mathcal{F}}$ acts with respect to the source charge Q appears in Eq.(4 $\mathcal{R}$). With the relative velocity postulates $\vec{\mathcal{F}}$ can be written as

$$\vec{\mathcal{F}}_{\mathcal{R}} = \frac{Q}{4\pi\epsilon_0 r^2}\left[\vec{a}_r - \frac{\{\vec{v}(t)-\vec{u}(t)\} \times \{(\vec{v}(t)-\vec{u}(t)) \times \vec{a}_r\}}{2c^2}\right]$$

$$-\frac{Q}{8\pi\epsilon_0 c^2 r}\left[\frac{d\vec{v}(t)}{dt} - \frac{d\vec{u}(t)}{dt} + \frac{\{\vec{v}(t)-\vec{u}(t)\}}{c} \times \left[\left[\frac{d\vec{v}(t)}{dt} - \frac{d\vec{u}(t)}{dt}\right] \times \vec{a}_r\right]\right] \qquad (5\,\mathcal{R})$$

In order to predict the Edwards effect[5] we must consider the special case in which the source is a steady current, so $\frac{d\vec{v}}{dt} = 0$ and the receiver is stationary, so $\vec{u} = 0$, $\frac{d\vec{u}}{dt} = 0$.

Then Eq.(5) becomes,

$$\vec{\mathcal{F}}_{\mathscr{C}} = \frac{Q}{4\pi\epsilon_o r^2}\vec{a}_r \qquad (6\,\mathscr{C})$$

$$\vec{\mathcal{F}}_{\mathscr{R}} = \frac{Q}{4\pi\epsilon_o r^2}\left[\vec{a}_r - \frac{\vec{v}\times(\vec{v}\times\vec{a}_r)}{2c^2}\right] \qquad (6\,\mathscr{R})$$

Since a current element contains equal quantities of stationary positive charge and moving negative charge, the effect of the Coulomb term in both equations is exactly nil. According to classical theory the force on a stationary test charge in the vicinity of a conductor carrying a steady current is zero.

$$\vec{\mathcal{F}}_{\mathscr{C}} = 0\,. \qquad (7\,\mathscr{C})$$

However, from Eq.(6 $\mathscr{R}$)

$$\vec{\mathcal{F}}_{\mathscr{R}} = \frac{Q\cos\theta}{8\pi\epsilon_o r^2}\left[\frac{v}{c}\right]^2 \vec{a}_y\,. \qquad (7\,\mathscr{R})$$

This is exactly the form of relation found experimentally by Edwards[5] since $|Q\,v| = |I\,ds|$.

3. Conclusion

The existence of a small force which is direcctly proportional to the square of the velocity has been established by Edwards in a series of very careful experiements. This force is predicted in any mathematical formulation of electromagnetic theory in which the vector potential and the force equation are both expressed in terms of relative velocity of the interacting charges as first suggested by Riemann. No such force is predicted by the classical formulation of electromagnetic theory.

The authors wish to thank Prof. Peter Graneau and Prof. Howard Hayden for calling our attention to the Edwards' papers. This effect can also be predicted by the less mathematical but more intuitive approach of Beckmann[6] which has been applied to the Edwards effect by Hayden[7]. In this special case we believe that both approaches are essentially equivalent.

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MARINOV'S NOTE ADDED TO THE SECOND EDITION (see Marinov's comments on the next page)

Prof. Wesley wrote me in his letter of the 4 February 1989 that one can obtain the Ampere equation (see eq. (1) on p. 126) from the Weber's magnetic potential energy (F) only if there will be a factor "2" in the denominator, as he shows in his article in Ref. 3, p. 193. Thus, according to Prof. Wesley, my formula (F) is wrong with a factor "2" in the denominator. I do not wish to discuss this problem in detail as according to me:

1) The magnetic potential energy of two electric charges is not given by Weber's formula (F) (with or without the factor "2"), but by Neumann's formula (4) on p. 9.

2) The force between two current elements is not the Ampere force (1) on p. 126 but the Grassmann force (2) on p. 126.

MARINOV'S OPINION ON THE PREVIOUS PAPER BY D. E. SPENCER (et al.)

I do not like the approach of Dr. Spencer, considering it as scientifically unsound.

To show this clearly, first I shall simply repeat the matter in her paper, as her mathematical speculations present some difficulties when one tries to check them quickly.

Let us consider at the very beginning a stationary case and thus assume $\partial\mathbf{A}/\partial t = 0$. Then, denoting by $\mathbf{u}$ the velocity of the unit test charge and by $\mathbf{v}$ the velocity of the charge Q which generates the electric and magnetic potnetials Φ and $\mathbf{A}$, we shall obtain, putting Φ and $\mathbf{A}$ from (4C) into (1) and (2) and then (1) and (2) into (3), taking into account that, for $\mathbf{v} = \mathbf{Const}$, $\mathrm{rot}(\Phi\mathbf{v}/c^2) = -(v/c^2)\times\mathrm{grad}\Phi$,

$$\mathbf{F}_C = \frac{Q}{4\pi\varepsilon_0 r^2}\left(\mathbf{a}_r + \mathbf{u}\times\frac{\mathbf{v}\times\mathbf{a}_r}{c^2}\right), \qquad (A)$$

where $\mathbf{a}_r$ is the unit vector from the charge Q to the reference point crossed by the charge at the moment of observation.

This formula for the potential force of charge Q on the unit test charge will be obtained by the conventional theory and by me, too.

Now Dr. Spencer takes the electric and magnetic potentials not in their absolute (Coulomb) forms (4C) but in their relative (Riemann, or better to say - see beneath - Weber) form (4R), where $\mathbf{A}$ is defined by the relative velocity $\mathbf{v} - \mathbf{u}$ of the charge Q with respect to the test charge, and considering $\mathbf{u}$ in (A), i.e., $\mathbf{w}$ in Spencer's formula (3), as the relative velocity $\mathbf{u} - \mathbf{v}$ of the unit test charge with respect to the charge Q. Under such an approach one will obtain instead of the "Coulomb" force (A) the following "Riemann" force (concerning the superfluous factor "2" in Spencer's formula (5R) see beneath)

$$\mathbf{F}_R = \frac{Q}{4\pi\varepsilon_0 r^2}\left\{\mathbf{a}_r + (\mathbf{u} - \mathbf{v})\times\frac{(\mathbf{v} - \mathbf{u})\times\mathbf{a}_r}{c^2}\right\}. \qquad (B)$$

Assuming now that the test unit charge is at rest and that the positive charges Q^+ equal the negative charges Q^-, so that their mutual electric action on the test charge is nil, Dr. Spencer remains with a force

$$\mathbf{F}_R = -\frac{Q}{4\pi\varepsilon_0 c^2 r^2}\,\mathbf{v}\times(\mathbf{v}\times\mathbf{a}_r) = \frac{Q\sin\theta v^2}{4\pi\varepsilon_0 c^2 r^2}\,\mathbf{a}_y, \qquad (C)$$

where θ is the angle between the vectors $\mathbf{v}$ and $\mathbf{a}_r$ (Spencer's angle θ' is equal to $\pi/2 - \theta$), and the unit vector $\mathbf{a}_y$ is perpendicular to the plane determined by the vectors $\mathbf{v}\times\mathbf{a}_r$ and $\mathbf{v}$. Putting in tis formula $Q\mathbf{v} = I\mathbf{ds}$, where I is the current flowing in a wire's element ds, Dr. Spencer obtains

$$F_R = \frac{1}{Q/ds}\,\frac{I^2 ds}{4\pi\varepsilon_0 c^2 r^2}. \qquad (D)$$

My comments are the following:

1) Formula (D), i.e., Spencer's formula (7R), is nonsensical, as there is in the deno-

minator the quantity Q/ds, i.e., the current conducting charge on unit of wire's length, which is an unmeasurable quantity. Thus it is impossible to make an experimental verification of formula (D).

2) The fundamental error of Dr. Spencer is the following: She substitutes the absolute velocity of the test charge $\mathbf{w} = \mathbf{u}$ in eq. (3) by its relative velocity $\mathbf{u} - \mathbf{v}$ with respect to charge Q. Dr. Spencer has the right to define axiomatically the magnetic energy of two charges by the help of their relative velocity (and not by the scalar product of their absolute velocities, as do I), but in this case she has to deduce the relevant equation of motion and she has not the right to use the Newton-Lorentz equation (3) which is valid only if the potentials are chosen in the form (4C). In Ref. 1 I show that only proceeding from the Neumann form of the magnetic energy of two charges one can come to the Newton-Lorentz equation (3).

3) The right approach to the fundamental equation of motion when proceeding from the Weber form of the magnetic energy of two charges is given by Riemann[2] and recently by Wesley[3]. Weber's magnetic energy of two charges Q_1, Q_2 is given by the formula[4]

$$W = \frac{Q_1 Q_2}{c^2 r} \left(\frac{dr}{dt}\right)^2, \qquad (E)$$

where r is the distance between both charges and this formula is written in the CGS-system of units. Taking into account that $r = (\mathbf{r}.\mathbf{r})^{1/2}$ and that dr = vdt, where v is the relative velocity of the charges, we obtain (E) also in the form used by Wesley[3] (p. 195)

$$W = Q_1 Q_2 (\mathbf{v}.\mathbf{r})^2 / c^2 r^3. \qquad (F)$$

Wesley has in the denominator of this formula a superfluous factor "2" (as Dr. Spenser in her formula (4R) and all the following) which was in the XIX-th century formulas as a result of the difference between the electrostatic and magnetostatic units of measurement in that time. This is noted by Riemann on p. 279 of Ref. 2. Working in the CGS system of units this factor "2" becomes superfluous.

Thus in conclusion I must state that, unfortunately, the approach of Dr. Spencer is mathematically unsound. In Ref. 5 I show which are the forces of constant currents on charges at rest in the laboratory which appear only because of the special shapes of the loops (leading to the result that the motional and motional-transformer inductions are not equal) and to the absolute velocity of the laboratory. These forces depend on I and not on I^2. I do not search for theoretical effects depending on I^2 before becoming persuaded that such effects really exist as Edwards and Sansbury affirm.

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NOTE. As a matter of fact Weber's magn. energy (E) does not allow the introduction of the potential (4R) as it is not a function of $v^2 = (dr/dt)^2$ but of $(dr/dt)^2$.

Ether and the one-way speed of light

Abraham Ungar
Department of Mathematics, North Dakota State University, Fargo, North Dakota 58105

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Thinking about nature seems, not surprisingly, to invite thought experiments. The aim of this article is to shed light (and dark) on two recently proposed thought experiments to detect one-way velocities. It is shown that these thought experiments fare like a naive thought experiment to detect absolute velocities relative to the ether.

It seems easy, to the unexperienced, to measure motion through the ether in a thought experiment! One only needs measuring instruments that, when moving, suffer no time dilation and no length contraction. Moreover, it seems no more difficult to measure one-way velocities! For this, time dilations and length contractions are fine; one only needs measuring instruments that, when moving, suffer no *anisotropic* time dilation and no *anisotropic* length contraction. Although thought experiments to measure absolute velocities do not appear in the literature on the special theory of relativity,[1] nevertheless, thought experiments to measure one-way velocities do emerge from time to time.[2,3]

The role of Einstein's *isotropy convention*[4] in clock synchronization has been discussed by Poincaré,[5] Reichenbach,[6] Grünbaum,[7] Winnie,[8] Salmon,[9] and Torretti,[10] among others, all of whom argued that clock synchronization involves an ineradicable element of convention. In order to test the isotropy of one-way light propagation it is necessary to devise a method of clock synchronization that is *independent* of Einstein's convention that one-way light propagation is isotropic, or any other convention about the nature of the one-way speed of light. Such a method has not yet been found.[11] A most convincing demonstration of nature's conspiracy to prevent us from measuring the one-way speed of light was performed by Winnie, who established the ϵ-Lorentz transformation, that is, the extended Lorentz transformation that is free of Einstein's isotropy convention, or any other one-way velocity convention.[8] Employing his ϵ-Lorentz transformation, Winnie showed that *anisotropy* in one-way motion, including anisotropy in the one-way speed of light as a special case, is associated with *anisotropy* in time dilation and in length contraction in such a way that anisotropy in time dilation, in length contraction, and in one-way speed of light is *undetectable*.

The "existence" of anisotropy in the one-way speed of light, which is *immeasurable* due to the "existence" of an associated immeasurable anisotropy in time dilation and in length contraction, recalls to mind a similar situation in special relativity as it was before Einstein, when people like Lorentz and Poincaré thought that there was a preferred frame of reference, the *ether*, but that measuring instruments were distorted by motion in such a way that motion through the ether could not be detected. Most physicists agree today that there is no preferred frame of reference and, similarly, most space-time philosophers[4–12] agree that *light does not have a one-way velocity*.[12]

An elementary derivation of Winnie's ϵ-Lorentz transformation and, hence, its associated anisotropic time dilation and length contraction is now available.[13] The anisotropic time dilation and length contraction are crucially important in our understanding of the way nature outmaneuvers the physicist who wishes to detect anisotropy in the one-way speed of light. It is, therefore, hardly a surprise that a thought experiment involving moving clocks that suffer no *anisotropic time dilation*, or rotating disks that suffer no *anisotropic length contraction*, can "establish" isotropy in the one-way speed of light as a matter of "experimental fact." Such thought experiments were recently proposed by Brehme[2] and by Spavieri.[3] Brehme did not take into account anisotropic time dilation effects that, according to the conventionalist thesis, affect the reading of moving clocks in such a way that anisotropy in one-way motion cannot be detected. Similarly, Spavieri did not take into account anisotropic length contraction effects that, according to the conventionalist thesis, are associated with one-way velocities having a specific anisotropic distribution pattern[14] that affects rotating disks in such a way that anisotropy in one-way motion cannot be detected.

Brehme's and Spavieri's thought experiments to detect anisotropy in one-way motion thus fare like a thought experiment to detect motion through the ether by means of moving measuring instruments that...suffer no time dilation and no length contraction.

[1] There are, of course, exceptions! For a recent one see S. Marinov, *New Scientist* (18 December 1986), pp. 48–50, and J. Maddox, Nature **316**, 209 (1985); and the author's reply, on behalf of the world's scientific conscience, A. Ungar (submitted for publication to *New Scientist*).
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Marinov's note. Immediately after reading the above article, I wrote to Dr. A. Ungar (of whom I published a paper in the PROCEEDINGS OF ICSTA (p. 164)) to send me the answer "on behalf of the world's scientific conscience" to my address to this "conscience" (NEW SCIENTIST, 18 Dec. 1986, p. 48) but received NO answer.

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Measuring Maxwell's Displacement Current Inside a Capacitor

D. F. Bartlett and T. R. Corle[(a)]
Department of Physics, University of Colorado, Boulder, Colorado 80309
(Received 25 February 1985)

We have measured the magnetic field directly inside a thin, circular, parallel-plate capacitor as it is being charged. We find that this field varies linearly with distance from the axis, as is to be expected if a uniform displacement current flows between the plates. The measured slope of B vs r agrees with predictions to within 5%.

PACS numbers: 41.10.Fs, 03.50.De, 06.30.Lz

A century ago Maxwell wrote, "One of the chief peculiarities of this thesis is the doctrine which asserts that the true electric current, that upon which electromagnetic phenomena depend, is not the same thing as the current of conduction but that the time derivative of the electric displacement must be taken into account."[1] The existence of the displacement current was shown dramatically by Hertz in a series of experiments in which electromagnetic waves were generated and detected.[2] To our knowledge, however, no one has as yet measured the displacement current in the apparently direct fashion by observing the magnetic field inside a capacitor that is being slowly charged.[3] That there should be such a current is shown in most texts.[4]

Imagine that a circular, parallel-plate capacitor is being charged by a conduction current I_C. By Ampère's law, the integral of B around the loop shown in Fig. 1 is $4\pi I_{enc}/c$. If measured by the current piercing the surface S_1, the current enclosed is simply I_C. However, no conduction current pierces surface S_2; thus to ensure the uniqueness of Ampère's law we must hypothesize a displacement current I_D inside the capacitor. Additionally, in the central region the current density $\mathbf{J}_D = (1/4\pi)(\partial \mathbf{D}/\partial t)$ with $J_D = (1/4\pi d)(d\mathcal{V}/dt)$ is a constant and, by Ampère's law, $\mathbf{B}$ is always in the azimuthal direction and has a magnitude $B = (r/2cd)/(dV/dt)$. Here d and V are the separation and potential difference between the plates. Hence B increases linearly with r with a slope $dB/dr = (1/2cd)(dV/dt)$ up to the edge of the plates. From the edge outwards B increases as $1/r$.

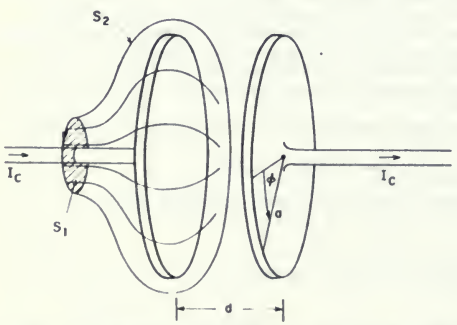

FIG. 1. Ampère's law and Maxwell's displacement current.

Ideally the experiment should be done with a direct current. However, the plates would quickly become so highly charged that they would spark. A simple expedient is to charge the plates quasistatically with an audio frequency ω. If $V = V_0 \sin\omega t$, the magnetic field is $B = (r\omega V_0/2cd)\cos\omega t$. In the case of a hand-sized capacitor charged to a kilovolt and with plates separated by a centimeter the maximum value of B is only about half a microgauss.

To detect this small field we use a superconducting quantum interference detector (SQUID). The detector consists of a commerical probe[5] coupled by short twisted leads to a 1.5-mm-diam, 25-turn coil. The entire probe may be moved vertically between the plates, thus sampling B_ϕ as a function of r. The coil is shielded from electric fields by being enclosed in a stainless steel tube. The Josephson junction of the probe is shielded from both stray electric and magnetic fields by a superconducting lead shield. (See Fig. 2.)

To maintain the low temperatures needed for superconductivity, the capacitor is immersed in liquid helium inside a 1-m-deep, 13-cm-diam bucket Dewar. Unfortunately, all access to the Dewar is from the top. Although the axis of the capacitor is horizontal, it is fed by currents flowing through two vertical wires, thus compromising the ideal arrangement of Fig. 1. The plates and connecting wires are driven at 0.8 sV (240 V_{rms}) by two 1250-Hz signals that are 180° out of phase. The driving signals are derived from a single audio oscillator driving an amplifier, whose center-tapped output is further amplified by two automobile ignition coils. This "push-pull" arrangement ensures that the grounded stainless steel tube of the magnetometer will not appreciably disturb the electric fields inside the capacitor. To detect the field, the signal from the SQUID magnetometer is amplified and compared with that from the audio oscillator in a phase-sensitive or "lock-in" amplifier.

We use an *in situ* method to set the phase of the

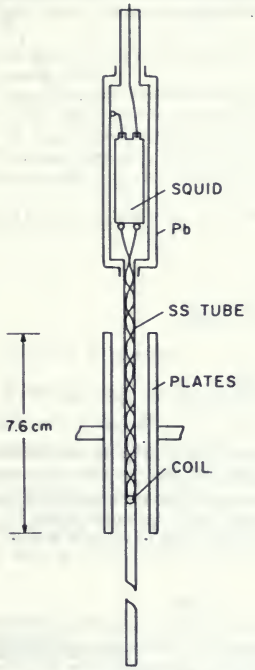

FIG. 2. SQUID magnetometer. The permeability of the nonmagnetic stainless steel tube is unity for the small fields used in this experiment; thus this tube shields electric, not magnetic, fields.

lock-in detector to agree with that of I_D. The vertical leads feeding the capacitor are symmetric about the axis of the Dewar and are separated by only 4 cm. The current in these leads is in phase with the displacement current. By raising the SQUID probe into the region above the capacitor we sample the magnetic field of the vertical leads and are thus able to set the phase of the lock-in detector. To minimize the unwanted influence of the vertical charging currents on the magnetic field within the plates, the leads are bent through 90° before making their final horizontal, axial approach to the capacitor (see Fig. 3). By rotating the SQUID probe through 90° we can measure either the magnetic field of the displacement current B_D or the magnetic field of the vertical conduction currents B_C.

This arrangement leaves us with some problems. Current in the lower 90° bends shown in Fig. 3 gives an unwanted contribution to the measured B_D. Conversely, current in the two axial leads, which should stretch to infinity, can only contribute for a short distance. This situation would lead to a large but calculable correction to the expected field were it not for a more insidious problem. The stray capacitance of the lead wires to the walls of the Dewar is several times the capacity between the plates. Thus much of the current which enters the Dewar does not travel through the plates but rather travels (as displacement current) to the walls of the Dewar. From there the current is conducted in a highly asymmetric manner through welded seams to the other side of the Dewar. Here it travels again as displacement current to the other wire and returns to the amplifier. If unshielded these unwanted currents produce an uncalculable spurious B_D comparable to the desired signal.

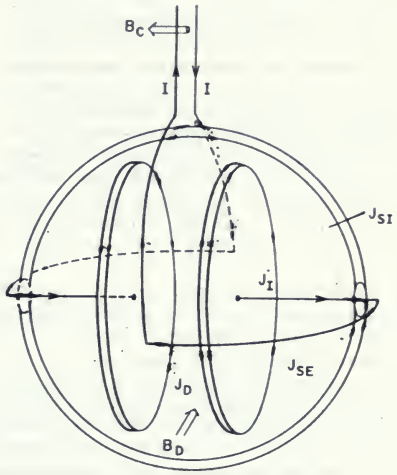

FIG. 3. Apparatus. Capacitor within superconducting sphere. The light, broad arrows show schematically the various current densities. See text for defintions of symbols.

Fortunately, these currents can be shielded by use of the Meissner effect.[6] Surrounding the plates is a 12.5-cm-diam copper spherical shell which has been coated internally with 50–50 Pb-Sn solder. This solder is superconducting and so, when put in a magnetic field, maintains $\mathbf{B}=0$ inside the solder itself. Currents external to the shield cause superficial currents $\mathbf{J}_{SE}(\theta,\phi)$ to flow in both the polar direction $\hat{\theta}$ and the azimuthal direction $\hat{\phi}$ on the outside of the solder shell. The combined effect of $\mathbf{J}_{SE}$ and all external currents is to maintain $\mathbf{B}=0$ in the solder material which will (by the uniqueness theorem) also maintain $\mathbf{B}=0$ at all internal points.

The superconducting shell also shields against unwanted internal currents $\mathbf{J}_I$ arising from displacement current traveling to the shell from the plates and

the horizontal wires. In this case the argument is a little subtle. The internal currents, both the unwanted $\mathbf{J}_I$ and the essential $\mathbf{J}_D$ between the plates, are azimuthally symmetric: they have no ϕ component. (See Fig. 3.) Even so, were the shell not superconducting it could easily support nonazimuthally symmetric conduction currents and we would again have a noncalculable contribution to the measured **B** field. But the shell is a superconductor. To maintain $\mathbf{B}=0$ inside the solder material, an azimuthally symmetric current $\mathbf{J}_{SI}(\theta)$ must flow on the inside surface to balance $\mathbf{J}_I$ and $\mathbf{J}_D$.

Since all the internal currents now have azimuthal symmetry, the vector potential **A** must have neither a ϕ component nor be dependent upon ϕ. Thus $\mathbf{B}=\nabla\times\mathbf{A}$ within the shell everywhere must be in the ϕ direction and must be independent of ϕ. The magnetic field can then readily be calculated by Ampère's law with the result that within the shell the predicted field is just the same as it would be if the capacitor were completely isolated, fed by infinitely long axial leads. Thus the azimuthally symmetric superconducting shield not only shields, it makes our cramped physical apparatus effectively the same as the idealized infinite apparatus of Fig. 1.

The results obtained are shown in Fig. 4, where we have plotted B_D versus the height of the probe h. The dots represent data from two sets of measurements. The theoretical curve clearly shows a linear form between the bottom and top of the capacitor plates with a falloff in the region of the fringing fields. This curve, which allows for the finite geometry of the plates and the copper spherical shield, was determined by a numerical relaxation method.[7] There were two free parameters: the position of the capcitor center line and the slope of B_D vs h in the linear region.

In principle, the depth of the capacitor axis below the top of the Dewar can be accurately measured with a meter stick. But the capacitor is mounted at the end of a long plastic tube. The unknown temperature profile in the Dewar makes it difficult to allow for thermal contractions, and so we feel that the location of the center line is best determined by the data themselves.

The slope which best fits the experimental data is $dB_D/dh=0.171\pm0.005$ μG/cm. The predicted slope is

$$dB/dr = K\omega V/(2cd) = 0.180\pm0.005\ \mu\text{G/cm}.$$

Here K, the dielectric constant of liquid helium, is 1.05, $\omega=7850$ rad/s, $V=1.60\pm0.08$ sV_{rms}, and d, the plate separation, is 1.22 cm. The agreement between measurement and theory is at the level of 5%.

Clearly the time derivative of **D** must be "taken into account" if we use Ampère's law. But what if we use the Biot-Savart law? Do we need to consider $\mathbf{J}_D$ as well as $\mathbf{J}_C$? Curiously we do not. As French and Tessman have shown, in any quasistatic measurement **B** can be found from the conduction currents alone. The argument is simple. According to the Biot-Savart law

$$\mathbf{B}=\int\frac{\mathbf{J}\times\hat{\mathbf{R}}\,d\tau'}{cR^2}=\int\frac{\nabla\times\mathbf{J}}{cR}\,d\tau',$$

where $\mathbf{J}=\mathbf{J}_D+\mathbf{J}_C$ and R is the vector from the source point (primed) to the field point. But $\nabla\times\mathbf{J}_D\propto\nabla\times\partial\mathbf{E}/\partial t$ and for quasistatic measurements $\nabla\times\mathbf{E}\approx0$. Thus only $\mathbf{J}_C$ contributes.[8]

What we have shown, then, is that the Biot-Savart law applies to open as well as to closed circuits. One may write the differential form of this law as

$$d\mathbf{B}=I_C d\mathbf{l}\times\hat{\mathbf{R}}/cR^2,$$

without the usual caveat that only the integral around a closed loop is meaningful.

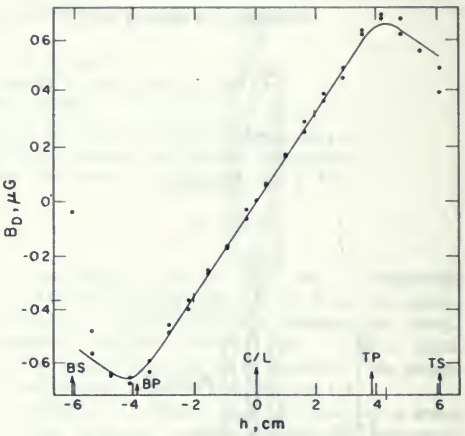

FIG. 4. Results. The scale of B_D was determined in a separate calibration in which the coil was placed inside a small Helmholtz coil carrying a known 1250-Hz current. BS = bottom of sphere, BP = bottom of plates, C/L = center line, TP = top of plates, and TS = top of sphere.

We gratefully acknowledge the help given by Peter Wilcoxen, William Stone, and Tracey Clyde. Very useful comments were received from A. P. French. This work was partially supported by a National Bureau of Standards Precision Measurement Grant funded in cooperation with the National Science Foundation and by a grant from the Research Corporation.

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[a]Now at Department of Applied Physics, Stanford

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Editorial note. Marinov's comments to the above article are given in TWT-I, third ed., p. 317.

FEYNMAN'S PARADOX

(from FEYNMAN'S LECTURES ON PHYSICS) (p. 17-8)

17–4 A paradox

We would now like to describe for you an apparent paradox. A paradox is a situation which gives one answer when analyzed one way, and a different answer when analyzed another way, so that we are left in somewhat of a quandary as to actually what should happen. Of course, in physics there are never any real paradoxes because there is only one correct answer; at least we believe that nature will act in only one way (and that is the *right way*, naturally). So in physics a paradox is only a confusion in our own understanding. Here is our paradox.

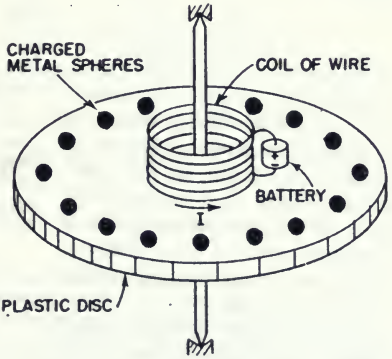

Fig. 17–5. Will the disc rotate if the current I is stopped?

Imagine that we construct a device like that shown in Fig. 17–5. There is a thin, circular plastic disc supported on a concentric shaft with excellent bearings, so that it is quite free to rotate. On the disc is a coil of wire in the form of a short solenoid concentric with the axis of rotation. This solenoid carries a steady current I provided by a small battery, also mounted on the disc. Near the edge of the disc and spaced uniformly around its circumference are a number of small metal spheres insulated from each other and from the solenoid by the plastic material of the disc. Each of these small conducting spheres is charged with the same electrostatic charge Q. Everything is quite stationary, and the disc is at rest. Suppose now that by some accident—or by prearrangement—the current in the solenoid is interrupted, without, however, any intervention from the outside. So long as the current continued, there was a magnetic flux through the solenoid more or less parallel to the axis of the disc. When the current is interrupted, this flux must go to zero. There will, therefore, be an electric field induced which will circulate around in

circles centered at the axis. The charged spheres on the perimeter of the disc will all experience an electric field tangential to the perimeter of the disc. This electric force is in the same sense for all the charges and so will result in a net torque on the disc. From these arguments we would expect that as the current in the solenoid disappears, the disc would begin to rotate. If we knew the moment of inertia of the disc, the current in the solenoid, and the charges on the small spheres, we could compute the resulting angular velocity.

But we could also make a different argument. Using the principle of the conservation of angular momentum, we could say that the angular momentum of the disc with all its equipment is initially zero, and so the angular momentum of the assembly should remain zero. There should be no rotation when the current is stopped. Which argument is correct? Will the disc rotate or will it not? We will leave this question for you to think about.

We should warn you that the correct answer does not depend on any nonessential feature, such as the asymmetric position of a battery, for example. In fact, you can imagine an ideal situation such as the following: The solenoid is made of superconducting wire through which there is a current. After the disc has been carefully placed at rest, the temperature of the solenoid is allowed to rise slowly. When the temperature of the wire reaches the transition temperature between superconductivity and normal conductivity, the current in the solenoid will be brought to zero by the resistance of the wire. The flux will, as before, fall to zero, and there will be an electric field around the axis. We should also warn you that the solution is not easy, nor is it a trick. When you figure it out, you will have discovered an important principle of electromagnetism.

(p. 27-17)

We will mention two further examples of momentum in the electromagnetic field. We pointed out in Section 26–2 the failure of the law of action and reaction when two charged particles were moving on orthogonal trajectories. The forces on the two particles don't balance out, so the action and reaction are not equal; therefore the net momentum of the matter must be changing. It is not conserved. But the momentum in the field is also changing in such a situation. If you work out the amount of momentum given by the Poynting vector, it is not constant. However, the change of the particle momenta is just made up by the field momentum, so the total momentum of particles plus field is conserved.

(see fig. 1 on p. 125 of this volume)

Finally, another example is the situation with the magnet and the charge, shown in Fig. 27–6. We were unhappy to find that energy was flowing around in circles, but now, since we know that energy flow and momentum are proportional, we know also that there is momentum circulating in the space. But a *circulating* momentum means that there is *angular* momentum. So there is *angular* momentum in the field. Do you remember the paradox we described in Section 17–4 about a solenoid and some charges mounted on a disc? It seemed that when the current turned off, the whole disc should start to turn. The puzzle was: Where did the angular momentum come from? The answer is that if you have a magnetic field and some charges, there will be some angular momentum in the field. It must have been put there when the field was built up. When the field is turned off, the angular momentum is given back. So the disc in the paradox *would* start rotating. This mystic circulating flow of energy, which at first seemed so ridiculous, is absolutely necessary. There is really a momentum flow. It is needed to maintain the conservation of angular momentum in the whole world.

More on the Feynman's Disk Paradox

Fred L. Boos, Jr.
Department of Physics, California State University at Chico, Chico, California 95929

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Reference Gabriel Lombardi's excellent article about the Feynman Disk Paradox.[1,2] A simple example that illustrates the principles and is easy to analyze is as follows:

An infinite solenoid of radius R, current i, and n turns per meter is concentric with two cylindrical tubes of charge Q and $-Q$, and radii a and b, respectively. The charge is distributed uniformly over the cylindrical surfaces and both tubes have length l, where $l \gg b > R > a$. The coil and the cylindrical tubes are all stationary initially but free to rotate without friction about their common axis.[3] Thus the initial mechanical angular momentum is zero.

The apparent paradox arises when the current in the solenoid is interrupted, say by raising the temperature above the super conducting point. The changing magnetic flux causes a tangential electric field that acts on charged tubes, giving them a mechanical angular momentum as follows:

$$L_{ma} = \int (\text{torque}) dt = \int aQE_a \, dt,$$
$$L_{mb} = \int (\text{torque}) dt = \int bQE_b \, dt, \tag{1}$$

where E_a and E_b are the tangential electric fields induced at the inner and outer tubes, respectively. According to Faraday's law of induction and Ampere's circuital rule we get[4]

$$E_a = \frac{d\Phi_a/dt}{2\pi a} = \pi a^2 \frac{dB/dt}{2\pi a} = a\frac{dB/dt}{2},$$
$$E_b = \frac{d\Phi_b/dt}{2\pi b} = \pi R^2 \frac{dB/dt}{2\pi b} = R^2 \frac{dB/dt}{2b}.$$

(In each case the field is tangential in the direction of the original current.)

Substituting these values into Eqs. (1) we get

$$L_{ma} = Qa^2 \int dB/2 = Qa^2 B/2$$

(in the direction of the solenoid axis. The rotation is in the same direction as the original current.).

$$L_{mb} = QR^2 \int dB/2 = QR^2 B/2$$

(direction opposite to that of L_{ma}),

where B is the initial magnetic field within the solenoid. The total final mechanical angular momentum is

$$L_m = L_{mb} - L_{ma} = QB(R^2 - a^2)/2$$
(in the direction of L_{mb}). (2)

Where does this mechanical angular momentum come from? The answer according to Lombardi's proof is that the initial electromagnetic field possesses angular momentum and that this is transferred to the cylindrical tubes as the current in the solenoid drops to zero in such a way that angular momentum is conserved. The initial field angular momentum is thus equal to the final mechanical angular momentum.

To check this for the present example we note first that initially B is equal to zero everywhere except within the solenoid where it is uniform. The electric field is nearly zero everywhere except in the region between the cylindrical shells where it is radially outward and of magnitude $E = Q/2\pi\epsilon_0 rl$, where r is the cylindrical radius.[5] The field angular momentum is, following the procedure given by Lombardi,

$$\mathbf{L}_F = \epsilon_0 \int \mathbf{r} \times (\mathbf{E} \times \mathbf{B}) d^3 r,$$
$$L_F = \epsilon_0 \int_{r=a}^{R} r(Q/2\pi\epsilon_0 rl)(B)(2\pi rl\, dr)$$
$$= QB \int_{r=a}^{R} r\, dr = QB(R^2 - a^2)/2$$
(in the direction of L_m). (3)

Hence the initial field angular momentum (3) is equal to the final mechanical angular momentum (2).

There is an alternate method for finding the field angular momentum transferred to mechanical angular momentum that uses vector potential. A vector potential for the infinite solenoid that works is[6]

$$\mathbf{A} = \mathbf{B} \times \mathbf{r}/2, \quad r < R, \quad \nabla \times \mathbf{A} = \mathbf{B},$$
$$\mathbf{A} = R^2(\mathbf{B} \times \mathbf{r})/2r^2, \quad r > R, \nabla \times \mathbf{A} = 0.$$

The angular momentum associated with A is[7]

$$L_{Aa} = \left| \int \mathbf{r} \times \mathbf{A}\, dQ \right| = QBa^2/2$$

(in the direction of L_{ma}),

$$L_{Ab} = \left| \int \mathbf{r} \times \mathbf{A}\, dQ \right| = QBR^2/2$$

(in the direction of L_{mb}),

for the inner and outer shells, respectively. The total field angular momentum transferred to the tubes as A drops to zero is the sum

$$L_A = L_{Ab} - L_{Aa} = B\ Q(R^2 - a^2)/2$$

(in the direction of L_m),

which is the same result given by Eq. (3).

This second method for showing that angular momentum is conserved as the current in the solenoid drops to zero is sometimes much easier to carry out, particularly if E and B are not so neatly confined as they are in the setup described here. An example where this is the case is the setup described above with the inner tube omitted.

[1] R. P. Feynman, R. B. Leighton, and M. Sands, *The Feynman Lectures* (Addison-Wesley, Reading, MA, 1984), Vol. II, p. 17-5.
[2] G. Lombardi, Am. J. Phys. 51, 213 (1983).
[3] A similar setup with two rotating charged cylinders but no solenoid is analyzed by E. Corinaldesi, Am. J. Phys. 48, 83 (1980).
[4] D. Halliday and R. Resnick, *Physics* (Wiley, New York, 1978), 3rd ed., Part 2, Sec. 35-5.
[5] Reference 4, Sec. 28-8.
[6] Reference 1, p. 14-3.
[7] J. D. Jackson, *Classical Electrodynamics* (Wiley, New York, 1962), 2nd ed., p. 574.

Field versus action-at-a-distance in a static situation

N. L. Sharma
Department of Physics and Astronomy, Eastern Michigan University, Ypsilanti, Michigan 48197

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The introduction of the electromagnetic field has been a necessity only in time-varying cases. In static or steady-state cases, it has been mostly a convenience. An example is discussed where even in static situations the field is a necessity in order to conserve angular momentum. The results are used to provide a classical picture for the electron spin in terms of the angular momentum of the associated electromagnetic field.

I. INTRODUCTION

There are two views concerning the interaction between static charges or steady currents. In one view, there is direct "action-at-a-distance" between charges or currents through Coulomb's or Biot–Savart's law, respectively. In the other, the interaction is through an intermediate agency called a "field." In the beginning, the concept of an electromagnetic field was introduced as a convenient *local* substitute for instantaneous action-at-a-distance. This invention decouples conceptually the sources from the test bodies experiencing electromagnetic forces. To find out the force on a test charge q at a point in space, you do not have to go all the way to find out where the sources (charges or currents) are; instead, you just have to know the values of **E** and **B** at that very point and use the Lorentz force law to compute the force. If the fields **E** and **B** from two source distributions are the same at a given point in space, the force acting on a test charge or current at that point will be the same, regardless of how different source distributions are. This gives **E** and **B** meaning in their own right, independent of sources. Further, the finite speed of propagation of electromagnetic signals, the retarded action, requires fields to carry energy, momentum, and angular momentum in order to guarantee conservation of these quantities. In fact, the photon, the quantum of the electromagnetic field, carries all these attributes and therefore is as real an entity as an electron. All the static (electrostatics) and steady-state (magnetostatics) situations, however, *could* just as well be treated using Coulomb's and Biot–Savart's laws for the force between charges and currents, respectively, without ever invoking an electromagnetic field. As a matter of fact, for static ($\partial/\partial t = 0$) situations the four coupled Maxwell's equations of electrodynamics decouple into two sets of two equations each, one for electrostatics and the other for magnetostatics:

$$\nabla\cdot\mathbf{E} = \rho/\epsilon_0, \quad \nabla\times\mathbf{E} = 0;$$

$$\nabla\cdot\mathbf{B} = 0, \quad \nabla\times\mathbf{B} = \mu_0\mathbf{J}.$$

The first set is completely equivalent to and can be derived from Coulomb's law; similarly, the second set is completely equivalent to and can be derived from Biot–Savart's law. In these situations, the energy stored in fields is the same as the potential energy of charge or current configurations, and linear and angular momentum are usually associated only with the propagating fields. This seems to suggest that the introduction of fields here is only a matter of convenience and not a necessity; that the field language is redundant and the source language is sufficient. This may be so if there are only static charges or steady currents, but not quite true for a general static situation. Here we discuss a static source configuration where the existence of the electromagnetic field is essential and not a mere convenience if we need to conserve the angular momentum. This example also presents a situation in which a static electromagnetic field configuration carries a nonzero orbital angular momentum. For the case of an electron, this field angular momentum can be related to its spin at the classical level.

II. THE FEYNMAN'S DISK PARADOX

A prototype of the example that we are going to discuss in Sec. III first appeared in the form of a paradox in the Feynman lectures.[1] Subsequently, it appeared[2–4] in different forms in previous issues of this Journal. However, the way the paradox is set up and resolved[1,2] has still left some skeptical readers[5] in confusion. We shall shed some light on this before we present an example that has no scope for such confusion.

The original paradox[1] involves a current-carrying coil placed at the center of a plastic disk that has charged metallic balls embedded symmetrically along its perimeter. When the current in the coil is interrupted so as not to impart any torque to the system, the disk will start rotating in the direction of the original current. This is because of the torque applied on the embedded charged balls due to the induced electric field created by the collapsing magnetic field associated with the current. It seems paradoxical because one suddenly finds angular momentum coming out of nowhere. The resolution lies in the revelation that it was there in the electric and magnetic field configuration associated with the charges and the current. The confusion arises when one[5] says, "Well! There was also angular momentum carried by electrons circulating in the coil." First, however, this contribution will be opposite to that from the field angular momentum and, second, this can be accounted for by first doing the experiment without charging the balls, in which case there is no field angular momentum. In order that mechanical angular momentum of current carriers in the coil and the field angular momentum do not get mixed up, we present here a different example.

III. AN ALTERNATIVE

Consider a charged conducting sphere that is magnetized in the vertical direction and is at rest. We now discharge it by connecting it to the ground. This sphere will start spinning if it is free to do so. We have not applied any torque on the sphere and it is still magnetized. Where, then, does the angular momentum come from? This is a quantitative version of Feynman's disk paradox where one can calculate things exactly. In this section, we show that this

angular momentum is initially stored in the *static* electromagnetic field configuration of the magnetized charged sphere. In Sec. IV, we show how this field angular momentum gets converted into mechanical angular momentum of the sphere when it is discharged. This, then, provides a method to verify experimentally the presence of angular momentum in the field, which, in turn, proves the existence of an electromagnetic field even for a static charge–current configuration.

Let Q be the charge and $M\hat{z}$ be the permanent uniform magnetization carried by the sphere. For a sphere with uniform magnetization, there are no higher multipoles,[6] and the magnetic field is a pure dipole field, not only asymptotically but also close to the sphere. This is given by

$$\mathbf{B}=\begin{cases}\frac{2}{3}\mu_0 M\hat{z}, & r<a,\\ (\mu_0/4\pi)(m/r^3)[2\cos\theta\hat{r}+\sin\theta\hat{\theta}], & r>a,\end{cases} \tag{1}$$

where $m=\frac{4}{3}\pi a^3 M$, the magnetic moment of the sphere. The electric field is

$$\mathbf{E}=\begin{cases}0, & r<a,\\ (Q/4\pi\epsilon_0 r^2)\hat{r}, & r>a,\end{cases} \tag{2}$$

The Poynting vector (energy flux) is given by

$$\mathbf{S}(r,\theta)=(1/\mu_0)\mathbf{E}\times\mathbf{B}$$

$$=\begin{cases}0, & r<a,\\ (QMa^3/12\pi\epsilon_0)(\sin\theta/r^5)\hat{\phi}, & r>a.\end{cases} \tag{3}$$

Thus the energy is flowing along circular paths outside the sphere. The associated electromagnetic momentum density (mass flux) is S/c^2. The angular momentum due to this flow (only the z component survives due to symmetry) is

$$L_{\rm em}=\int\left(\mathbf{r}\times\frac{\mathbf{S}}{c^2}\,dV\right)\hat{\mathbf{r}}\times\frac{S}{c^2}\,(dV)\cdot\hat{z}$$

$$=\int_a^\infty dr\int_0^\pi r\sin\theta\left(\frac{S}{c^2}\right)2\pi r^2\sin\theta\,d\theta$$

$$=\tfrac{2}{3}\mu_0 MQa^2,\quad \text{along the } z \text{ axis}. \tag{4}$$

This is the orbital[7] angular momentum carried by the static electromagnetic field associated with charge Q and magnetization M.

IV. EXPERIMENTAL VERIFICATION

In this section we explicitly show how the field angular momentum in Eq. (4) reveals itself as the mechanical angular momentum of the sphere when the latter is discharged. When one discharges the sphere by connecting its lowermost point to the ground, the discharging current along the longitudes of the sphere interacts with the magnetic field producing a torque on the sphere. We calculate the mechanical angular momentum generated due to this torque. Remember, no torque has been imparted to the sphere from outside.

Let $q(t)$ be the total charge on the sphere at any time t during the discharging process. The charge residing on the surface of a cap with angle θ (see Fig. 1) is

$$q_\theta(t)=\int_0^\theta\frac{q(t)}{4\pi a^2}2\pi a^2\sin\theta\,d\theta$$

$$=\tfrac{1}{2}(1-\cos\theta)q(t). \tag{5}$$

The current flowing out through the circular edge of this cap is

$$I(\theta,t)=\frac{1}{2}(1-\cos\theta)\frac{dq}{dt},\quad \text{along } \hat{\theta}. \tag{6}$$

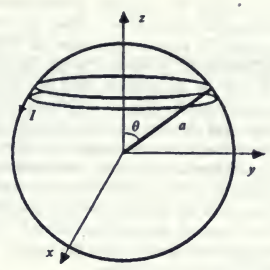

Fig. 1. Current flow along the longitudes of the charged magnetized sphere when the latter is discharged.

The force on a current strip lying between θ and $\theta+d\theta$ and having length $d\mathbf{l}=a\,d\theta\,\hat{\theta}$ in the direction of the current flow is[8]

$$d\mathbf{F}=Id\mathbf{l}\times\mathbf{B}(r=a)$$

$$=-\frac{1}{3}\mu_0 Ma(1-\cos\theta)\cos\theta\frac{dq}{dt}\,d\theta\,\hat{\phi}. \tag{7}$$

The angular momentum imparted to the sphere due to this force (again, only the z component will survive after integration) is

$$L_{\rm mech}=\int(\mathbf{r}\times d\mathbf{F}\,dt)\cdot\hat{z}$$

$$=\int_0^\pi\int_0^\infty a\sin\theta\,dF\,dt$$

$$=-\frac{1}{3}\mu_0 Ma^2\int_0^Q dq\int_0^\pi(1-\cos\theta)\cos\theta\sin\theta\,d\theta$$

$$=\tfrac{2}{3}\mu_0 MQa^2,\quad \text{along the } z \text{ axis}. \tag{8}$$

This is the same as in Eq. (4). Once the sphere is completely discharged, Q and thereby E become zero. Thus there is no angular momentum left in the field. The sphere, however, is still magnetized, so whatever spin angular momentum (of the atomic magnets) was there originally is still there. One clearly sees that it is the field angular momentum that shows up as mechanical angular momentum in the sphere. This is quite neat as there is no possibility of incorrectly thinking that the angular momentum of the disk might be due to that of the current carriers in the coil of the Feynman's disk paradox. In the above analysis, we have neglected the magnetic field associated with the discharging current and the displacement current associated with the collapsing electric field. This is justified if these currents are small; otherwise, some angular momentum will be lost to the radiation field.

There is still another manifestation of the angular momentum carried by the electromagnetic field. An angular momentum L is associated with a rotational (kinetic) energy $L^2/2I$, where I is the moment of inertia (MI) of the rotating object. This energy results from the work done by

the agency that creates the angular momentum. What about the field angular momentum? Does it need extra work when created? To answer this question one has to consider a slightly different problem. During the process of discharge the energy in the electric field of the charged sphere gets converted partly into the rotational kinetic energy of the sphere and the rest gets lost as heat and radiation. This latter form of energy cannot be calculated to check the energy balance. So instead, we consider a uniformly charged plastic[9] shell. Initially the shell only has an electric field. If one sets the shell spinning, a magnetic field is also created because of the surface current. It will be shown that this magnetic field carries the energy spent in creating the field angular momentum.

The E and B fields due to the charged shell spinning with angular velocity ω are exactly[10] similar as in Eqs. (1) and (2) except that the magnetization density M is replaced by $\omega Q/4\pi a$.[11] The field angular momentum in Eq. (4) then becomes

$$L_{\rm em} = [\tfrac{2}{3}(\mu_0/4\pi)Q^2a]\omega$$
$$= I_{\rm em}\omega\,, \tag{9}$$

where the expression inside the brackets has been identified as the electromagnetic MI $I_{\rm em}$ of the charged shell, which is an addition to its mechanical MI of $\frac{2}{3}ma^2$. The magnetic energy, which can be calculated using the same B as in Eq. (1), is

$$\frac{1}{2\mu_0}\int B^2\,dV$$
$$= \frac{1}{2\mu_0}\left[\left(\frac{2}{3}\mu_0 M\right)^2\frac{4}{3}\pi a^3 + \frac{\mu_0^2 m^2}{16\pi^2}\int_a^\infty \frac{1}{r^4}\,dr \right.$$
$$\left. \times \int_0^\pi (1+3\cos^2\theta)2\pi\sin\theta\,d\theta\right]$$
$$= \frac{1}{2}\left(\frac{2}{9}\frac{\mu_0}{4\pi}Q^2a\right)\omega^2$$
$$= \frac{L_{\rm em}^2}{2I_{\rm em}}\,, \quad \text{with the use of Eq. (9)}\,. \tag{10}$$

Thus the energy $L_{\rm em}^2/2I_{\rm em}$ spent in creating the field angular momentum is actually stored as the energy of the associated magnetic[12] field. This extra work done by the agency imparting torque to the *charged* shell, as compared to the neutral one, is thus a direct measure of the field angular momentum. One could also say that to impart a given angular acceleration to the charged shell one would need an extra torque proportional to Q^2 as compared to that required for the neutral one.

V. A MODEL FOR THE ELECTRON SPIN

From the analysis of Sec. III one concludes that even a static object carrying charge and magnetic moment will have an angular momentum (one may want to call it spin) in the associated electromagnetic field. Thus if the magnetic moment (instead of spin) and the charge of an electron are taken as its intrinsic attributes, one has a classical[13] picture to understand its spin in terms of the orbital angular momentum of the associated electromagnetic field. The electron carries a charge q_e and a magnetic moment $\hbar q_e/2m$, where m is the electron rest mass. If one takes a simple model of an electron in which its charge q_e is uniformly distributed on the surface of a sphere of radius a, then from Eq. (4) its spin can be calculated as

$$S = \frac{2}{9}\mu_0 q_e\frac{(\hbar q_e/2m)}{\frac{4}{3}\pi a^3}a^2$$
$$= \frac{2}{3}\frac{q_e^2}{4\pi\epsilon_0 c^2 ma}\frac{\hbar}{2}$$
$$= \frac{2}{3}\frac{e^2}{mc^2 a}\frac{\hbar}{2} \quad \text{in cgs units}\,. \tag{11}$$

Thus if $m = \frac{2}{3}(e^2/ac^2)$ then $S = \hbar/2$. This expression for the electron mass in terms of its radius is somewhat familiar. A moving electron is associated with a momentum—even if the electron had no mass before it was charged—because of momentum in the electromagnetic field. The coefficient of velocity in this field momentum is called the electromagnetic mass of the electron. For the same model of the electron, a charged spherical shell, this mass also[14] comes out to be $\frac{2}{3}(e^2/ac^2)$. The coincidence of the two masses that appear in the translational and rotational momentum of the electromagnetic field associated with an electron might be taken to imply at least a self-consistent treatment of the electron spin at the classical level. In this picture, the spin is associated with a physical rotation of the energy in the electromagnetic field. This association is devoid of any contradiction ($v > c$) with the theory of relativity that arises when one tries to assign the spin to the physical rotation of the electron itself.

VI. CONCLUSION

When a uniformly magnetized charged sphere is discharged, it starts spinning. We have proved that this spin originates from the orbital angular momentum of the static field configuration of the charged magnetized sphere. Through this example we have shown that in static situations where the Poynting vector is *not* zero, Coulomb's and Biot–Savart's laws do not explain everything and one has to take account of the associated electromagnetic field. In regard to the Feynman disk paradox, we hope to have put it in a wider perspective. Also, some confusion between the angular momentum of the current carriers and the field has been explained. The results have been applied to develop a classical picture for the spin of an electron.

ACKNOWLEDGMENT

The author wishes to thank Dr. M. F. Bishop for drawing Fig. 1 on her Mac-Plus.

[1] R. P. Feynman, R. B. Leighton, and M. Sands, *The Feynman Lectures on Physics* (Addison-Wesley, Reading, MA, 1964), Vol. II, pp. 17.5 and 27.11.
[2] E. Corinaldesi, Am. J. Phys. **48**, 83 (1980).
[3] G. G. Lombardi, Am. J. Phys. **51**, 213 (1983).
[4] F. L. Boos, Jr., Am. J. Phys. **52**, 756 (1984).
[5] O. B. Keyes, Am. J. Phys. **52**, 680 (1984).
[6] J. D. Jackson, *Classical Electrodynamics* (Wiley, New York, 1975), p. 194.
[7] A time-varying electromagnetic field may also carry spin angular momentum, which is due to the spin of photons.
[8] Though discontinuous across the surface, both values of B lead to the same result as in Eq. (7). This is because only the radial component of B, which is continuous, contributes to the cross product of $d\mathbf{l} = a\,d\theta\,\hat{\theta}$ with B.
[9] A metallic shell will have conduction losses and also centrifugal charge separation on rotation. A *shell* is preferred over a solid sphere so that one

has the same expressions for E and B as in Eqs. (1) and (2).

[10]Reference 6, p. 206, prob. 5.7 and p. 697, prob. 14.12 and 14.13. There are no radiation and relativistic corrections to the static E and B of a steady, *uniform* current in a closed path.

[11]This can be easily proved by integrating the relation $dm = i(\theta)dA$ over the spherical surface with uniform surface charge density $\sigma = Q/4\pi a^2$ to obtain m and finally obtain $M = m/(\frac{1}{3}\pi a^3)$.

[12]Having identified the electromagnetic MI as in Eq. (9), it can now be easily shown that Eq. (10) holds for the charged magnetized sphere of Sec. III as well.

[13]For a similar but quantum picture see Hans C. Ohanian, Am. J. Phys. **54**, 500 (1986) and J. D. Bjorken and S. D. Drell, *Relativistic Quantum Fields* (McGraw-Hill, New York, 1965).

[14]See Reference 1, Sec. 28-2. The result for the electromagnetic mass of the electron derived there does not alter upon inclusion of the magnetic field due to the magnetic moment of the electron. Note that the magnetic moment of the electron is assumed to be uniformly spread out over a sphere of radius a.

Editorial note. Marinov's comments on the Feynman's paradox and on the above two papers dedicated to this paradox are given in TWT-III, sec. ed., p. 59.

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LETTER TO THE EDITOR

Railgun recoil and relativity

Peter Graneau

Center for Electromagnetics Research, Northeastern University, Boston, MA 02115, USA

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Abstract. In relativistic electromagnetism the recoil force of a railgun should act on the magnetic field and absorb field energy-momentum. The Ampère–Neumann electrodynamics, on the other hand, requires the recoil forces to reside in the railheads and push the rails back toward the gun breach. Experiment confirms the latter mechanism.

Three years ago Pappas [1] demonstrated with an electrodynamic impulse pendulum that the momentum imparted to a metallic conductor, via the Lorentz force, was not balanced by a change in field energy momentum, as required by the special theory of relativity. The test revealed the required field energy to be much greater than the experimentally available energy. Pappas' energy source was a lead-acid battery with its severe restriction of the rate at which it could supply energy. The author [2] has confirmed the result obtained by Pappas, but used a capacitor bank as energy source which contained a precisely known amount of energy.

The author's experiments involved a variety of pulse current amplitudes produced by capacitor discharges. In every case far more energy was required for relativistic momentum conservation than was actually stored in the capacitor bank. Whatever experimental errors may have been present, the shortfall in field energy was so great that it completely disproved the idea of generating 'magnetic pressure' by free energy impinging on the pendulum conductor at the velocity of light and being stopped by the metal. For example, in a typical measurement the mechanical momentum change came to 0.1747 kg m s^{-1}. To produce an equal and opposite field energy-momentum change demanded the transfer of 67.6 MJ of energy through the field. This energy would have had to be supplied by the capacitor bank which contained no more than 25.6 kJ.

Pappas' discovery would probably remain just one more electromagnetic paradox in the annals of science, were it not for its practical impact on the operation of the railgun. Several industrial and government laboratories are engaged in developing this kinetic-energy weapon for the US Strategic Defence Initiative. Figure 1 is a simplified diagram of a railgun driven by a pulse power source S. Rails AB and CD carry a heavy current to and from the armature (projectile) which forms a mobile, conducting bridge between the rails. The armature is subject to the Lorentz force F generated locally by the interaction of the armature current with the magnetic field of the rail currents. This force can accelerate the

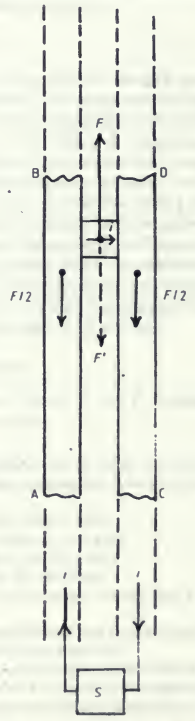

Figure 1. Railgun acceleration and recoil forces.

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armature—and any projectile in front of it—down the rails to great velocity. It has already been shown that railguns have the potential of achieving earth escape velocity, which has proved impossible with conventional guns using chemical explosives. Relativistic field theory stipulates that the magnetic pressure on the armature is caused by free energy, and its equivalent electromagnetic mass, striking the armature at the velocity of light. On account of its equivalent mass, free energy should be capable of transferring momentum to metallic conductors. It will be appreciated that the Lorentz force on the breach portion of the railgun circuit should also be the result of magnetic field pressure. Since the breach contains the energy source, presumably its Lorentz force is the recoil of energy leaving the breach with the velocity of light.

The railgun provides another opportunity to test relativistic momentum conservation. Let us consider an actual railgun shot reported in [3] in which a mass of $m = 0.317$ kg was accelerated to a velocity of $u = 4200$ m s^{-1} with $E = 16.3$ MJ of kinetic energy stored in the rotor of a homopolar generator. The equation for balance of the projectile momentum p is

$$p = mu = m_e c = (1/c^2) \int (E \times H)\, dv \qquad (1)$$

where m_e is the equivalent electromagnetic mass of field energy, c the velocity of light, v the volume of the armature and E and H are the electric- and magnetic-field strength vectors inside the armature. The integration of the Poynting vector has to be carried out over the volume of the armature where the field energy arrives with the velocity of light and has to be stopped in order to pass its momentum on to the armature. From equation (1) it follows that the energy required to furnish the necessary field energy momentum is

$$E = m_e c^2 = muc. \qquad (2)$$

This is the famous mass-energy relation of special relativity. For the railgun shot published in [3] the field energy required is $E = 3.99 \times 10^{11}$ J, whereas the energy actually available in the homopolar generator was only 16.3×10^6 J. The huge discrepancy rules out explanations in terms of experimental errors. The only reasonable conclusion one can draw from the experiment is that the momentum given by the Poynting vector divided by c^2 is not real momentum.

There exists another electrodynamic theory for currents in metallic conductors [4]. It was in wide use in Europe during the 19th century. The basis of the theory was developed by Ampère in France and F E Neumann in Germany. The author recently published a full review of the Ampère-Neumann electrodynamics of metals(5)* with 20th century extensions. Like Newtonian gravitation and mechanics, it is an action-at-a-distance theory resting firmly on the empirical basis provided by Coulomb, Ampère and Faraday. There appear to be no experiments on record which conflict with the old electrodynamics of metallic conductors. In many cases the latter makes the same predictions as relativistic field theory. However, when considering ponderomotive and electromotive interactions between parts of the same metallic circuit, the two theories disagree. The electrodynamic impulse pendulum and the railgun fall into the area of disagreement.

Ampère's law for the ponderomotive force between current elements places the railgun recoil force in the rails [5] just behind the armature, as indicated in figure 1 by the two $F/2$ forces. Longitudinal recoil forces in the rails almost certainly would have a detrimental influence on gun performance. In the Deis experiment the maximum current was 2.1 MA resulting in a maximum force on the armature of $F = 2.4$ MN. Hence the recoil force in each rail might at some time have been as large as 1.2 MN or approximately 122 ton-weight. The rails have to be held in position with somewhat flexible insulating materials, and a free passage must be

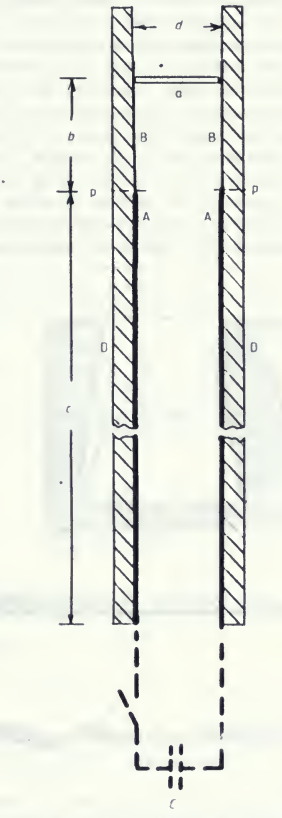

Figure 2. Railgun recoil experiment. (A), thick rails; (B), thin rails; (D), Wooden side boards; (p), anchor pins at rail joints; (a), stationary armature, (S), switch; (*C*), 8 μF, 100 kV capacitor bank; $b = 30$ cm; $c = 200$ cm; $d = 25$ cm.

*of the Ampere-Neumann electrodynamics of metals(5)

kept open between them. These conditions make it nearly impossible to prevent lateral deflections of the rails if the amperian recoil mechanism is active. Rail buckling would cause interference with the progress of a solid armature and projectile. Transient and permanent rail deformation that could have been produced by amperian recoil forces have been reported in [6] and [7].

The author devised the simple experiment shown in figure 2 to provide direct proof of rail recoil buckling, as predicted by Ampère's force law. The experiment can be easily repeated in any laboratory possessing a suitable capacitor bank. As shown in figure 2, the rails were supported on the outside by wooden boards (D) so that transverse forces on the rails could not deflect them outward. The main portions of the rails (A) consisted of 0.5 inch high, 0.05 inch thick copper strips secured to the wooden boards up to 30 cm behind the stationary copper armature (a). The last 40 cm of the rails consisted of much thinner strips (B) which were of the same height as the thick rails. Both aluminium and stainless steel was used for the thin rail extensions. The latter were pinned at (p) to the thick copper rails and boards. A 0.5 inch diameter copper rod formed the armature (a) and was in light contact with the thin rails.

An 8 μF capacitor bank, charged to various voltages up to 80 kV, was discharged through the railgun set-up in which the rails were spaced 25 cm apart. Current pulse amplitudes varied up to 100 kA. With sufficient current to heat the thin rail portions to within a few hundred degrees of their melting points, the strips (B) were found to deform plastically in two buckling modes.

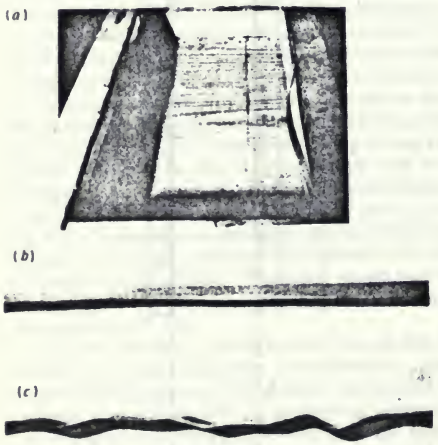

Figure 3. Buckling of thin rails (B): (*a*), inward deflection of aluminium rails; (*b*), steel rail before recoil experiment; (*c*), steel rail after recoil experiment.

They retained their distorted shapes during cooldown for subsequent inspection and photography. The simple inward deflection of figure 3(*a*) was obtained with aluminium rails. Steel rails buckled in concertina fashion as can be seen in figure 3(*c*). When the thin rail extensions were not perfectly aligned with the copper rails, the recoil forces would push the extensions up or down, making them pivot about the pinned joints.

The rail extensions were free to expand thermally in the lengthwise direction without being impeded in any way by the copper rod armature. This was confirmed by anchoring the projectile, not allowing it to move forward, and then observing the elongated arc marks on the rails produced by thermal expansion. The existence of the arcs themselves proved the absence of solid metallic contact between the rails and the armature.

Following the discovery of electromagnetic jets in liquid metal and wire fragmentation by pulse currents [5], the railgun recoil demonstration is the third group of experiments in which the Lorentz force law fails to account for the observed ponderomotive forces in metallic conductors. All three groups involve reaction forces between parts of an isolated circuit. This is precisely where the Ampère–Neumann electrodynamics disagrees with relativistic field theory. The success of Ampère's force law in relation to metallic conductors in no way challenges the Lorentz force when the latter acts on charges drifting in vacuum, as in particle accelerators and virtually all nuclear physics experiments. It was Lorentz who had to ignore Ampère's law in order to explain the behaviour of ions, and particularly electron beams, in vacuum. He then proposed that an electron moving through the metal lattice was magnetically equivalent to an electron moving with constant velocity in vacuum [8]. Surprisingly, in spite of the very different circumstances in metal and in vacuum, this assumption held good until the difficulties with reaction forces on metallic circuit components surfaced. There is now cause to re-examine what represents a metallic current element.

The author is indebted to Michael Visone of Northeastern University for building the apparatus for the recoil demonstration and assisting with the experiments.

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LETTER TO THE EDITOR

Railgun recoil and relativity

J E Allen

Department of Engineering Science, University of Oxford, Oxford OX1 3PJ, UK

Received 27 April 1987

Abstract. A recent communication on railgun recoil and relativity is refuted.

In a recent paper with the above title Graneau (1987) calculates the energy associated with certain railgun experiments, using relativity theory. In these calculations, however, the author displays a misconception concerning electromagnetism and relativity. An expression was correctly quoted for the electromagnetic momentum associated with the Poynting vector, namely

$$P = \frac{1}{c^2}\int (E \times H)\,\mathrm{d}V. \qquad (1)$$

The author then assumes, however, that this momentum is equal to that acquired by the projectile. This is not the case, the electromagnetic momentum being a much smaller quantity. This may be demonstrated as follows.

Let us consider, for simplicity, a constant current source feeding a planar system. The inductance of the system will be given by $L = \mu_0 tx/w$ where the dimensions are shown in figure 1. The electric field is given by $E = \mu_0 Iv/w$ and the magnetic field by $H = I/w$. Hence the magnitude of the Poynting vector $EH = \mu_0 I^2 v/w^2$ and the associated electromagnetic momentum is

$$P = \mu_0 I^2 vtx/wc^2. \qquad (2)$$

The energy in this problem is $LI^2 = \mu_0 I^2 tx/w$, half of which is stored in the magnetic field, so the associated mass is $\mu_0 I^2 tx/wc^2$ according to the theory of relativity. We see from equation (2) that the momentum can be associated with the velocity v and not c ($v \ll c$).

If we consider the energy stored in one of the experiments cited by the author (16.3 MJ) the associated mass according to the theory of relativity is E/c^2 which is 1.8×10^{-10} kg. Clearly this is a minuscule amount and the associated momentum will be very small compared with that of the heavy (0.317 kg) projectile.

Turning to Graneau's own experiments (Graneau 1987), I observed a similar effect during some early experiments with high currents (Allen and Craggs 1954). When a current of the order of 200 kA flowed through a thin copper strip (by mistake!) the latter was crumpled by magnetic forces. Such forces always tend to increase the inductance of a flexible system.

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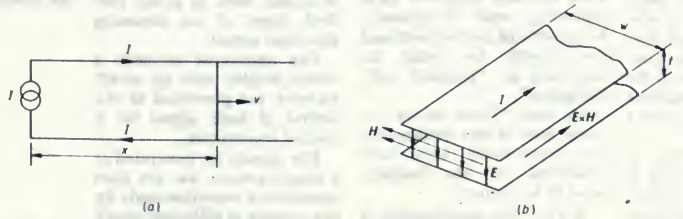

Figure 1. A schematic diagram of the railgun considered in this Letter; (*a*) illustrates a railgun fed by a constant current source; the projectile has moved a distance x; (*b*) shows a planar or strip-line system of rails.

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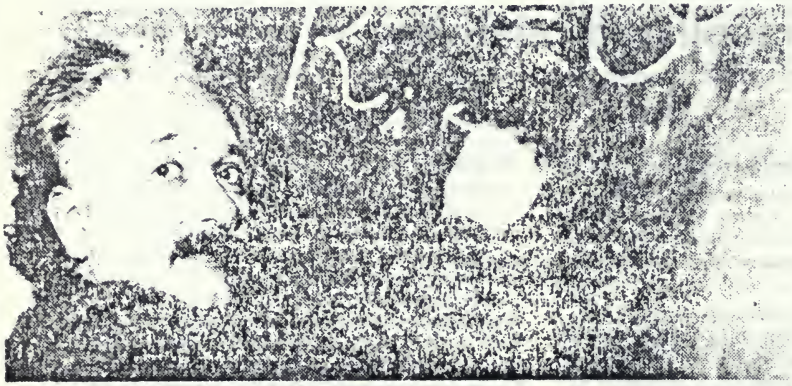
TECHNOLOGY



Albert Einstein — the inventor of the theory of relativity that is now being challenged

Is travel faster than the speed of light possible?

By Pearce Wright

The result of an experiment that contradicts one of the basic tenets of science is stirring controversy in the world of research. The discovery challenges the "scientific fact" taught to every schoolchild that nothing can travel faster than light.

The idea goes against Einstein, striking the foundations of modern physics which he helped lay. Yet the heresy suggesting that the light barrier may be broken, in much the same way as it is now accepted that the sound barrier can be broken, is published in the latest issue of the prestigous monthly magazine *Electronics and Wireless World*.

It describes a series of measurements made with a special electronic circuit, showing that electrical signals can travel faster than light.

Alleged discoveries that suddenly refute tried and tested knowledge often end up in a less illustrious publication known as the *Journal of Irreproducible Results*. In this case, there is no difficulty in repeating the research. The problem lies in explaining away the results.

The experiments into "superluminal velocities" were conducted on apparatus built by an American instrument maker, Alexis Obolensky, who designs high-performance electronic equipment for industrial research and defence applications for a company called Bromion Laboratories.

British expert, Dr Harold Aspden, research fellow at Southampton University and former senior scientist at the IBM Hursley Research Laboratories, near Winchester, has examined the methods and the results for what he described as "possible self-deception".

He said "There is no obvious flaw in the equipment; the experiments were well conducted and the findings seem to be correct".

In fact, the investigation is relatively straightforward. It is based on a novel scheme devised by Mr Obolensky for analysing the type of electrical signals that could comprise the pulses used for the transmission of telephone conversation or computer data. The idea for the experiment was prompted by a group of astronomers from the Max Plank Institute who reported tracking a number of galaxies which appeared to be travelling faster than than the speed of light.

Mr Obolensky believed the effect giving rise to the observation might be reproduced in the laboratory.

But the experiment in measuring events of a millionth of millionth part of a second has only been possible because of the latest advance in very sensitive electronic analysers used to detect ther first signs of an incoming electrical signal.

The apparatus includes a visual display unit on which pictures are presented of the arrival of each signal for a distant transmitter.

The signals are generated at a single source, but are then transmitted simultaneously by two circuits of differing length to the receiver where they are analysed. The measurements show that just before the main transmitted pulse arrives, there is a simultaneous arrival of a small signal from both circuits. It is about 1 per cent of the energy of the main signal travelling behind it, and it has to be travelling at twice the speed of light.

Mr Obolensky suggests that there are two modes by which the signals are propagated. The main one carrying most of the energy is the normal form of transmission recognized for such a circuit.

The faster small electrical pulse was found "by looking for a type of signal that nobody has bothered to look for because they would not expect to find it," he said. He has offered no theory to explain the findings.

CORRESPONDENCE

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

10 June 1988

Dr. M. C. Duffy
Mechan. Eng. Deptm.
Sunderland Politechnic
Chester Road
Sunderland SR1 3SD

Dear Dr. Duffy,

Today, returning from a short trip to London, I found in my post the appeal of the Conference PHYSICAL INTERPRETATION OF RELATIVITY THEORY, sent by my Italian friends.

I should like very much to take part in that conference. If I had information on the conference before flying to London, I could even visit you in Sunderland.

I send you the proofs of an article which will appear on the 18 August in NATURE. I was in London for discussions with Dr. Maddox and for the preparation of the proofs.

I think, it will be good to publish this paper earlier with relevant information on your conference presented by NATURE (Dr. Maddox). This will stir the public opinion and make your conference more representative. Also you (or other persons from the organizing committee) can appear on the pages of NATURE before the conference. Thus, I think, it will be good if you will write a letter to Dr. Maddox, informing him about the conference and suggesting the publication of a couple of materials on the "physical interpretation of relativity theory" before the conference.

You certainly know that my friend A. Maco has organized a Conference on Relativity and Gravitation in April in Munich (the appeal was published on the 17th December 1987 on p. viii in NATURE).

Then my friend R. Monti organized a conference in Bologna (the program is enclosed) and my friend U. Bartocci organized a similar conference with almost the same participants (only Aspden did not come) and some others in Perugia.

Please, write me whether Prof. Prokhovnik (whom I visited in 1986 in Sydney) will come to the conference.

If my participation will be accepted, my speech will be based on the material presented in the enclosed paper.

Hoping to hear soon from you,

Sincerely yours,

S. Marinov

Stefan Marinov

Physical Interpretations of Relativity Theory

LONDON: SEPTEMBER, 1988

The British Society for the Philosophy of Science is sponsoring an international conference, of three days' duration, "PHYSICAL INTERPRETATIONS OF RELATIVITY THEORY", to review the development, status, and potential of the various physical interpretations of the Relativistic Formal Structure. It is planned to open on Friday, 16th September, and to close on Monday, 19th September, 1988. The location will be Imperial College, London.

SECTIONS INCLUDE:

"Physical Time and Relativity"
"Privileged Reference Systems in Modern Physics and Cosmology"
"Relativity and the Nature of the Physical Vacuum"
"Ether Theory in the late 20th C."
"Relativity, Cosmology and Physical Theories of Related Phenomena"
"Experimental Aspects of Relativity"
"Formal Structures, Physical Interpretations and the Philosophy of Modern Physics"

The organising committee includes Prof. C. W. Kilmister (London); Dr. P. Kroes, (Eindhoven); Dr. T. Sjodin, (Brussels); S. J. Prokhovnik, (New South Wales); Dr. S. V. Clube, (Oxford); Dr. M. F. Podlaha, (Munich); Dr. T. Morris, (N.P.L. Teddington); Dr. J. Whealton, (Oak Ridge, USA); Prof. G. Spinelli, (Milan); Prof. S. Bergia, (Bologna); and M. C. Duffy, (Sunderland).

For more information, contact
Conference Co-ordinator: M. C. Duffy,
Mechanical Engineering Dept., Sunderland Polytechnic,
Chester Road, Sunderland SR1 3SD, U.K.
Tel: 091 567 6191 Ext. 107

STEFAN MARINOV
Morellenfeldgasse 13
A-8010 GRAZ — AUSTRIA

Dr. M. C. Duffy
Mechan. Eng. Departm.
Sunderland Polytechnic
Chester Road
Sunderland SR1 3SD

5 August 1988

Dear Dr. Duffy,

On the 10 June I wrote you a letter that I should like to take part in the Conference PHYSICAL INTERPRETATION OF RELATIVITY THEORY, to be held in London in September, but I did not receive an answer from you.

Please, be so kind to inform me whether my letter reached you and whether you have written me. As there is no much time until September, I beg you to inform me whether my participation is accepted and I beg you to send me more detailed information (participation charge, hotels, program).

Yesterday I spoke with Dr. Maddox (he was in his house in Wales) and he said me that my paper will be postponed for the 13 October, as Dr. H. Bondi intends first to appear in NATURE on the problems raised by me. Let me inform you that when Bondi said in Bologna in May in his speech that "We realized that there is a preferred direction in space, but until now we cannot establish this in the CLOSED laboratory", I shouted from the audience: "This is not true: in this room there are TWO persons who have done this - Silvertooth and me". Then I had a vivid discussion with Bondi, Sciama e tutti quanti.

I informed my friend Pappas about your conference. He is now in the States and he wrote me that on the way back he will visit the conference. If you are interested, I can bring many other persons to your conference (also from the SU - in Munich I have invited Dr. S. Pankratov, the Editor of NAUKA I ZHIZN', a scientific popular journal with edition of 3,500,000 copies, where in the last issues there was a big discussion on "relativity" between Prof. Logunov (the Rector of the Moscow University and Vice-President of the Academy of Sciences), supporter of the flat space, and Prof. Ginsburg, supporter of the curved space; Pankratov is an assistant of Logunov).

Write me if you need some support from me for the conference.

Hoping to receive your answer as soon as possible,

Sincerely yours,

S. Marinov

Stefan Marinov

PS. In July I was in Linden, near Bern, where I saw the first functioning PERPETUUM MOBILE in the world. I can present some information at the conference without touching some details which I am not allowed to make public.

Editorial note. The answer of Dr. Duffy is given in his letter of the 1 September 1988.

OPTICS LETTERS
A publication of the Optical Society of America

August 11, 1988

Dr. Stefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Graz, AUSTRIA

Re: MS #599A *Silvertooth's Experiment for Measuring the Aether Drift is Inconclusive*

Dear Dr. Marinov:

We are returning your paper along with the reports of our reviewers.

It appears best to give you a chance to respond to their comments before we proceed.

We will be happy to give a revised manuscript further consideration.

Sincerely yours,

P. L. Kelley

PLK/jkc

Enclosures

Editorial note. The reports of the first and second referee and the relevant Marinov's comments follow this paper. The final decision of Dr. Kelley is given in his letter of the 16 November 1988.
The above paper was submitted to OPTICS LETTERS exactly in the form in which it appeared in TWT-I, third edition, p. 287.

P. L. Kelley, Editor P. A. Rogers, Assistant to the Editor
Mail: Optics Letters, MIT Lincoln Laboratory, Lexington, MA 02173-0073
Telephone: 617-276-6733 Facsimile: 617-276-6721

QUESTIONS

MS # 5995
REV # 1

SCIENTIFIC CONTENT

1. Is the paper of good scientific quality? Is it an original and significant contribution?

   No. No.

2. Is the paper clearly written? Are the assumptions clearly stated and procedures adequately outlined?

   Yes. Yes.

3. Is the paper reasonably self-contained?

   Yes.

4. Are values given for all the important experimental parameters? Are the numerical data backed up by a description sufficient for procedure replication and critical assessment?

   Yes. No.

5. Is the work placed in proper context with related work?

   Yes.

6. Does the title identify the subject matter clearly?

   Yes.

7. Is the abstract sufficiently informative, concise, and clear?

   Yes.

8. Are the tables and figures well used and effectively presented?

   Yes.

SUITABILITY FOR *OPTICS LETTERS*

1. What is novel, stimulating, or newsworthy about this work? (Explain below.) Does the author make this clear?

   The only novel idea is the author's new "quasi-Michelson exp."*

2. If you question the novelty of this work, can you cite references?

3. Would rapid publication affect the research of others?

   No.

4. Would this Letter interest a substantial part of the optics community?

   No.

5. Is there a more appropriate journal for this article? If so, which?

   Yes. Spec. Sci. Techn.

COMMENTS (If necessary, put on separate page and write See Attached here)

See Attached

*But from the statements in lines 4-7 on page 4, the results appear to be not very good.

Check if the revisions you request should be optional ___ or mandatory ___. Assuming revision, where required, by the author(s), please indicate your recommendation below.

	X		
Strongly against publication in *Optics Letters*		Neutral	Strongly for publication in *Optics Letters*

OPTICS LETTERS
Report of the first referee

Referee's Report

The so-called 'absolute space-time theory' does not have the fundamental four-dimensional symmetry and, hence, is incompatible with all high-energy experiments and particle physics. Thus, it is not interesting to analyze any experiment on the basis of this theory.

The statements in lines 7-10 (from bottom) on page 1 is correct if and only if the observer (or wave receiver) is at rest in the absolute space. If the observer is co-moving with the moving light source, then these properties are simply not true.

The statement " suppose now that frame K is set into motion in absolute space with a velocity V..." (line 9, p.2) appears to imply that the laser in Fig. 1 is also moving together with the mirrors M_3 and M_4. If this is the case, then the equations (3) cannot be applied because there is no (relative) motion between the laser and M_3 (or the laser and M_4).

The statements and reasonings in the second and the third paragraphs on p. 3 are model-dependent. They are in general incorrect. This can be seen by considering a counter-example, say, the Voigt transformation (see 'Theory of Relativity' by W. Pauli, p.1, ref 1 and eq. (1) on p.3):

$$A'_x = A_x - VA_0/c, \quad A'_y = A_y(1-V^2/c^2)^{\frac{1}{2}}, \quad A'_z = A_z(1-V^2/c^2)^{\frac{1}{2}}$$

$$A'_0 = A_0 - VA_x/c \; ; \qquad (A^\mu = x^\mu, \; k^\mu, \text{ etc.})$$

where the absolute rest frame K is characterized by the fundamental space-time tensor $g_{\mu\nu} = \eta_{\mu\nu} = (1,-1,-1,-1)$ and the moving frame K' with the absolute velocity V is characterized by $g'_{\mu\nu} = \eta_{\mu\nu}/(1 - V^2/c^2)$. The framework based on such a transformation has both the properties of the four-dimensional symmetry and the absolute space. This transformation is consistent with the Michelson experiment and will have a second-order effect in the Kaahi-Wiener experiment.

If the author is really interested in the absolute space, whatever it is, he should work out all physical implications of the Voigt transformation.

QUESTIONS

MS # 599A
REV # 2

SCIENTIFIC CONTENT

1. Is the paper of good scientific quality? Is it an original and significant contribution?
   difficult to judge without revisions.
2. Is the paper clearly written? Are the assumptions clearly stated and procedures adequately outlined?
   no - what is the "absolute space-time theory"?
3. Is the paper reasonably self-contained?
   no - see 2.
4. Are values given for all the important experimental parameters? Are the numerical data backed up by a description sufficient for procedure replication and critical assessment?
   no - results of quasi-Michelson experiment are not clear.
5. Is the work placed in proper context with related work?
   yes.
6. Does the title identify the subject matter clearly?
   Only partly - see detailed comments.
7. Is the abstract sufficiently informative, concise, and clear?
   Only partly - see detailed comments.
8. Are the tables and figures well used and effectively presented?
   yes.

SUITABILITY FOR *OPTICS LETTERS*

1. What is novel, stimulating, or newsworthy about this work? (Explain below.) Does the author make this clear?
   Expected null result for previous experiment.
2. If you question the novelty of this work, can you cite references?
3. Would rapid publication affect the research of others?
   Yes.
4. Would this Letter interest a substantial part of the optics community?
   yes - it brought up to proper standards.
5. Is there a more appropriate journal for this article? If so, which?
   no.

COMMENTS (If necessary, put on separate page and write See Attached here)

see Attached.

Check if the revisions you request should be optional ___ or mandatory X. Assuming revision, where required, by the author(s), please indicate your recommendation below.

	X	
Strongly against publication in *Optics Letters*	Neutral	Strongly for publication in *Optics Letters*

OPTICS LETTERS

Report of the second referee

Referee Report

on

MS #599A

"Silvertooth's Experiment for Measuring the Aether Drift is Inconclusive

by

Stefan Marinov

Although the title and abstract of this paper only refer to the Silvertooth experiment, the author actually attempts to do two things. The first is to criticize the Silvertooth experiment to measure absolute velocity on the grounds that it should yield a null result. The second is to promote his own work on this subject, and answer earlier criticisms of his work by Kelly (ref. 11).

First, concerning the Silvertooth experiment, the derivation of the expected null result appears to apply only within the context of the author's "absolute space-time theory", which certainly must be at least as subject to question as the standard special theory of relativity. The author should state the principles on which his theory is based, especially since the references he gives are not widely available, and make it clear that his expected null result may not apply in other theoretical frameworks. In addition, it is not clear why, on p. 4, the author at first saw an effect in his quasi-Michelson experiment, but then later changed his mind.

Second, concerning the Kelly paper, the author dismisses this carefully written and well-reasoned work rather lightly. The criticisms are certainly not too complicated to be addressed in a short note. In addition, Kelly does not conclude that the author's experiment "cannot give a positive effect", as stated on p. 7, but rather that a positive effect corresponds to the indeterminate case where clocks are not resynchronized after acceleration. It is certainly not adequate to speculate what the results other people's experiments will be when they try to repeat the author's work.

Finally, concerning the style, the overall tone of the paper is excessively polemical. If the author prepares a revised version which addresses the above points, he should confine himself to a carefully reasoned argument, and avoid making personal remarks concerning himself or others.

OPTICS LETTERS
Ms 599A, Rev. No. 1

MARINOV'S ANSWER TO THE COMMENTS OF THE FIRST REFEREE TO THE PAPER
"Silvertooth's experiment for measuring the aether drift is inconclusive"

The referee writes that my "absolute space-time theory does not have the fundamental four-dimendional symmetry and, hence, is incompatible with all high-energy experiments and particle physics." The referee makes this assertion only because he has not seen my encyclopaedic work CLASSICAL PHYSICS, where I calculate the results of all important high-velocity experiments (including, for example, the angular distribution of the synchrotron radiation, the radiation damping, the high-velocity collisions of particles, etc.). I work intensively with the 4-dimensional formalism. But I show that there are TWO substantially different invariances: the Lorentz and the Marinov invariance. The first is to be used when the OBSERVED particle changes its velocity, while the second is to be used when the OBSERVER changes his velocity. According to the principle of relativity the effects in these two cases must be the same, but according to the experiments of Kennard (1917), Sagnac (1913), Dufour and Prunier (1943), Müller (1984) and according to my numerous experiments the effects in these two cases are different. Kennard's, Müller's and my experiments have shown that if a wire moves with a velocity $\mathbf{v}$ in the field of a magnet where the magnetic potential is $\mathbf{A}$, then the induced electric intensity is $\mathbf{E} = \mathbf{v} \times \mathrm{rot} \mathbf{A}$. However, if the magnet is at rest and the wire moves the induced intensity is NOT $\mathbf{E} = -\mathbf{v} \times \mathrm{rot} \mathbf{A}$, as it is according to the principle of relativity but $\mathbf{E} = (\mathbf{v}.\mathrm{grad})\mathbf{A}$. If the scientific world has until now not realized this TREMENDOUS difference, it is only because my papers are systematically rejected by the journals.

The referee writes that a source moving in absolute space deforms (contraction or dilation) the emitted light waves only if the observer is at rest in absolute space. This is a TREMENDOUS error done by the relativists. The lengths of the emitted waves do NOT depend on the observer. According to the referee a ship sailing in the lake will contract the waves propagating forwardly only if the observer is at rest in the lake, but if the observer is on another ship sailing with the same velocity, there will be not contraction. No, no, no! The terrible mess in physics began with the introduction by Einstein of the "observer", meanwhile one has to "observe" the physical phenomena so as "God" sees them. When proceeding from my absolute point of view light kinematics becomes a stuff for children, as it is so simple. I hope that soon when the results of my experiments will be accepted by the scientific community the relativistic SCHOLASTICISM will disappear as a nightmare.

The referee's conception that the wavelengths are RELATIVE quantities leads him to the conclusion that equations (3) can be not applied if there is no RELATIVE motion between the laser and M_3 (M_4). As ω in the moving laboratory remains as in absolute space, then if λ will also remain the same, then by force c must also remain the same. But c in the moving laboratory is DIRECTION DEPENDENT, and the conclusion which is to be made by force is that λ is also direction dependent.

The referee asserts that there is a second order effect in the quasi-Wiener experiment. I show in the paper (p. 4) that if a second order directional depending effect would exist in the quasi-Wiener experiment, then the Michelson-Morley experiment would lead to NON-NUL result. My speculations are entirely clear and logical, so that there is NO experimental ground to assert that the quasi-Wiener experiment can have directional depending second order effects. The Wiener experiment and the Michelson experiment are very tightly connected. For this reason I could develop the quasi-Michelson experiment from the quasi-Wiener experiment.

There is NO way to measure a light wavelength. One can measure only the lengths of STANDING WAVES. When the laboratory with source and mirror moves in absolute space (with respect to the AETHER), the standing wave which STAYS in the laboratory moves as a SOLID BODY with respect to any other frame, and thus with respect to absolute space. The forth and back waves propagating in the moving laboratory have DIFFERENT lengths, but the lengths of the waves in the standing wave are EXACTLY THE SAME as when source and mirror are at rest in absolute space and one measures the lengths of the standing waves in absolute space. The length of a standing wave does not depend on the observer. There is a moving source and a moving mirror, light is sent forth and back, the rays interfere, the standing wave is built. During the whole this procedure the observer does not take part. The result of the interference (blacking of strips on a film) must be the same for a film at rest in the laboratory and for a film at rest in absolute space if one can "activate" the latter for times MUCH SHORTER than the period of light and with a frequency EQUAL to the frequency of light (or to this frequency divided by an integer number).

I repeat, the difference between standing waves in a moving laboratory and in absolute space is only one: in absolute space the electric vector at the antinodes achieves its maximum at all antinodes SIMULTANEOUSLY, while in the moving laboratory NON-SIMULTANEOUSLY.The relevant formulas are given in the paper (p. 4).

Editorial note. Marinov's comments to the referees' opinions are sent with a short letter to Dr. Kelley of the 20 August 1988. For saving space the letter is not reproduced.

OPTICS LETTERS
Ms 599A, Rev. No. 2

MARINOV'S ANSWER TO THE COMMENTS OF THE SECOND REFEREE TO THE PAPER
"Silvertooth's experiment for measuring the aether drift is inconclusive"

I preserved the title as it is, as one cannot give in a short title the contents of a paper. But I followed the advice of the referee and I enlarged the text of the abstract, so that from this text one becomes aware that I not only present and criticize Silvertooth's experiment but that I present a variation of Silvertooth's experiment executed by me which I called the "quasi-Michelson" experiment, preserving for Silvertooth's experiment the name of a "quasi-Wiener" experiment. I did not introduce in the abstract information that in the paper I give also a short answer to Dr. Kelly's criticism to my "rotating axle" experiments, as in this case the abstract should become too long.

To evade reference to my absolute space-time theory, I analyse Silvertooth's and the quasi-Wiener experiment accepting equalities (3) as "axiomatical". It is impossible in such short letter to state the principles of my theory, as my absolute space-time theory enters in the fundamentals not only of the kinematics of light but of whole physics and shows that a good deal of the today's electromagnetic concepts are simply WRONG.

I agree with the referee that my theory is not widely available (although I have about 50 publications), but this is not my guilt, as I submit papers to all physical journals of the world but only few are accepted. To bring the results of my theory and experiments I published paid advertisements: Nature, **317**, p. xii (26 Sept. 1985), Nature, **322**, p. x (21 August 1986), New Scientist, **112**, 48 (1986). More can I not do. My books are acquired by few of the American universities. One can read about my theory and RECENT experiments only by buying my books.

In the revised paper I explain clearly why I first saw effects in my quasi-Michelson experiment which I, follwoing Silvertooth, also attributed to the absolute velocity of the laboratory, although I have developed my theory of the quasi-Wiener experiment in my book EPPUR SI MUOVE, published in 1977, and came to the firm result that the effect must be null.

Following the suggestion of the referee I showed why Kelly's criticism is not well-reasoned. The relativists, ... after so many years, do not realize that a moving (or rotating) rod MAKES A NEWTONIAN TIME SYNCHRONIZATION. And when I perform experiments with rotating axles and when I obtain effects, the relativists make as if my experiments do not exist.

I introduced some changes in the text, following the referee's suggestion, to avoid certain personal remarks concerning myself and others.

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

22 August 1988

Dr. Robert Romer
AMERICAN JOURNAL OF PHYSICS
222 Merill Sc. Bldg.
Box 2262
Amherst College
Amherst
MA 01002

Dear Dr. Romer,

I submit to the AJP the following papers

1. LATE DISCOVERY OF THE MOTIONAL-TRANSFORMER INDUCTION.
2. THE MYTHS IN PHYSICS.
3. MAXWELL'S DISPLACEMENT CURRENT DOES NOT GENERATE MAGNETIC FIELD.
4. PHYSICAL ESSENCE OF THE MAXWELL LORENTZ EQUATIONS.

The PACS numbers of all papers is: 03.50.De, 41.10.Fs.

All eventual charges will be paid by myself.

Herewith I transfer the copyright for these papers to the AJP.

I submit papers to the AJP since the time of Forest I. Boley. The total numbers of the papers submitted until now comes to about hundred. All these papers have been rejected. Many papers have received referees' reviews but a good amount of the papers was rejected with the motivation that my papers are RESEARCH and not DIDACTIC papers. If you have the files for the papers received by the AJP in the last 20 years, you can see the titles of the papers submitted by me.

You are a new editor of the journal. I wish to try my luck with you. Maybe you will find that my papers are written exactly according to the style of the AJP and you will accept them for publication. The "research" character of my papers consists in the following: I treat exactly the same problems which are discussed in the AJP, I use the same clear and simple physical and mathematical language, I give always experimental confirmation of the "theoretical" conclusions. The difference between my papers and the other papers which are routinely published by the AJP is only one: my papers are adequate to the physical reality, while the routinely published papers are in many aspects not. I do not understand why two papers written exactly in the same style on the same problems are to be treated as "research" and "didactic" papers only because the one is adequate to the physical reality and the other not.

I submit papers also to the "research" journals. Although I have published until now about 50 papers (only in FOUND. PHYS. about 10), I publish my papers with VERY GREAT DIFFICULTIES. I issued three volumes of the collection of documents THE THORNY WAY OF TRUTH where I present many of the rejection letters and referees' comments on rejected papers (many of which then have been published). All these documents show the dificulties which I meet with the editors of the journals.

I beg you, before sending my papers to a reviewer, or before writing a letter for "automatic" rejection, to read all submitted papers. They are very easily readable and the stuff is highly exciting. The experiments which are there described can be extremely easily repeated. Be not afraid to publish these papers. You can, of course, attach some note of "doubt", but do not deprive the large readership of the AJP of the possibility to learn about my experiments, of the machine TESTATIKA, etc.

I consider the AJP as the BEST physical journal in the world. Such was FOUND. PHYS. some years ago (let me note that I began to publish papers in FOUND. PHYS. after its late editor, Prof. Yourgrau, visited me in Sofia; Prof. van der Merwe published then some papers of me, but then he wrote me that "for the time being" he must stop with the publication of further papers).

Please, acknowledge the reception of this package. I send you only one copy of the papers, as I doubt that you will send the papers to TWO referees. I should suggest, however, that you send the papers to TEN referees. But first, read the papers without jumping "from page to page". Any man who has finished physics in some university of the world can be a referee of my papers, as the TRUTH IS AMAZINGLY SIMPLE.

PS. Enclosed are two "routine" rejection letters to the first paper.

Sincerely yours,

S. Marinov

Editorial note. The answer of Dr. Romer is given in his letter of the 30 September 1988.

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

Проф. И. Е. Дзялошинскому
Письма в ЖЭТФ
ул. Косыгина 2
Москва 117334

22 августа 1988 г

Глубокоуважаемый Проф. Дзялошинский!

Спасибо за Ваше письмо с 11-го июля, с которым Вы окончательно отвергли мое письмо в ЖЭТФ "Нарушение третьего закона Ньютона...", хотя отклонение статьи не было приятным для меня.

Тот мотор я еще не построил, ибо, видно, Вы не заинтересовались узнать, будет ли он крутиться или нет, так как, видимо, Вы уверены, что он не будет крутиться /речь идет о моторе, скицированным в фиг. 3 моей отклоненной статьи/. Так как, с другой стороны, я абсолютно уверен, что он будет крутиться, мне просто неинтересно терять время и деньги на его постройку /живя в волчей пасти капитализма, я финансирую всю мою экспериментальную деятельность из собственного кошелка/.

Но на базе этого моторчика я построил другой, который, во-первых проще и дешевле, во-вторых КУДА ДИКОВЕННЕЙ! Этот мотор я назвал ВРАЩАЮЩИМСЯ МОСТОМ АМПЕРА. Он работает НАРУШАЯ закон сохранения углового момента. Не верите? Конечно, не верите. Но статейки, которые теперь посылаю прочтите-ка, и если есть сынишка у Вас старше 18-ти лет и смышленым мальчишкой, дайте ему статью в руки, даже ничего не объясняя /конечно сынышка должен уметь по английски читать/. Сынышка Ваш все смастерит , не спрашивая долго какой там Ньютон, что сказал.

На базе вращающегося моста Ампера можно построить и ЛЕТАЮЩИЙ МОСТ АМПЕРА. А им не только сынышка Ваш заинтересуется, а и те, что народные деньги тоннами керосина из ракет выбрасывают, чтобы пару килограммов груза "на орбиту" поднять.

Так что, будьте добры повнимательнее мои теперь посылаемые статьи прочесть, а потом их и толковым рецензентам дайте.

Письма, которые я теперь направляю в ЖЭТФ следующие:

1. LATE DISCOVERY OF THE MOTIONAL-TRANSFORMER INDUCTION.
2. MAXWELL'S DISPLACEMENT CURRENT DOES NOT GENERATE MAGNETIC FIELD.
3. EXTREMELY EASY EXPERIMENT DEMONSTRATING VIOLATION OF THE ANGULAR MOMENTUM - CONSERVATION LAW.

В случае принятия статей, я в течение дня изготовлю русские переводы /тут на Западе, хоть и глотки не дерем, но не только с ускорением, а и со супер-ускорением /третья производная пути по времени, термин мною введенный - см. КЛАССИКЭЛ ФИЗИКС/ работаем/. С переводами вышлю и фотографию моего вращающегося моста Ампера.

Буду чрезвычайно рад, если Вы мне пошлете уведомление о получении статей, а потом и в обычном для журнала для быстрой публикации сроке также и Ваше окончательное решение.

С коммунистическим приветом:

Стефан Маринов

ПП. Порекомендую послать мои статьи на рецензию Акад. Сахарову, который меня хорошо знает, хотя все еще мою физику что-то боится принять. /Слова Андрея Дмитрича: "Меня, конечно, можно переубедить, но тру-у-у-дно."/

Editorial note. The answer of Dr. Dzialoshinski is given in his letter of the 13 October 1988.

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22 August 1988

Dr S Marinov
Morellenfeldgasse 16
A-8010 Graz
AUSTRIA

Dear Dr Marinov

TITLE: Elastic collisions of particles in absolute ...
AUTHORS: S MARINOV

Your Paper submitted to Classical and Quantum Gravity has now been refereed.

We regret to inform you that the referee has recommended that your Paper should not be published in this journal for the reasons given in the enclosed report. We are therefore returning your typescripts.

Yours sincerely

Linda M Richardson
Staff Editor
Classical and Quantum Gravity

Editorial note. The above paper was published exactly in the form in which it was submitted to the JOURNAL OF PHYSICS A in the PROCEEDINGS OF ICSTA (International Conference on Space-Time Absoluteness, Genoa, July 1982), p. 68, and on different pages of Marinov's encyclopaedic book CLASSICAL PHYSICS, part III.

BOARD MEMBER'S REPORT

Referee's report on "Elastic Collisions of Particles in Absolute Space"

By S. Marinov

I have a considerable number of objections to this paper, and it would not be useful to list all of them. My overall conclusion is that this paper is not acceptable for publication.

Let me mention just one or two of my objections. Section 1 purports to obtain "Newtonian" effects, but appeals to formulae from some theory of the author's own. The derivation of (6) is incorrect; due to a premature assumption that $\underline{V} = \underline{V}'$. The absolute space effects of the author's theory are introduced crucially in equation (7): since eqquation (9) would therefore not hold in other theories, it is not surprising that this "has not been noted". That it has never been noted in experiments seems a fatal blow to the theory! The concluding remarks of this section show a curious osallation betweeen ignoring and allowing for the very slow motion of the heavy particle. One should either include it consistently or ignore it consistently .

The arguments of sections 4, 6 and 7 have appeared in separate articles by this author which have been rejected by your journal. Surely they are no more acceptable as the subject of sections of another paper. The later comments (Section 9) are polemical rather than scientific, but it should be noted that the author's claims of confirmation of his formula would be strongly disagreed with by moat physicists including this reviewer.

The very lengthy and tedious analysis of various situations in the later parts of the paper are of little significance, and also re-capitulate material the author has attempted to present before.

Marinov's note. The later comments in Section 9 of polemical rather than scientific character are the following:

"Let me mention that I already suggested to the grant institutions of the world[3] to stop any financial support to experiments which have to establish whether there is a difference between "inertial" and "gravitating" masses. All experiments of this kind are senseless as an "inertial" mass does not exist. The mass is only gravitational as the time energy of the particles is their world gravitational energy (see Sect. 1)

Now, I permit some POLEMIC to be added: The stupidity of the scientists is an important factor leading to waste of public money. A democratic society must never permit that stupid people decide how public money is to be invested in science. The way for chasing away stupid scientists from leading position was invented recently by a sly Russian called (in English translation) Michael Backman. This way is called in Russian GLASNOST.

nature

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London WC2R 3LF
Telephone 01-836 6633
Telex 262024

22nd August 1988

Dr Stefan Marinov
Morellenfeldgasse 16
A-8010 GRAZ
Austria

Dear Dr Marinov

We have safely received your proof corrections and the revised figure.

We do not produce the final pages of an issue of Nature until about 10 days before the date of publication. This is because we do not know until then whether we will be starting on a left or right-hand page, which could influence the way we do the layout. Also we do not have page numbers until then, and our typesetters are better employed working on the issues that are finalised.

Thus an article appearing in Nature is never available in a "Final Form", including volume and page numbers, until just before publication. I appreciate that you had hoped for a 'final version' sooner, but the schedules on a weekly are tight and we have to abide by them.

Yours sincerely

Mr Charles Wenz
Production Editor

Editorial note. This letter concerns the paper "Experimental violations of the principles of relativity, equivalence, and conservation of energy and angular momentum" which until the date of the publication of this book is still blocked by Dr. Maddox. The last galley proofs of the paper are published on p. 146 of TWT-III, second edition.

JOURNAL OF APPLIED PHYSICS **APPLIED PHYSICS LETTERS**

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August 22, 1988

Dr. Stefan Marinov
Morellenfeldgasse 16
A-8010 Graz
AUSTRIA

Dear Dr. Marinov:

Subj: Mss. "Maxwell's Displacement Current Does Not Generate Magnetic Field," and "Extremely Easy Experiment Demonstrating Violation of the Angular Momentum Conservation Law"

You have submitted your manuscripts to the wrong journal. We only publish papers on applied physics. As yours are concerned with basic matters, they should be submitted elsewhere.

I am returning them herewith.

Sincerely yours,

Gilbert J. Perlow

GJP/ko
Encls:
2 Manuscripts

Editorial note. The first of the above papers is published in TWT-I, third edition, p. 317, the second in this volume.

Annales de l'Institut Henri Poincaré
PHYSIQUE THÉORIQUE • THEORETICAL PHYSICS

Rédacteur en chef
Editor in chief

Pierre COLLET
Laboratoire de Physique
Théorique
École Polytechnique
F-91128 PALAISEAU Cedex
FRANCE

August 29, 1988.

Prof. S. Marinov
Morellenfeldgasse 16
A - 8010 Graz
Autriche

Dear Sir,

The editorial committee of the Annales de l'Institut Henri Poincaré (Physique Théorique) has considered for publication your paper "Violations of the laws of conservation of angular momenty and energy". However it appears that this paper is more than half experimental, and therefore does not correspond to the editorial policy of our journal which publishes only theoretical contributions.

Sincerely yours,

P. COLLET.

Editorial note. The above paper is published on p. 33 of TWT-III, second edition.

gauthier-villars

Publié avec le concours du CNRS

SUNDERLAND POLYTECHNIC

From:-

M. C. Duffy
Conference Co-ordinator
Mechanical Engineering Dept.,
Sunderland Polytechnic
Chester Road
Sunderland, SR1 3SD
United Kingdom

1st September 1988

To:-

Dr. S. Marinov
Morellenfeldgasse 16
A - 8010
GRAZ
Austria

"PHYSICAL INTERPRETATIONS OF RELATIVITY THEORY"

Dear Dr. Marinov,

Forgive me if I speak plainly and at some risk to hurting your feelings, but I fear that it is my duty to do so as a member of the Organizing Committee and as the Conference Co-ordinator.

It is quite impossible for you to participate in the above conference, which is due to take place in September at Imperial College.

For one thing, it is much too late to permit any additions to the programme, which has been long finalized. You have not registered. You have submitted no abstrac You have paid no registration fee. The conference is now some two weeks away, wit all accomodations booked, and with the papers printed, bound and duplicated, so it i too late by several months for you to offer a contribution.

Not only this, but you have clearly totally failed to understand the nature of the planned meeting, which was deliberately organized to review those theories which accept the accuracy of the Relativistic Formal Structure, and which provide some physical interpretation of it. There is no place in our programme for papers which claim that Relativity is in error, and which advocate such unorthodox notions as a conspiracy to preserve errors in physics, and (as you mention in your latest letter and phone call) perpetual motion machines.

The conference was never intended to discuss such matters, and apart from the fact that it is too late to change the programme, any contribution dealing with them would have been firmly rejected.

Continued.....

I cannot stress too strongly the plain fact that your work has no place in our programme. It is not relevant to the matters we intend to discuss. It was stated quite clearly in the Conference Brochure that all contributions of a polemical, anti-Relativity nature would not be accepted.

The conference organizing committee is quite familiar with your work, and we all judge it to be outside the subjects which we intend to review. It has no bearing on the theme which delegates have paid to hear discussed, and therefore it must be afforded no place in the meeting.

Remember, Dr Marinov, that the organizing committee is perfectly entitled to decide who addresses the meeting, and who does not. It is perfectly entitled to decide which papers are accepted and which are rejected. During the actual meetings, the chairman has absolute authority to control the questions asked from the floor, and to terminate any discussion which is going on for too long, and which is not relevant to the conference theme.

If you find these restrictions too much to bear, the remedy is obvious - set about organizing your own conference, with its speakers, papers and published proceedings, but don't try to make use of other people's meetings, organized for some different end, to publicize your own theories which are unwelcome at such meetings.

It would be better for you not to attend the Imperial College Meeting. You are not entitled to do so, as you have not registered or paid the fees, and I must emphasize that I will not accept late registration or a cheque for the fees at this stage.

It is my duty to point out that should you present yourself at the Meeting at Imperial College in September, you will be excluded on the perfectly reasonable grounds that you are not entitled to be there, and that your offered participation has been clearly rejected by the Committee.

If necessary, I shall call on the Imperial College security staff to exclude you from the meeting, as I will tolerate no interruption of a scientific meeting which it has taken two years to prepare.

Please note that any attempt by you to register will be rejected.

Any trip which you make to London to attend this conference will be in vain, and will be for you a waste of time and money.

Please take my advice, Dr. Marinov: Organize your own conference, with your own programme of invited speakers, your own publicity, at a place of your own choosing, made up of contributions which you have yourself refereed - but stop trying to make use of meetings organized by others, where you are simply not welcome.

I am quite determined about the points made in the above letter, and I advize you to heed them and avoid the inconvenience of a wasted journey to London in September.

yours sincerely

M. C. Duffy

Marinov's note. Ибал си е веко англичанино. Пише ти черно на бяло, че ако му идеш на гости, ще извика полицай да те изхвърли на улицата, и подписва писмото с yours sincerely. Лордове бе, лордове с лачени патъци, само да им се двериш.

L. Di Lella
Editor
Modern Physics Letters A
Int. Journal of Modern Physics A

Dr. Stefan Marinov.
Inst. for Fundamental Physics
Morellenfeldgasse 16
A - 8010 Graz
Autriche

2 September 1988

Dear Dr. Marinov,

I am returning to you herewith one copy of your paper

The Myths in Physics

which you have submitted for publication on the International Journal of Modern Physics A (as usual, I keep one copy for my file).

Once again, I regret to inform you that the referee's report has been negative. In summary, because of many fallacies and misinterpretations of experimental facts contained in your paper, it was recommended to reject it.

Let me now add a few personal comments:

1. The isotropy of light velocity is demonstrated daily here at CERN by the fact that our high-energy accelerators work successfully. This is perhaps the most convincing proof that special relativity is correct. This does not mean, however, that photons must have the same frequency in all reference systems, or that the length of an optical path is a relativistic invariant. The fact that laser gyros work is not in contradiction with the principles of relativity.

2. It is a pity that the TESTATIKA machine is connected to the electrical network of Linden. Even if I went there, I am sure that I would find it difficult to know if the 3 kWatts claimed in your paper are being indeed produced and not absorbed by the machine. During my career, I was

confronted with two similar claims, and in both cases the machine stopped working when it was disconnected from the network. Since 3 kWatts are equivalent to about 4 HP, may I suggest that the machine is used to provide energy to a water pump or a lawn mower, with no connection whatsoever to an energy source. Then, if it still works, you call the press and everybody will be happy (with the exception of oil producers and builders of power plants). I am rather surprised that no ecological group has been informed of the existence of such a machine, which would solve, of course, a large number of environmental problems.

3. It would seem to me that an appropriate journal for your ideas is the American Journal of Physics. Prompted by your papers, I have looked at this journal over the last few weeks, and I have found many unconventional ideas published in it. Have you tried to submit your papers there?

In conclusion, I would be grateful if you submitted no further paper on similar subjects to the International Journal of Modern Physics.

Sincerely yours,

L. Di Lella

Editorial note. Marinov answered this letter of Dr. L. Di Lella with his letter of the 9 September 1988.

PHYSICS LETTERS A

PROFESSOR V.M. AGRANOVICH
Institute of Spectroscopy
USSR Academy of Sciences
Troitsk
Moscow 142092
USSR

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ - AUSTRIA

5 сентября 1988 г.

Глубокоуважаемый доктор Маринов!

В ответ на Ваши письма от 17 июня и 22 августа 1988 г. сообщаю Вам, что Ваши статьи находятся у рецензентов, которые хотят основательно разобраться в них и, как я выяснял, продолжают заниматься этим. Вы просите меня сообщать Вам мое решение: я не могу отправить статью в ФИЗИКЛ ЛЕТТЕРЗ, пока не буду иметь положительного отзыва рецензентов, так что я вынужден ждать их заключения.

С уважением,

V. Agranovich

Профессор В.М.Агранович

TRANSLATION

Dear Dr. Marinov,

Answering your letters of the 17 June and 22 August 1988, I inform you that your papers are with the referees. The referees wish to scrutinize them thoroughl and, as I have established, continue to do this. You ask for my decision: I cannot send a paper to PHYSICS LETTERS (Агранович, бедняга, еще названье журнала им редактируемого не выучил и пишет Physical Letters) before having a positive opinion of the referees, so that I must await for their conclusions.

Sincerely yours,

Prof. V. M. Agranovich

Marinov's note. Уже 70 лет собирается русский медведь американца обогнать. А что обогнать, бежать надо, язычок в поту высунуть, а не над чепуховым статьями, языком для младенцев писаньми, месяцами дрыхнуть. Впрочем будьте, медведи, спокойньми: и физревцы, и те над моими статьями годами мозгуют.

NORTH-HOLLAND PHYSICS PUBLISHING ★ P.O.B. 103 ★ 1000 AC AMSTERDAM ★ THE NETHERLANDS
Cables: ESPOM Amsterdam — *Telex:* 10704 espom nl — *Telephone:* 020 - 586 29 11

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

5 September 1988

When dispatching from
England, my TELEFAX is:
0043/316/77560

To TELEFAX: 0044/1/8297615

NEW SCIENTIST
Advertisement Department
1-19 New Oxford Street
London WC1 1NG

Dear Sirs,

During my visit at your Editorial Office in June this year, I settled the problem that if I shall need to publish quickly some advertisement, you will effectively collaborate with me.

Now I send you the text of the following ONE-PAGE advertisement (with a drawing and a photograph) which I should like to publish on the 15th September.

Please, be so kind to confirm TODAY to my above given TELEFAX whether this will be possible and inform me about the sum which I have to send you. As the transfer of money takes some time, I shall send you by a telefax tomorrow a copy of the payment document which my bank will issue, so that you can be sure that the money is on the way to London. Give me your exact bank account to which the money is to be sent. After receiving your confirmation today, I shall dispatch to you the text of the advertisement by an express letter with the drawing and the photograph, begging you, immediately after use to send the photograph back to me. When the text will be composed (if possible exactly as it will appear in the journal), send it to me by a telefax, so that I can correct the errors if there will be such. I shall then on the same day send you the corrected text by a telefax.

Print the advertisement exactly in the same style as my advertisement on p. 48 in vol. 112. Make the figures as small as necessary, so that the text can fit to one page. And do not forget to send me one (better, two) issues of NEW SCIENTIST where the advertisement will be published.

You can introduce some grammar corrections but for changes of the text you have to ask for my consent.

If you would like to verfify the authenticity of my conversations with Dr. Duffy, you can phone to him at the phone 091 567 6191 (Ext. 107).

I do not know the phone of Prof. Bondi, but you can obtain it from the Secretary of Dr. Maddox at the London phone 240 2015.

Send me the name of the person whom I have to contact by phone and his direct phone number.

Sincerely yours,

St. Marinov

Stefan Marinov

MARINOV TO THE PARTICIPANTS OF THE AETHER CONFERENCE

The Conference "Physical Interpretations of Relativity Theory" sponsered by the British Society for the Philosophy of Science will meet on the 16 - 19 September 1988 at the Imperial College, London. All members of the organizing committee are people supporting the aether concepts and there is no single orthodox relativist who categorically denies its existence. The organizer is Dr. M. C. Duffy who intended to visit the International Conference on Space-Time Absoluteness[1] which had to meet in 1977 in Bulgaria but was prohibited by the Bulgarian government and 20 days before its beginning I was imprisoned in a psychiatric clinic where, after a bargain with representatives of the Bulgarian Academy of Science and the Bulgarian KGB, I "bought" my freedom by consenting to cancel the conference because of a "fear for an earthquake"[2].

In due time I submitted my contribution to Dr. Duffy but my letter was not answered. After two months I wrote another letter, which also remained unanswered. Then I wrote to Prof. Kilmister, the head-member of the organizing committee, with whom I was in correspondence some 10 - 15 years ago, but neither this letter was answered. Then I phoned to Dr. Duffy who told me that my letters have been received but as there are too many speakers, there is no time available for me. I said: "You, Dr. Duffy, know very well that I am world's patriarch in space-time absoluteness. It is an absurdity that now when a conference will meet where the word "aether" will be no more pronounced with the same hatred as the word "trotzkist" in the SU I remain again deprived of the possibility to speak as this was always the case at the conferences of the orthodox relativists."[3,4] "I am sorry but there is no time for you, indeed." "Can I then visit the conference without being a speaker?" "You are welcomed." But a couple of days later I phoned again: "Look, Dr. Duffy, if I shall be *persona non grata* at that conference, tell me this openly, so that I spare my time and money." "Yes, Dr. Marinov, was the answer, you are *persona non grata* and it will be better if you would not come." "Can you, please, tell me the reasons for this ostracism?" "The reasons are that if you will come, then many other scientists will refuse to participate." I thanked Dr. Duffy for his sincerity and said him shortly what I now present in a written form as a message to all participants at the conference and to the whole scientific community:

The fundamental theoretical basis of special relativity is the principle of relativity and of general relativity the principle of equivalence. I showed with my *rotating axle experiments* that both these principles are *wrong* (see references in ref. 4). When Prof. H. Bondi spoke at the conference "Modern Cosmology in Retrospection" (Bologna, May 1988) he said: "Following Einstein we thought that there is no privileged frame in our world but in the last years we understood that this categorical assumption was wrong There is a privileged frame but there are no experiments establishing its existence locally." I shouted from the audience: "This is not true! I did many times such experiments measuring the Earth's absolute velocity in a closed laboratory, the first time in 1973, publication in 1974, and you, Prof. Bondi know this pretty well:" Prof. Bondi remained half a minute with open mouth but then continued to speak without answering my apostrophe. In a conversation after his speech I said to Prof. Bondi, who confirmed

that he is well acquainted with my experiments: "If you know that such experiments have been carried out and you say publicly that such experiments do not exist, this is a lie. If you do not believe in the results of my experiments, you have to do one of the following two things: 1) to show theoretically that my experiments must have a negative outcome, or at least to declare that according to you the outcome must be negative, or 2) if according to your theoretical expectations the outcome must be positive but you doubt whether my experiments are well done, to reveal their experimental flaws. This is science, Dr. Bondi, all other what one does at the relativity conferences is a twaddle."

But the absolute character of our space and time leads to much more drastic results, of vital importance for the energetic and ecological survival of mankind, than the academic measurement of the Earth's absolute velocity. Proceeding from the absolute space-time concepts, I showed that in any textbook on electromagnetism after one truth follow two lies. So I discovered the motional-transformer induction $\mathbf{E} = (\mathbf{v}.\mathrm{grad})\mathbf{A}$, appearing in a wire at rest if a magnet generating the magnetic potential $\mathbf{A}$ moves with a velocity $\mathbf{v}$.[3,4] Those who like Einstein, the orthodox relativists and the leading group of the "aetherists" at the Imperial College defend the sacrosanctity of the principle of relativity are *unable* to write a formula for the induced electric intensity in the above *childishly simple* case spitting to the aether and jumping from the frame in which the problem is posed to a frame in which the magnet is at rest and the wire moves with a velocity $-\mathbf{v}$ write the *completely wrong* value $\mathbf{E} = -\mathbf{v}\times\mathrm{rot}\mathbf{A}$. Proceeding from the motional-transformer induction, I constructed my machine MAMIN COLIU which violates the energy conservation law.[3,4]

Then I constructed my BUL-CUB MACHINE WITHOUT STATOR which violates the angular momentum conservation law. An information on this machine will be published in my six-pages paper which will appear on the 13 October 1988 in NATURE.

Here I should like to inform the participants of the conference about another machine constructed by me, called the ROTATING AMPERE'S BRIDGE which also violates the angular momentum conservation law and whose theory (see the drawing) and practical execution (see the photograph) is a stuff for 16-years old children.

In the drawing I show the forces perpendicular to the axis ABGH acting on the current elements of the wire ABCDEFGH. Easily can be seen that the net moment of all these elementary forces about the axis ABGH is zero, as is the case for any closed or unclosed current wire with a rotational degree of freedom. I exchanged the conduction currents along the paths BC and FG by "displacement currents" replacing the wires BC and GF by two cylindrical capacitors filled with barium titanat ($\varepsilon = 10^4$). According to Maxwell (and according to all professors in our world) the displacement current generates magnetic forces and "absorbs" magnetic forces generated by other currents. This assumption, however, is a *tremendous lie*, as to assert that one can set in motion the vacuum between the plates of a capacitor, putting it in a magnetic field, is the same *idiocy* as to try to ride the shadow of a horse. Thus in my rotating Ampere's bridge the forces along the paths BC and GF (as well as along CD and FE) *disappear* and the whole system comes into continuous rotation when alternating current from the mains is conducted to the two axles taken from an old alarm clock on which the bridge is suspended.

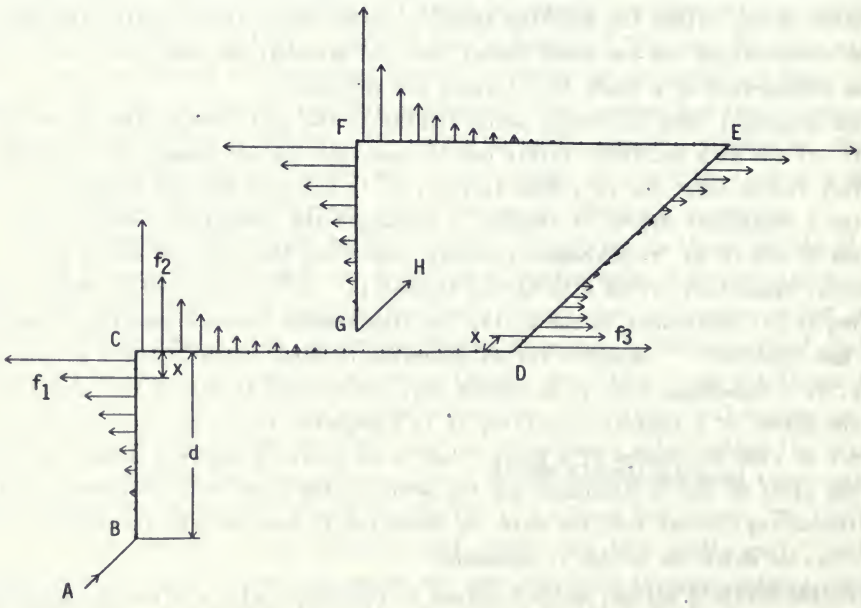
My FLYING AMPERE'S BRIDGE, which I intend to construct, will violate the momentum

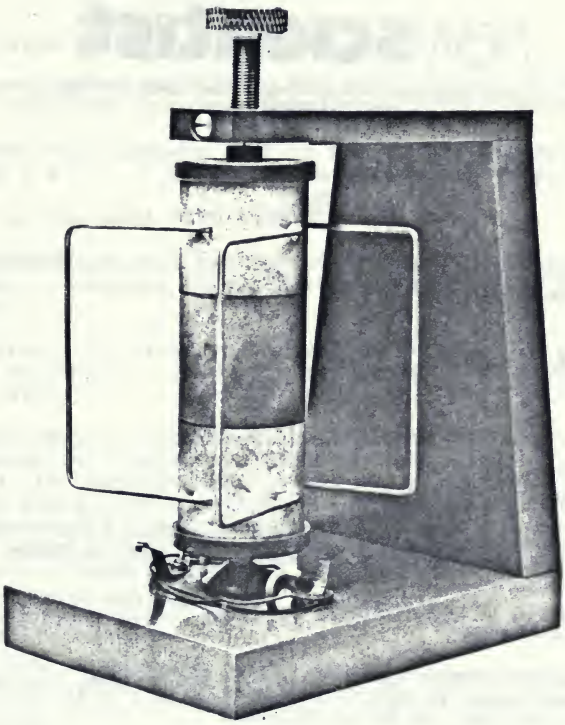
conservation law. The flying Ampere's bridge is a rectangular wire, the one side of which is replaced by displacement current. Let me note that Ampere has mastered his floating bridge few years after Oersted's discovery that current wires attract and repel one another; it represents a Π-form wire swimming in two troughs of mercury to which direct or alternating curent is conducted. Applying the Grassmann (1845) formula for the interaction of current elements (I do this for my rotating Ampere's bridge in the drawing), any child comes to the conclusion that the historical Ampere's bridge moves under the action of internal forces but there is no single professor in the whole world who defends this opinion.

And now some of the participants of the aether conference are afraid to have me between them and to see all my *childishly simple* but *unbelivably fantastical* experiments which in a couple of years will change the whole life on our planet. Poor souls! But even if I will be not present at the Imperial College, my shadow, like Banquo's ghost on Macbeth's feast, will be there and if some of the participants, like Prof. Bondi, will begin to spread misinformation, their tongues will be on the spot petrified.

Stefan Marinov
Morellenfeldgasse 16, A-8010 Graz, Austria

1. S. Marinov, New Scientist p. 662 (23 Sept. 1976).
2. V. Rich, Nature **271**, 296 (1978).
3. S. Marinov, Nature p. x (21 August 1986).
4. S. Marinov, New Scientist **112**, 48 (1986).





Additional note.

The above machine which I called the ROTATING AMPERE'S BRIDGE rotates under the action of internal forces, as the current is conducted along the axes of suspension. This is a WONDER, as the sacrosanct law of conservation of angular momentum is violated.

I visited Acad. Sakharov in Moscow on the 29 October 1987 to inform him about my experiments violating the laws of conservation. After explaining the principles of action of my machines, I said to Acad. Sakharov the following: Увидеть тело, вращаемое внутренними силами, это для физика большее чудо, чем для христианина увидеть Святую Богоматерь. (To see a body rotated by internal forces is for a physicist bigger wonder than for a Christian to see Saint Mary.) One can see on the first page of NEW YORK TIMES of the 7 November 1987 how its Moscow correspondent has presented to the world my visit at Sakharov.

newscientist

Commonwealth House, 1-19 New Oxford Street, London WC1 1NG
Telex: 9157 48 MAGDIV G
Switchboard: 01-404 0700

FAX

6th September 1988

Mr. Stefan Marinov,
Morellenfeldgasse 16,
A-8010 Graz,
AUSTRIA.
Fax No: 0043 316 77560.

Dear Mr. Marinov,

Please find attached the amendments to your copy which I shall require prior to carrying your advertisement in New Scientist on 15th September.

Some of the alterations are grammatical. No alterations have been made to your technical references.

Please note I am not prepared to allow quoted references to individuals and consequently must insist no reference is made to Dr. Duffy, and that references to Prof. Bondi have been amended accordingly.

Yours sincerely,

Phil Abrahams
Display Advertisement Manager

Marinov's note. In a phone conversation with Mr. Phil Abrahams, he told me that he has spoken with Dr. Duffy.

I said to Mr. Abraham that the numerous amendments suggested by the Editor of NEW SCIENTIST makes the publication of this advertisement senseless and I renounced to the publication.

REQUIRED AMENDMENTS TO ADVERTISEMENT
COPY TO BE CARRIED IN ISSUE DATED
15TH SEPTEMBER

Ref. your telefax 5.9.88

a) Change heading to: MARINOV TO THE PARTICIPANTS OF THE PHYSICAL INTERPRETATIONS OF RELATIVITY THEORY CONFERENCE.

b) Delete from "All members ..." to the end of the following paragraph i.e. " ... to the whole scientific community."

This may be replaced with the following wording:

"Having been requested not to attend the 1988 conference, I now present a message to all delegates and to the scientific community:"

c) With reference to paragraph "The fundamental ..." delete from "He said following ..." to "is a twaddle." This may be replaced with:

"In a conversation with Prof. Bondi at the Modern Cosmology in Retrospection Conference (Bologna, May 1988) I claim he confirmed his acquaintance with my experiments. I said that if he was aware such experiments had been carried out, yet suggested publicly that no such experiments existed, then this was wrong of him. If people do not believe in the results of my experiments they should do one of two things:-

(1) Show theoretically that my experiments must have a negative outcome, or

(2) - and if, according to theoretical expectations the outcome should be positive - to reveal any flaws in my methods."

d) With reference to paragraph commencing "But the absolute ...", delete:

"childishly simple" and,

"spitting to the aether and".

e) With reference to paragraph commencing "In the drawing ..." alter

"Easily can be seen" to read

"It can easily be seen."

f) Same paragraph: delete "a tremendous lie" and replace with the word "wrong".

g) With reference to paragraph commencing "My flying Ampere's Bridge ..." delete "any child" and replace with "anyone".

h) Delete final paragraph in its entirety. If you wish it may be replaced with the statement:

"For further information, write to Stefan Marinov ..."

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

INSTITUT D'ASTROPHYSIQUE

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TÉL 43 20 14 25. TÉLEX 270070 SU CNRS

LE DIRECTEUR

INTERNATIONAL JOURNAL OF MODERN PHYSICS

JA/MCP/533

Paris, September 8, 1988

Dr Stefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Graz, Austria

Dear Dr Marinov,

I finally received the referee report concerning your paper: "Silvertooth's Experiment for measuring the Aether Drift is inconclusive". The answer's referee is that your paper should appear (if suitable for publication) in the same journal as the paper of Dr Silvertooth. I will strictly follow his advice and therefore will not accept it for publication in Modern Physics Letters.

Sincerely yours,

Jean Audouze

REFEREE REPORT: Silvertooth's experiment for measuring the aether drift is inconclusive.
Stefan Marinov

This paper is a criticism of an experiment (or more precisely the interpretation of an experiment) of Silvertooth (ref 1). In my opinion, the paper should be submitted for publication to the journal in which Silvertooth's paper appeared (Spec. Sc. Tech.). In that journal the paper will receive the widest possible audience, and Silvertooth would have the opportunity to reply to the criticism. That procedure is consistent with the standards of the field.

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

9 September 1988

Prof. L. Di Lella
Int. Journal of Modern Physics
CERN
CH-1211 Geneve 23

Dear Dr. Di Lella,

Thank you very much for your letter of the 2 September with which you declined my paper THE MYTHS IN PHYSICS and closed the doors for my papers.

This is my last effort to show you that I have discovered TREMENDOUSLY IMPORTANT EFFECTS and that my papers are to be published as soon as possible. If this effort will fail, then I have also to close the doors to your journal as I have closed the doors to almost all physical journals in the world.

Enclosed see my book THE THORNY WAY OF TRUTH, Part III (TWT-III), the second edition of which I received today from the printer. There you will find (on p. 166) an answer to your question from item three of your letter, namely whether I have tried with the AMERICAN JOURNAL OF PHYSICS. To this journal I have sent in the last 20 years at least 100 papers, but no one was published.

You will find in TWT-III also the correspondence with you and with other physical journals which still answer my letters. You can see that it is impossible for me to break the resistance of editors and referees, although there is no SINGLE their objection which might be right. Absolutely all objections of the referees are WRONG, including all objections of your referees. If you cannot see this, then I am asking whether you have eyes.

Now to your objections in the last letter:

1. How can you affirm that the isotropy of light velocity is confirmed dayly in CERN?! The only thing which you confirm dayly in CERN is the Newton-Lorentz equation (19) from TWT-III, p. 35, nothing else. You say that light velocity is isotropic, but on a rotating disk it is not isotropic. Or according to you alo on a rotating disk light velocity is isotropic? Thus answer, please, clearly, is light velocity isotropic on a rotating disk, or not? You consent that on a rotating disk it is anisotropic, yes? O. K. Make then the radius of the disk 10^{100} km. Will it remain isotropic? Yes, it will? - But a frame rotating along a center with such a big radius is practically inertial as there will be no possibility to establish experimentally that such a frame has a centrifugal acceleration. Per favore, Dottore Di Lella, I work with these problems for 40 years. And I beg you, don't begin with the stupid questions about synchronizations of clocks etc. --- I measured the Earth's absolute velocity with three different apparatus. If you have some objections, read my papers, appear then with a criticism in the press. NOBODY from the camp of the relativists has criticized me in the press, as everybody knows that one is unable to attack me.

2. Now you make the objection that if TESTATIKA is not connected to the electrical network in Linden, it will not work. Why you take me for a fool? Have I demonstrated with my writings that I am so stupid? --- The machine works absolutely alone and produces heat. It is not connected directly to the electrical network as it produces direct current. It charges batteries, and then the current from the batteries, after making it alternative and with tension 220 V, is sent to the electrical net of the village. The community has also wind generators which supply electrical energy to the village. --- You are surprised why ecological groups have not been informed. The reason is that the machine is invented in a religious sect which considers humanity as unripe to use this source of energy and it is not interested to reveal its principle of action. You can find information on that machine on pp. 264 and 265 of TWT-III. But the Swiss government KNOWS about the machine. Ask (in the name of CERN) directly the Swiss government and you will see which answer will you receive.

But you reject my paper, as a matter of fact, with the following comments at the beginning of your letter: "In summary, because of many fallacies and misinterpretations of experimental facts contained in your paper, it is recommended to reject it." --- WHICH are the fallacies, WHICH are the misinterpretations!? You don't say, because you cannot give even a SINGLE example. All objections raised in your previous letters were shown by me to be WRONG. Thus I beg you to present OBJECTIONS to my paper THE MYTHS IN PHYSICS. And when I shall show that these objections are untenable, you have either to confirm their untenability or to show that my counter-objections are not right. This the way of SCIENCE. Any other way is a way of suffocation of the scientific truth. Hoping to receive your answer soon,

Yours:

THE PHYSICAL REVIEW

AND

PHYSICAL REVIEW LETTERS

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13 September 1988

Dr. Stefan Marinov
Morellenfeldgasse 16
A-8010 Graz, AUSTRIA

Re: The fundamental equations in
electromagnetism and gravimagretism

By: Stefan Marinov SV3607A

Dear Dr. Marinov:

We regret to inform you that your manuscript is not considered suitable for publication in the Physical Review. We are therefore returning your manuscript.

Yours sincerely,

C. Lewis Snead, Jr.

C. Lewis Snead, Jr.
Associate Editor
Physical Review A

enc.

Editorial note. The above paper is published in this volume (p. 30). Marinov has answered the above letter with his letter of the 1 January 1989.

europhysics letters

Editor in Chief
Dr. N. Kurti
University of Oxford
Dept. of Engineering Science
Parks Road
Oxford OX1 3PJ U.K.
Tel: +44 865 273115 (Direct)
273000 (Switchboard)
Tx: 83295 NUCLOX G Fax +44 865 272400

Staff Editor
Mrs Ch. Bouldin

Business Manager
Mr. G. Thomas

P.O. Box 69
CH - 1213 Petit-Lancy 2
SWITZERLAND
Tf: (022) 93 11 30
Tx: 428 024 (eps ch)
Cables: europhys genève

24 September 1988.

Dr. Stefan Marinov,
Morellenfeldgasse 16,
A-8010 Graz, Austria.

Dear Dr. Marinov,

This is in reply to your letter of 22 August. I enclose the views of a colleague of mine who has spent a considerable time in finding and pointing out your errors. I accept his judgment and my decision is not to publish your paper. Nor do I want to involve my colleague in arguments with you - it was most kind of him to spend so much time on this task. So please do not send me counter-arguments - I shall not forward them to him.

As to the Methernitha community: You mentioned in a previous letter that my colleague in whom I have confidence (this is not the same as a confident colleague) needs a personal introduction from you to enable him to visit the community. Could you please ask the leader of the community, or whoever is responsible for the remarkable installation which produces electrical power from nothing, to write to me giving details of the installation's performance and an undertaking that my colleague would be able to inspect the plant and its immediate surroundings and see it in operation. I will then ask my colleague to get directly in touch with Methernitha. Methernitha can write to me in German; I'll understand it.

I have looked in vain for your article in Nature - did I overlook it?

Yours sincerely,

N. Kurti

N. Kurti.

Editorial note. Marinov's answer to the above letter and partly to the enclosed referee's comments is given in Marinov's letter of the 30 September.

The paper rejected by Dr. Kurti has the title "Late discovery of the motional-transformer induction" and is published in TWT-I, p. 303.

As Dr. Kurti did not allow to Marinov to present objections against the referee's criticism, Marinov did it in the paper "Absolute and relative Newton-Lorentz equations" published in this volume (p. 101).

Those are the comments of the EUROPHYSICS LETTERS referee on the paper "Late discovery of the motional-transformer induction" by Stefan Marinov

---

Paper by Stefan Marinov

My apologies for holding on to the paper for so long. As soon as you gave it to me I had a house-wiring crisis, which was only just cleared up when I went on holiday for two weeks. However I took the paper to France with me and gnawed at it for a bit. I haven't a fully worked refutation, but I'm sure I know what the problem is.

Basically, magnetism is an "order v/c" phenomenon. So when Marinov moves a coil with velocity v he is creating a system that requires analysis up to order v^2/c^2. Relativity is essential, even if v is small! I'm sure that, given time, I could meet the challenge on his page 3, of working out the fields in the lab frame when the coil moves. But I'd either need a relativistic treatment using four-vectors, or an expansion-approximation method working to order v^2/c^2. It's obvious he rejects relativity, and won't accept a complicated argument, so there's no hope of persuading him of his mistake.

Here are some detailed notes that clarify the problem.

1. Centre of page 4. Marinov states that: if the circuit moves the force on a test charge $= -(v.\nabla)A$, while if the charge moves the force is $v \times \mathrm{curl} A$. This *can't* be acceptable, because it assumes you have an absolute frame of reference against which to identify the object that moves. Is he treating the laboratory as stationary? But the lab is anchored to a rotating earth, moving in an orbit, ... So what's fixed? How does the experiment change if you do it on a train? Anyone except Marinov would immediately conclude he's done something wrong, and look for a new solution.

2. Work with A and ϕ involves a choice of gauge. Marinov doesn't state what gauge he's in, but he takes it as obvious that $\phi=0$ if there is no charge density. And his (7) is calculated from

$$A = \frac{\mu_0}{4\pi} \int \frac{j}{r}\, dv \qquad \text{in a frame in which the coil is at rest.}$$

So I take it that he intends to work in the Lorentz gauge, and is therefore evaluating

$$A = \frac{\mu_0}{4\pi} \int \frac{[j]}{r}\, dv \qquad \text{where } [j] \text{ is retarded current density.}$$

In fact, his A is calculated from an *unretarded* j, so it's correct to the first order in v/c only. With his (7) you can calculate the E-field up to order v^2/c^2 but no higher. That would be enough to analyse and dispose of his thesis. But it's interesting he seems to think he hasn't approximated.

3. The solution to the main problem is in W. K. H. Panofsky & M. Phillips, *Classical Electricity and Magnetism*, Addison-Wesley, 2nd ed. (1962) chapter 18. Their discussion uses relativity and four-vectors, but that's unavoidable since we have to work to order v^2/c^2 or better. They show that charge and current transform between frames according to ($v = v_x$)

$$j'_x = \gamma (j_x - \rho v) \tag{18.56}$$

$$\rho' = \gamma \left(\rho - j_x \frac{v}{c^2} \right). \tag{18.57}$$

A coil carrying a steady current j in a circle is uncharged in its rest frame; it is *not* uncharged when observed in a lab frame relative to which it is moving. Panofsky & Phillips explain clearly why: protons in the wire move with velocity v, electrons with velocity $v+u$, and you find more electrons per length than protons because of the greater Lorentz contraction for the higher speed. Marinov's moving coil acquires an electric dipole moment, in the plane of the coil and perpendicular to v, of order vj/c^2 (Panofsky & Phillips, figure 18-4). Marinov ought to work out the (retarded) electric potential ϕ due to this electric dipole moment, and add its contribution to the electric field. It is of the same order as the quantities he retains.

4. Marinov's equation (4) is algebraically correct: $-\partial A/\partial t = (v.\nabla)A$. We can help to identify the problem by using a vector identity:

$$\nabla(P.Q) = (P.\nabla)Q + (Q.\nabla)P + P \times \mathrm{curl}\, Q + Q \times \mathrm{curl}\, P.$$

Apply this to the case $P = v$ = constant vector, $Q = A$.

$$v \times \mathrm{curl} A = - (v.\nabla)A + \mathrm{grad}(v.A).$$

The difference between Marinov's $\partial A/\partial t$ and the conventional one is connected with grad($v.A$), the gradient of a scalar. A gauge transformation cannot be very far away.

The proper way of working out E is, as I've said in item 3, to work out A and ϕ properly, and add their contributions to E. But we could gauge-transform away ϕ by adding the gradient of a scalar to A; all my instincts are that if we hammered this through, it would just supply the grad($v.A$) needed to get E to $v \times \mathrm{curl} A$.

5. Incidentally, the first expression in Marinov's equation (7) has a π omitted from the denominator.

As said, if forced, I'd work all this through, in the lab frame with the coil moving, but it would be something of a slog. So I'll do it if you ask, but would prefer to use my time on other things.

ROYAL ACADEMY OF SCIENCES
NOBEL COMMITTEE FOR PHYSICS
STUREGATAN 14
S-114 36 STOCKHOLM

September 25, 1988

Dr. Stefan Marinov
Morellenfeldgasse 16
A-8010 Graz - Austria

Dear Sir,

This is to acknowledge receipt of your communications "The Thorny Way of Truth I and III"

Yours sincerely,

Bengt Nagel
Secretary
Bengt Nagel

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

30 September 1988

Prof. N. Kurti
EUROPHYSICS LETTERS
Dept. of Eng. Science
Parks Road
Oxford OX1 3PJ

Dear Prof. Kurti,

Thank you very much for your letter of the 24 September with which you rejected my paper "Late discovery of the motional-transformer induction".

As you do not allow me to present arguments against the referee's opinion, I shall not present them. I shall only note that the referee was UNABLE to calculate the induced intensity in a wire at rest if the magnet (electromagnet with stationary current or permanent magnet) moves. Poor referee!

The referee, however, is sure that if he will work longer time, he will be able to show that the formula must be

$$\mathbf{E} = - \mathbf{v} \times \mathrm{rot} \mathbf{A}.$$

Please, be so kind at least to tell to the referee that the EXPERIMENT shows that this formula is WRONG. So if there is a rectangular loop with long sides MUCH BIGGER than the short sides and an open wire in the middle parallel to the short sides, then if moving the open wire one registers electric tension induced along its length, however if moving the loop there is NO tension. These effects are ABSOLUTE, they do NOT depend on the observer, as the induced tension is measured by the opening of leaflets attached to the ends of the wire. I submitted a paper on this experiment three years ago to Dr. Kibble but it was REJECTED. Thus the formula for the case of a moving loop (magnet) and wire at rest is MY FORMULA

$$\mathbf{E} = (\mathbf{v}.\mathrm{grad})\mathbf{A}.$$

You write that you accept the judgement of your referee and you beg me to not give counter-arguments. But need I at all to present counter-arguments? If you see a picture of Rembrandt and a picture of Picasso, do you need that one explains you that this one of Rembrandt is a master-piece and this one of Picasso is a daub? The same is with my paper and the referee's opinion. If you are unable to see the difference, then it is senseless that I present "arguments". For me you are like an aboriginal who looks at a picture of Rembrandt and of Picasso and takes this one of Picasso to hang it in his wigwam.

Thus I can only wheep seeing that in the whole world there is no SINGLE editor or referee with EYES.

Dr. Maddox postponed the publication of my paper for the 13 October. Here is an excerpt of his letter of the 29 July:

> Dear Dr. Marinov, I hope you will not think this is too disapointing a letter. As you know, we have been planning to publish your article on 18 August, but now I am afraid we must postpone it until 13 October. Here are the reasons.
> As you may have heard, we have just published a controversial article on homoeopathic medicine, followed by a sceptical report on it. There has been a great amount of interest in the general press and among NATURE's readership about the matter. I am afraid that I do not have the stomach for a second such battle in such a short time between now and 18 August.

Let us hope that on the 13 October the paper will be published. Then many doors will be opened for my papers, although my two big paid advertisements where I presented the above two formulas and the experiments confirming their veracity stirred no attention.

The community METHERNITHA is NOT interested in revealing the physical essence of the machine TESTATIKA. If I shall ask Mr. Bosshard to write you a letter, he, surely, will send you a copy of the "circular" letter which is enclosed and which he sends to anybody who wishes to receive some WRITTEN information.

The people of the community only SHOW the machine to CERTAIN people, but one does not receive any technical explanations. I should suggest that you ask the man in whom you have confidence to address the Swiss government with the question: "Is there a running P.M. in Linen?" Look then to the answer. --- I shall submit further my papers directly to the office in Switzerland.

Sincerely yours, Stefan Marinov

AMERICAN JOURNAL OF PHYSICS

Robert H. Romer, Editor
Mark D. Semon, Assistant Editor
Karla Keyes, Assistant to the Editor

Merrill Science Building, Room 222
Box 2262
Amherst College
Amherst, Massachusetts 01002
(413) 542-5792

September 30, 1988

Dr. Stefan Marinov
Morellenfeldgasse 16
A-8010 Graz - AUSTRIA

Dear Dr. Marinov:

I have examined the various papers that you recently submitted to this Journal, and after my examination of these papers I am sorry to have to say that it is my conclusion that your papers are not appropriate for publication in this Journal. I am sorry to have to decline to publish them.

Sincerely yours,

R. H. Romer

Robert H. Romer

RHR/kk

Editorial note. This is the answer of Dr. Romer to Marinov's letter of the 22 August 1988. The titles of the rejected papers (published in TWT-I and TWT-II) are given in that letter.

J. P. WESLEY, *Ph.D. Physicist*

Weiherdammstr. 24, *7712 Blumberg, West Germany,* Tel: 07702-658

2 October 1988

Dr. Stefan Marinov
Morellenfeldgasse 16
8010 Graz, Austria

Dear Stefan,

The Biot-Savart law for the force $d^2\mathbf{F}_{21}$ on current element $I_2 d\mathbf{s}_2$ at $\mathbf{r}_2$ due to a current element $I_1 d\mathbf{s}_1$ at $\mathbf{r}_1$ is usually given by

$$d^2\mathbf{F}_{21} = I_2 I_1 d\mathbf{s}_2 \times (d\mathbf{s}_1 \times \mathbf{R})/R^3, \qquad (1)$$

where

$$\mathbf{R} = \mathbf{r}_2 - \mathbf{r}_1. \qquad (2)$$

Interchanging subscripts 1 and 2 (and sign) yields an equivalent (when an integration about a closed loop is performed) force $d^2\mathbf{F}'_{21}$ on current element $I_2 d\mathbf{s}_2$ due to the current element $I_1 d\mathbf{s}_1$. Thus, a completely equivalent Biot-Savart law is given by

$$d^2\mathbf{F}'_{21} = I_1 I_2 d\mathbf{s}_1 \times (d\mathbf{s}_2 \times \mathbf{R})/R^3. \qquad (3)$$

There is no way to distinguish between Eqs. (1) and (3) based merely upon the result obtained when integrating $d\mathbf{s}_1$ or/and $d\mathbf{s}_2$ around a closed loop. Why do you happen to choose Eq. (1) instead of Eq. (3) when they are perfectly equivalent? They must, by index symmetry, both be valid; or else both must be false.

The force $d^2\mathbf{F}'_{21}$ does not, of course, equal $d^2\mathbf{F}_{21}$ (in general neither in magnitude nor direction); thus, there is no unique way of choosing the Biot-Savart force merely on the basis of the net integrated force between a closed current loop and a current element. When no integration about a closed current loop is involved, such as for the force on Ampere's bridge or the force between two moving charges, Eqs (1) and (3) yield different predictions. Thus, this again proves the absurdity of the Biot-Savart law. A valid physical law must give a unique prediction for all cases. As you know, the original Ampere law, which satisfies Newton's third law, remains valid for all cases!

Since you now say that you were mistaken in your original claim to having confirmed Silvertooth's experimental result for the absolute velocity of the solar system, and since you now say that Silvertooth was probably also mistaken; I will now forget the Silvertooth experiment. It caused me a lot of trouble, as I was never able to obtain the result with any adequate theory.

I find your confrontation with Bondi very amusing. As you may recall ~~xxryxamusingxxxAsxyouxmayxrecall~~, I had an exchange of letters with Bondi about 8 years ago. He first claimed that he would not accept the result of your coupled-mirrors experiment, measuring the absolute velocity of the solar system, until it was repeated by some one else. I then wrote to him asking him if he would supply me with a letter recommending the repetition of your experiment, which I might use to help me to obtain

financial support to repeat the experiment myself. He refused to supply me with such a letter (like refusing to support motherhood). I replied by quoting from a speech he had delivered some years before in which he said that current new experiments may be important and that they should be encouraged, etc., etc. He became so enraged that he pointedly insulted me by returning a subsequent letter with the comment on the envelope that he had not read it. Bondi is, of course, no physicist at all and only a mediocre mathematician. His refusal to supply me with a letter recommending that your experiment be repeated and his subsequent unwarranted insult were clear indications to me of 1) his incompetence, 2) his hypocrisy, and 3) his anxiety that his prestige might be compromised. Now you have proved that he is a liar as well; as, of course, he knows of your experiment measuring the absolute vleocity of the solar system (as well as the experiment of Conklin and others). Men, like Bondi, do much damage I feel.

I find your difficulties with Duffy also very amusing. Winterberg (a professor at the U. Nevada, USA), who I saw last Thursday, attended Duffy's London Conference and witnessed your expulsion from the Meeting. He did not know what was going on; but afterwards Duffy told him that you had not paid your fees and that you were going to disrupt the Conference. I feel that Duffy should have permitted your participation at the Conference despite any possible irregularities regarding late registration or fees. After all, you went to a lot of trouble to go to London with an attendent loss of time and money. In addition your important contributions and activities in space-time physics should have provided you with some extra consideration. Duffy should certainly have at least invited you to hear the talks, even if he did not want you to speak; as usually students and other nonparticipants sit in to listen. Your ejection from the lecture hall was indeed a very sorry precedence, which I hope will never be repeated. I have been with you at a number of international conferences and have never known you to disrupt any meeting. I have never even heard of your ever disrupting a meeting.

It is hard for me to understand what could have motivated Duffy. It is true that "relativity" has become a holy religion. Heretics, who dare to suggest that "relativity" might be wrong, are subject to all sorts of marrassment by the common horde of fanatical believers. Heretics seldom manage to get their theories or experiments published. Heretics do not get the professorships. Heretics are fired from their jobs. Etc. Etc. Are heretics now to be also expulsed from international conferences?

I chose not to participate in the London Conference (although I probably should have gone); because it seemed like the participants were suppose to claim that "relativity" works, and they were suppose to merely present research to show how and why it works. I do not think it works at all! It is outrageously inconsistent and contradicts all pertinent experimental fact. I simply throw "relativity" out of the window as being beneath my attention and a waste of my time. For example, Lorentz covariance requires ~~requires~~ the absurd (as discussed above) Biot-Savart law; and Ampere's empirically correct force law is not Lorenz covariant.

According to Winterberg Duffy's London Conference was quite good with

about 100 participants. Borneas of Romania writes me that he also found the Conference rewarding. He only regreted that I was not there.

It is all a bit ironic; because I find your ideas rather clase to the usual relativist's views. While, for example, I find Winterberg's ideas, based upon an eather sea of positive and negative mass particles (each of the mass of Planck's elementary mass), to be a drastic departure from the usual relativist's views.

Paul

P.S. Since you never respect the privacy of my letters to you anyway, you may as well send a copies of this letter to Bondi and Duffy.

copy to Pappas

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

4 October 1988

Dr. John Maddox
NATURE
4 Little Essex Street
London WC2R 3LF

Dear Dr. Maddox,

THIS WAS THE MOST UNKINDEST CUT AT ALL!

I have no words to give expression of my indignation. And it is senseless to wheep and to cry as you are MERCILESS.

I do not believe that you will invite me to London for a talk and pay trip and sojourn, as you promised me in our yesterday phone conversation. But I shall await for your invitation. What other have I to do? - To immolate myself? To immolate myself because you played with me as a cat with a mouse? - NO. My life is more worth then by sacrificing it to show to the world your mockery over one of the most brilliant heads in history of physics.

Now I wish that you show at least once that you have a "good will". I send you my paper "Late discovery of the motional-transformer induction", the letter of rejection of Dr. Kurti, the editor of EUROPH. LETT., the comments of his referee and my answer to Dr. Kurti. Read all these materials. Then read the paper

ABSOLUTE AND RELATIVE NEWTON-LORENTZ EQUATIONS,

which I SUBMIT to NATURE. Then publish this paper as soon as possible. In this paper there are no violations of the laws of conservation, there are no all these things which drive into your soul a panic fear. If you will not publish this paper (as a letter to NATURE) during THIS month, then it will become clear for me that you are not and never were sympathetic with me and during all these long years you simply tormented me.

All these years I believed in you. After every lie I believed and belived and believed, as if I shall lose the faith in my fellow man, I cannot live.

God bless you.

Sincerely yours,

Stefan Marinov

PS. Write me, please, whether you intend to publish all those materials (my letters to Gorbachev, the correspondence "Queer or peer", Tiomno's comments and my answer, etc., etc.) which you promised to publish AFTER the appearance of the big paper, whose publication you again POSTPONE for INDEFINITE time.

Marinov's note.

This letter was written after a phone conversation between Dr. Maddox and me in which he said that he will postpone the publication of my big paper (see p. 146 in TWT-III). Before publishing the paper he would like to have lengthier conversation with me and will invite me (paying trip and sojourn) to London. This invitation took place and I visited London in the middle of December. The big paper had to appear on the 18 August and then it was scheduled for the 13th October (see TWT-III, p. 330)..

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

Проф. И. Е. Дзялошинскому
ПИСЬМА В ЖЭТФ
ул. Косыгина, 2
Москва 117334

8-го октября 1988

Глубокоуважаемый Проф. Дзялошинский!

Письмом от 22 августа 1988 г. я направил в ПИСЬМА В ЖЭТФ мои статьи:

1. Late discovery of the motional-transformer induction.
2. Maxwell's displacement current does not generate magnetic field.
3. Extremely easy experiment demonstrating violation of the angular momentum conservation law.

По сегодняшний день я не получил Ваше уведомление о получении статей. Посылали ли Вы такое уведомление? Или Вы экономите народные деньги и уведомления о получении статей не посылаете?

Будьте, ради Бога, добры и сообщите мне, получены ли статьи и если они получены, то в какой срок предполагаете выработать окончательное решение о принятии или отклонении.

Проф. Агранович /ФИЗИКС ЛЕТТЕРЗ/ тоже волокитничал с корреспонденцией со мною, но когда я ему написал: "Мир, Проф. Агранович, взаимозависим. Если Вы хотите, чтобы Вам зубной врач зубы как следует делал, то и Вы должны Ваши обязанности как полагается выполнять", то сразу же и письмецо послал.

Тот мотор из статьи "Нарушение третьего закона Ньютона...", которую Вы отвергли, ибо по-Вашему мотор крутиться не будет, я еще не построил. Но я подвел через трущиеся контакты ток к "ротору" сфотографированному в третьей из названных выше статей и он шибко начал крутиться /чтобы катить ротор по двум острым рельсам тока в 20 - 30 А вполне хватит/. А и еще проще можно эффект вращения наблюдать. Подвесьте этот "ротор" на нитке и и подведите ток к нему через мягкие тонкие проволоки /скажем 0.3 мм диаметр/. Опять закрутится и если резонанс кручения использовать, то тока в 5 - 6 А хватит.

Так ответьте же мне: есть у Вас сынишка или нет. Этот эксперимент на нитке он Вам смастерит в течении дня, если он старше 14-ти лет. Ток можно от автомобильного аккумулятора использовать. Нужно еще два металлических цилиндрика взять и к ним проволоки прикрепить как показано на рисунке. Чепуховый эксперимент. И десятилетний мальчишка сможет его смастерить. А Вы говорите: ротор крутиться не будет. А крутится этот ротор ВНУТРЕННИМИ СИЛАМИ. ВНУТРЕННИМИ СИЛАМИ, профессор, с СИНИМИ ШАПКАМИ на головах!

Мой ВРАЩАЮЩИЙСЯ МОСТ АМПЕРА вращается очень хило и на нем энергетические измерения проводить нельзя. Я не могу сказать: есть ли в нем обратное электродвижущее напряжение или нет. А если обратного электродвижущего напряжения нет, так этот моторчик и есть ПЕРПЕТУУМ МОБИЛЕ!!! Если закон сохранения углового момента нарушен, то и многое другое рушится.

Видите, что статьи архи-важные, ПОТРЯСАЮЩЕ ВАЖНЫЕ. А Вы мне даже уведомление о получении статей не послали. Да во что же мы превратились нырнув в пучину бумашины и циркулярщины. Куда запропастили мы наши души искателей истины. Или мы уже, увидев чудо, потеряли способность вздрогнуть и восхититься.

Надеюсь получить Ваше уведомление о получении выше названных статей в течении РАЗУМНОГО СРОКА и Ваше окончательное решение.

Проф. Агранович писал мне 5го сентября, что он не может быстро выработать решение, так как рецензенты хотят основательно с моей теорией и с моими экспериментами познакомиться. Я ему ответил, что я с удовольствием прилетел бы /ЗА СВОЙ СЧЕТ/ в Москву, чтобы рецензентам все косточке по косточке разъяснить и объяснить. С тем же самым предложением обращюсь и к Вашим рецензентам. Отсюда в Москву лететь - в два дня устраивается, ибо тут все с ускорением работают, когда им денежки на стол выложишь.

Искренне Ваш:

Стефан Маринов

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

8 октября 1988 г.

Проф. В. М. Аграновичу
PHYSICS LETTERS A
Институт Спектроскопии
Троицк
Москва 142092

Глубокоуважаемый Проф Агранович!

Большое спасибо за Ваше письмо от 5-го сентября 1988.

Я хорошо понимаю Ваших рецензентов. Им трудно ПРОГЛОТИТЬ мои статьи, хотя ПЕРЕВАРИВАТЬ их долго совсем не нужно. Я пишу исключительно простым и ясным языком, мои математические операции не сложны и любой студент на протяжении пары минут может убедиться в их законности. Так что, думаю, рецензентам нечего скоро год обдумывать: "To swallow or not to swallow." Они должны решиться: Либо проглотить, либо выплюнуть. Прошу Вас только об одном: Если они статьи выплюнут, чтоб дурацкие рецензии не писали.

Моя абсолютная пространственно-временная теория исключительно проста математически и построена на паре простейших аксиом. Конечно из одной или из двух статей нельзя вникнуть сразу же во всю теорию, но из десяти статей можно. Теория изложена в моем фундаметальном труде CLASSICAL PHYSICS, который в Союзе находится, но не знаю в какой библиотеке. Некоторые из моих книг я посылал в АСССР /в Академию/, но в чьих руках они застряли, тоже не знаю.

Поворот, который я делаю в физике гораздо важнее поворота сибирских рек, ибо это вопрос о построении вечного двигателя. Я покамест вечный двигатель со замкнутым энергетическим циклом не успел построить. Мне пока что удалось только наблюдать нарушения закона сохранения энергии. И мне удалось продемонстрировать нарушения закона сохранения углового импульса. Поставить соответные эксперименты не так уж трудно /соответные статьи опубликованы в первом и во втором издании моей книги THE THORNY WAY OF TRUTH, Part III: в первом издании представлен один эксперимент - моя машина Бул-Куб без статора, во втором издании еще и другая машина названная мною "вращающийся мост Ампера"/ Соответные статьи направлены в Physical Review Letters.

Но я хочу Вам сказать, что в июле я посетил христианскую коммуну МЕТЕРНИТА в деревне Линден у Берна, где я ВИДЕЛ работающий ВЕЧНЫЙ ДВИГАТЕЛЬ, который уже ШЕСТЬ ЛЕТ производит свободную энергию в 3 кило-ватт. Коммуна принцип двигателя не оглашает, так как считает, что человечество не созрело для пользования этого неистощимого энергетического источника. Только когда другие коммуны начнут жить согласно их коммунистическим принципам /без денег, без зарплат, без иерархии/, они с удовольствием предоставят таким коммунам этот источник для пользования. Я предложил им, чтобы я привез акад. Сахарова посмотреть на ихнюю машину, но они мое предложение не приняли. Мне принцип машины не стал ясным. Во втором издании TWT-III я даю фотографию машины, названная ТЕСТАТИКА, и сообщение о моем посещении в коммуне Метернита.

Видите, что вопрос вправе важнее вопроса поворота сибирских рек. Если Ваши рецензенты действительно хотят разобраться в моей теории и в моих экспериментах, то я с удовольствием прилетел бы в Москву, чтобы им все разъяснить и объяснить. Дорогу и пребывание я оплачу себе сам. С удовольствием я прочел бы и пару лекций здесь и там, а потом потолковали бы что, да как и почему Максвелл, Эйнштейн и тутти кванти всю физику перепутали.

Видите, что с моей стороны е готов сделать все, чтобы облегчить решение рецензентов: "Проглотить или выплюнуть". Но все же, думаю, журнал для быстрой публикации поэтому и является журналом для быстрой публикации, ибо там это решение должно приниматься БЫСТРО. Иначе журнал ФИЗИКС ЛЕТТЕРЗ под Вашей редакцией становится журналом для медленной публикации.

Надеюсь в скором времени получить Ваш ответ.

Искренне Ваш:

Стефан Маринов

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

Prof. Luigi di Lella
Int. J. Modern Physics
CERN
CH-1211 Geneve 23

8 October 1988

Dear Dr. di Lella,

To my letter to you of the 9 September 1988 I have not received an answer. However, I received back my book THE THORNY WAY OF TRUTH, Part III. I think that in this way you wished to say: The problem is closed and you saved your time in non writing a letter.

Although I am almost sure that the case must be such (the editors of the physical journals in the world have played similar tricks when I tried to explain to them how right I am and how wrong is conventional physics, sacrificing too many efforts and money to present to them the scientific information in the most simple, clear and motivated way), I shall try once more to persuade you to publish a paper of me. I know that my endeavour is almost hopeless, as the couple of letters which I exchanged with you show clearly that there is no hope with you. Nevertheless I shall try once more. Understand me well: I have no other way. I correspond with ALL physical journals and with ALL editors since 20 years. The doors are closed almost everywhere. And in the few cases where the door is not completely closed I throw my efforts. I cannot accept that humanity can be so blind (at the present time "humanity" are the editors and the referees, as my papers can not reach the wide readership). I think that between the hundres of editors and referees there will be someone, who will say: "Stop! What are we doing. Marinov is a saint person."

Thus I submit now to your journal my paper (in two copies)

ABSOLUTE AND RELATIVE NEWTON-LORENTZ EQUATION.

I beg you, for a LAST time to send this paper to a referee and to beg him, in the case that he will reject the paper, to write the formula which according to him will give the intensity induced in a wire at rest if a magnet moves with a velocity **v** and the magnetic potential which the magnet originates at the reference point where the wire is placed is A. I affirm that neither your referee nor you can write such a formula. If your referee (or you) will write such a formula, which, of course, must be DIFFERENT from my own

$$E = (\mathbf{v}.\mathrm{grad})A,$$

then I shall accept the rejection without presenting any comments. But if the referee (or you) will reject the paper without being able to write such a formula, then, I think, you are not doing science.

You can see that the referee of EUROPHYSICS LETTERS was unable to write such a formula. But he is sure that if he will spend more time, he will be able to write it. May be your referee will also say that if given time he will be able to write this formula, but "time is money". Well, as I state in the paper, I shall gladly send to your referee $ 3,000 for the time lost.

I send you the proofs of a paper of me which next month will appear in the Bologna journal SEAGREEN. Perhaps you have not heard about this journal. It is a quite intresting journal covering many different areas and is read by "una borghesia illuminata". If you would like, I shall gladly send you the paper (or the whole issue) after its appearance.

You see, Dr. di Lella, I do all possible to bring the scientific truth to the judgement of the scientific community. If my papers cannot appear, this is not MY guilt.

Hoping to receive your acknowledgement for the reception of the paper and then in due time your final decision (although I am very afraid that you will reject my paper "automatically"),

Sincerely yours,

Stefan Marinov

torial note. This letter remained without answer.

PS. Please, do not reject the paper "automatically". Read it, send it to a referee!!!!!

F I Z I K A

A Journal of Experimental and Theoretical Physics

The Editor would like to inform you that the manuscript:

---

by: ---

has been

☐ received on

☐ accepted for publication

☐ recommended for revision in orded to meet the referee's suggestions

☐ rejected for publication. This editorial decision is based on many factors (the limitations of space, the specialties of this journal etc.) and does not necessarily reflect on the quality of the paper.

Editor

Editorial note. With this letter Dr. Vladimir Sips, the Editor of the Yougoslav journal FIZIKA rejected Marinov's paper "Late discovery of the motional-transformer induction" published in TWT-I, third ed., p. 303.

The referee's comments are given on the following page.

Marinov presents his objections in his letter of the 19 October.

Journal FIZIKA

Referee's comments to the paper "Late discovery of the motional-transformer induction" by Marinov

Equation (1) of S.Marinov's paper "Late discovery of the motional-transformer induction" is not in accord with the results of simple experiments (see, e.g., The Feynman Lectures in Physics, Vol.2, p.17.1). The basic laws of induction, in accord with experiments, are $\mathrm{rot}\vec{E} = -\partial\vec{B}/\partial t$ and $\vec{F} = e(\vec{E} + \vec{v}\times\vec{B})$. The third term on the right hand side of Eq. (1), $\vec{v}\times\mathrm{rot}\vec{A} = \vec{v}\times\vec{B}$, could be added as the negative part of the electric field if this field would be split into two parts.

In introducing potentials one should be aware of gauge invariance. As M.Babiker and R.Loudon, J.Phys.A:Math.Gen. 17 (1984) 2973 have explicitely shown that one should be careful in calculating the vector potential (and even the magnetic field) of a solenoid of infinite length. It could happen that the difference of Eq. (9) and (10) would be caused by the "somewhat anomalous properties" of the solenoid of infinite length.

The referee cannot recommend the publication of S.Marinov's paper in Fizika.

№ 699

АКАДЕМИЯ НАУК СССР

ЖУРНАЛ ЭКСПЕРИМЕНТАЛЬНОЙ И ТЕОРЕТИЧЕСКОЙ ФИЗИКИ

Москва, 117334 ул. А.Н.Косыгина, 2 *Письма в редакцию* Тел. 137-75-89

«__» октябрь 19 88 г.

Editorial date: 13 October 1988
Moscow's post stamp date: 5 November 1988

тов. Стефану Маринову

Глубокоуважаемый Стефан Маринов !

Редколлегия рассмотрела на заседании от 13 октября все три Ваши работы и не нашла возможным принять их к публикации, так как их содержание не соответствует современному научному уровню.

Главный редактор журнала И.Е.Дзялошинский

TRANSLATION

Dear Stefan Marinov!

The Editorial Board has discussed at the meeting of 13 October all three your works and has not found a possibility to accept them for publication as their contents is not on the contemporary scientific level.

Editor-in-Chief: I. E. Dzialoshinski

Editorial note. The rejected papers are:

1. Late discovery of the motional-transformer induction (published in TWT-I, third ed., p. 303).
2. Maxwell's displacement current does not generate magnetic field (published in TWT-I, p. 317).
3. Extremely easy experiment demonstrating violation of the angular momentum conservation law (published in this volume).

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

INSTITUT D'ASTROPHYSIQUE

98 BIS. BOULEVARD ARAGO 75014 PARIS
TÉL 43 20 14 25 TÉLEX 270070 SU CNRS

Paris, Oct. 17, 1988

LE DIRECTEUR
JA/CD/633

Dr. S. MARINOV
Morellenfeldgasse 16
A-8010 GRAZ, Austria

Dear Dr. Marinov,

I acknowledge receipt of your new manuscript entitled :

Elastic collisions of particles in absolute space.

To tell you the truth I have the very strong impression that this paper is not scientifically correct and therefore does not deserve to be published. Since I have not enough time to prove or disprove this quite unpleasant impression and I do not see at first hand any suitable referee to evaluate properly this quite unusual contribution, I forward it to the executive editor to let him taking the appropriate action.

Sincerely yours,

Jean Audouze

Editorial note.

At the date of sending the book to the printer no letter from the executive editor of the International Journal of Modern Physics has been received.

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Our ref: FO/OME

18 October 1988

Dr Stefan Marinov
Morellenfeldgasse 16
A-8010 Graz
Austria

Dear Dr Marinov,

I have considered your piece entitled "The perpetuum mobile ADAM etc. and have regretfully decided that I cannot fit it into our schedule of articles I am therefore returning the script to you.

Thank you again for submitting the article: I hope you will bear EWW in mind when writing other pieces.

Yours sincerely,

C.M. Evans
Secretary

pp

Frank Ogden
Editor

Marinov's note. During my visit in London in December 1988 I visited Mr. Frank Ogden in his editorial office in the Quadrant House and had a very nice conversation with him demonstrating to him the rotation of the ball-bearing motor. Mr. Ogden promised to publish my paper on the ball-bearing motor in the April-1989 issue of E&WW.

Returning back to London I passed the station Clapham junction about an hour before the big accident which took numerous victims.

REED BUSINESS PUBLISHING

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STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

19 October 1988

Dr. Vladimir Sips
FIZIKA
POB 1016
YU-41001 Zagreb

Dear Dr. Sips,

Thank you very much for your letter of the 11 October 1988, although the rejection of my paper

LATE DISCOVERY OF THE MOTIONAL-TRANSFORMER INDUCTION

was, of course, not pleasant for me.

I do not agree with the referee's comments and I present my objections.

I show in my paper that neither the referee nor somebody in the world is able to write the force acting on a unit positive charge at rest if a magnet originating the magnetic potential **A** moves with a velocity **v** (for the opposite case, charge moving and magnet at rest, the force is **v**×rot**A**). I am the only man in the world who has succeeded to write the formula for this case, namely (**v**.grad)**A**.

I think that you can reject my paper only if the referee will write the relevant formula which must be valid according to him. If he will be able to write such a formula, I shall gladly send him $ 3000. As he WILL BE UNABLE to write this formula, I think you have to publish my paper.

Hoping to receive your answer soon,

Sincerely yours,
Stefan Marinov

PS. For yours and your referee's information I enclose the leaflet MARINOV TO THE PARTICIPANTS OF THE AETHER CONFERENCE.

COMMENTS OF STEFAN MARINOV TO THE REFEREE'S COMMENTS TO MARINOV'S PAPER

"LATE DISCOVERY OF THE MOTIONAL-TRANSFORMER INDUCTION"

The referee writes that the Newton-Lorentz equation (1)

$$\mathbf{E} = -\operatorname{grad}\Phi - \partial\mathbf{A}/\partial t + \mathbf{v}\times\operatorname{rot}\mathbf{A} \qquad (1)$$

is not in accord with simple experiments. Meanwhile he writes the Newton-Lorentz equation in the following form

$$\mathbf{F} = e(\mathbf{E} + \mathbf{v}\times\mathbf{B}) \qquad (2)$$

and since, <u>according to the referee's notations</u>,

$$\mathbf{E} = -\operatorname{grad}\Phi - \partial\mathbf{A}/\partial t, \qquad \mathbf{B} = \operatorname{rot}\mathbf{A}, \qquad (3)$$

by putting (3) into (2), the referee will obtain

$$\mathbf{F} = e(-\operatorname{grad}\Phi - \partial\mathbf{A}/\partial t + \mathbf{v}\times\operatorname{rot}\mathbf{A}). \qquad (4)$$

If now we should designate $\mathbf{E} = \mathbf{F}/e$ (this **E** is not equal to the **E** of the referee), we shall obtain exactly my equation (1), as I call (see the paper) electric intensity the kinetic force of a unit positive electric charge surrounded by a system of electric charges, which generate the electric and magnetic potentials Φ and **A** at the reference point (where this unit positive electric charge moving with a velocity **v** is put).

Conventional physics (and the referee) calls electric intensity the first formula (3), although in this formula there is a term $\partial \mathbf{A}/\partial t$ which is MAGNETIC term as **A** is MAGNETIC potential. I show in my papers and books that we have either to separate the elecric from the magnetic terms or unify them all, as I do in equation (1). If we do not make all these precisations, we shall never undertand what is motional induction, rest-transformer and motional-transformer induction and electromagnetism which is a stuff for 16-years old children will remain a sphinx for ALL professors in the world as it is now.

As I showed in my papers and books, the fundamental quantities which determine the interactions between the electric charges are NOT the intensities but the POTENTIALS. I showed to the cases where the calculation with the intensities leads to WRONG results and where only the calculation with the potentials leads to RIGHT results. I showed that one cannot make gauge calibrations at will as this leads to WRONG results.

The referee, obviously, has NOT understood that formulas (9) and (10) in the paper refer not to a very long solenoid but to a circular current wire. The difference in these two formulas comes exactly from the fact that the motional and motional-transformer inductions are NOT reciprocal.

The referee (and the editor) must take into account that I make a GENERAL REVISION of conventional electrimagnetism. In today's electromagnetism after one truth follow TWO LIES. The principle of relativity must be thrown over board and one must become aware that all electromagnetic effects depend on the absolute velocities of the charges.

I am afraid that the referee will not have the courage to recognize the failure of conventional electromagnetism and I have full understandings for his fears. The authorities of such idols as Maxwell, Lorentz and Einstein are unshakable for him. If he wishes, however, to understand electromagnetism, he must be ready to accept that Maxwell, Einstein and Lorentz were in MANY MANY aspects completely WRONG.

I should like only to note that if the referee has rejected my paper, he is indebted to write the force acting on a unit electric charge which is at rest if a magnet originating at the reference point the magnetic potential **A** moves with a velocity **v**.

As the referee is UNABLE to write this formula(in the case that he will be able to write such a formula, I shall gladly send him $ 3000), he has not the right to reject my paper.

Thus the referee has to choose between the alternatives:

To insist for rejection and then to present the above formula, or

To suggest my paper for publication.

The choice of any other alternative will be unfair.

Editorial note. This letter remained without answer.

Marinov's note of the 20 January 1989 (after seeing that the referee refuses to win the offered $ 3000 for deducing the formula - $\mathbf{v}\times\mathrm{rot}\mathbf{A}$, for the case of a moving magnet): Хрвати, Бога ми, су глуп народ. Па како не! Ја том рецензенту из загребачког физичког журнала гурам три хиљаде долара у тврдой валути у уста, а он, будала, не че да ги прогута. Због те властите глупости ми одат сите ови загребачки серсеми голи kao соколи!

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

22 October 1988

Dr. Robert Romer
AJP
Merril Science Bldg., Room 222
Box 2262
Amherst College
Amherst
MA 01002

Dear Dr. Romer,

Thank you very much for your letter of the 30 September 1988, although the rejection of my papers was, of course, not pleasant for me. You presented NO motivations for the rejection and I understand you very well, as you are UNABLE to present motivations. My papers are written in such a simple language, with such a simple and undiscutable logic and are supported by such SIMPLE and easily repeatable experiments, that it is not possible at all to present objections, of course, if one is not afraid to become ridiculous. Every one who has tried to criticize my theory and experiments has become ridiculous, as the numerous documents in the collection THE THORNY WAY OF TRUTH show, and all those who have seen these books have closed for ever their mouths when receiving a paper of me in their hands.

I wish to try once more to persuade you to publish at least ONE paper of me. And I submit now this paper

ABSOLUTE AND RELATIVE NEWTON-LORENTZ EQUATIONS.

Read it attentively. And show the scientific courage to publish it. If you would reject the paper, I shall beg you very much to write me which will be the electric intensity induced in a wire at rest if a magnet originating at this wire the magnetic potential **A** moves with a velocity **v**. You will be UNABLE to write this formula. I know. And if after being unable to write this formula, you will reject my paper where I show which is the formula, then the conclusion will be only one: you would make yourself ridiculous. This is not a research paper, dear Dr. Romer. This is a problem of teaching in the colleges. The whole BIG science cannot write this formula. The big Einstein with his big moustaches and the whole cohort of professors are unable to write the induced electric intensity in this simple case. And you reject the paper where I show which is the formula. WHY? Because you are afraid that after publishing this paper whole conventional electromagnetism will crumble to pieces in a couple of months! Yes, you are right - it will crumble to pieces. The logic is childish, the experiments supporting the theory are childish. There is only one way to save for a year or two more the life of this old ill man called "RELATIVITY" - black out on Marinov.

I wish to bring to your attention some materials in the hope that you will convince yourself to publish a paper of me. I saw a picture of you in the AJP. Your eyes raised a confidence in my soul. And I can see deeply in one's eyes!

I send you:

1. The proofs of my article EXPERIMENTAL VIOLATIONS OF THE PRINCIPLES OF RELATIVITY, EQUIVALENCE, AND CONSERVATION OF ENERGY AND ANGULAR MOMENTUM, which had to appear in NATURE on the 18th August, then on the 13th October. Now Dr. Maddox wishes to invite me (for his expances) for a FOURTH time to London to discuss the matter and he promises to publish the paper only after this conversation.
2. The letter of Dr. Maddox to me of the 29 July.
3. My letter to Dr. Rigden of the 26 July 1986 with an excerpt of my letter to Dr. Rigden of the 12 May 1986 (the page is taken from my bok TWT-III)
4. The letter of Dr. Rigden to me of the 6 August 1986 (The page is taken from TWT-III).
5. My paper ON THE ACTION AND INTERACTION OF STATIONARY CURRENTS which was rejected by Dr. Rigden and now has appeared in the Toth-Maatian Review (soon in this Review will appear also the second paper rejected by Dr. Rigden entitled COUP DE GRACE TO RELATIVIVITY AND TO SOMETHING ELSE).
6. The leaflet MARINOV TO THE PARTICIPANTS OF THE AETHER CONFERENCE (I beg you to read Ref. 1 in the paper of A. Ungar published in AJP, **56**, 814 (1988)).

I beg you very much to ACKNOWLEDGE the reception of this letter and then to send me your decision in due time.

Sincerely yours,

Subscriptions and administration:
12 Clarence Road,
Kew,
Surrey,
TW9 3NL
England

Editor: Dr. Alan L. Mackay,
Department of Crystallography,
Birkbeck College (University of London)
Malet Street,
London WC1E 7HX
England

SPECULATIONS IN SCIENCE AND TECHNOLOGY

25 Dec. 1988

Dear Dr Marinov,

Many thanks for your letters.

I regret that I cannot publish your paper & polemic discussions ~~that~~ have not assisted in making this decision. We just do not have the resources to deal in detail with matters of this complexity.

Yours sincerely

Alan Mackay

Editorial note. The rejected paper is "Very easy demonstration of the violation of the angular momentum conservation law and of the failure of conventional electromagnetism" (published in TWT-III, sec. ed., p. 48).

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

1 November 1988

Dr. Alan Mackay
SST
Birkbeck College
Malet Street
London WC1E 7HX

Dear Dr. Mackay,

Thank you very much for your letter of the 25 October with which you have rejected my paper

VERY EASY DEMONSTRATION OF THE VIOLATION OF THE ANGULAR MOMENTUM CONSERVATION LAW AND OF THE FAILURE OF CONVENTIONAL ELECTROMAGNETISM.

You rejected the paper because, you write,"we just do not have the resources to deal with matters of this complexity".

I agree with you that the EXPLANATION of this experiment is a VERY BIG PROBLEM, as, according to me, this experiment violates the angular momentum conservation law. I think, however, that before beginning to EXPLAIN the experiment we must INFORM the scientific community about its execution. Simply to give a description of the experiment and of the effect observed. THEN one will try to give an explanation of the effect.

You saw that PHYS. REV. has rejected the paper because, according to the referees, my explanation is WRONG, although both referees had NO objection against the effect of the experiment and according to them (according to the conventional theory) the effect must be exactly this one which I (and Graham and Lahoz) have observed. The result of this "politics" of the scientific journals is that more than a year the scientific community cannot become aware of the effect in my experiment.

I will consent to CANCEL my explanation, but I think that if an author has DONE an experiment he HAS THE RIGHT to present HIS OWN explanation of the effect. It is interesting that normally the authors of the experiments give the RIGHT explanation of the observed effects (as, for example, Sagnac, Kennard) and the "theoreticians" give then a wrong explanation, but there are also cases where the authors of the experiment (as, for example, Graham and Lahoz) give a wrong explanation. The right exaplanation can be established during the discussion of the experiments in the scientific journals. There is no other way. But if the experiments will be not published, then the scientific community has NOTHING to discuss.

Thus I beg you to reconsider your decision and to accept the paper for publication. Moreover, you have not to be afraid of an EVENTUAL wrong explanation which I should give because the title of your journal is SPECULATIONS IN SCIENCE AND TECHNOLOGY. Of course, I have VERY LITTLE hope that you will reconsider your decision.

In your letter you write nothing about the other paper

RELATIVISTIC EFFECTS IN THE RADIATION FROM MACROSCOPIC LIGHT SOURCES

which I submitted to SST on the 11 May 1988. When I visited you in June 1988 you told me that the paper is sent for examination to Dr. Aspden. I know Dr. Aspden very well and I know that he has elaborated his opinion in no more than a week. Please, be so kind and inform me which is the status of THIS paper.

Hoping to receive your answer soon,

Sincerely yours,

Stefan Marinov

Editorial note. The answer of Dr. Mackay is given on the next page.

Subscriptions and administration:
12 Clarence Road,
Kew,
Surrey,
TW9 3NL
England

Editor: Dr. Alan L. Mackay,
Department of Crystallography,
Birkbeck College (University of London)
Malet Street,
London WC1E 7HX
England

SPECULATIONS IN SCIENCE AND TECHNOLOGY

7 Nov. 1988

Dear Dr Marinov,

Thank you for your letter of 1st Nov. I regret that I can publish neither paper.

Yours sincerely

A.L. Mackay

Editorial note. Marinov answers this letter with his letter of the 28 November. See also the previous page.

THE PHYSICAL REVIEW

AND

PHYSICAL REVIEW LETTERS

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Cable Address: PHYSREV RIDGENY
BITNET Address: pra,b,c,d@APSEDOFF

9 November 1988

Dr. Stefan Marinov
Morellenfeldgasse 16
A-8010 Grax, Austria

Re: Manuscript No. LX3848

Dear Dr. Marinov:

We return your paper "Propulsive and rotating Ampere bridges violate the energy conservation law" as premature for the journal. The first three are currently under review. It is appropriate to wait for the resulting evaluation and decision before launching into more review. The manuscript is returned.

Sincerely yours,

George Basbas
Editor
Physical Review Letters

GB:ef
enc.

Editorial note. The rejected paper above is published in this volume p. 136 under the title "Propulsive and rotating Ampere bridges violate the principle of relativity".

THE PHYSICAL REVIEW

AND

PHYSICAL REVIEW LETTERS

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Telex: 971599 AMPHYSSOC Fax: (516) 654-0141
Cable Address: PHYSREV RIDGENY
BITNET Address: pra,b,c,d@APSEDOFF

9 November 1988

Dr. Stefan Marinov
Morellenfeldgasse 16
A-8010 Graz, Austria

Re: Manuscript No. LX3849

Dear Dr. Marinov:

We return your paper "Absolute and relative Newton-Lorentz equation" as premature for the journal. The first three are currently under review. It is appropriate to wait for the resulting evaluation and decision before launching into more review. The manuscript is returned.

Sincerely yours,

George Basbas
Editor
Physical Review Letters

GB:ef
enc.

Editorial note. The rejected paper above is published in this volume p. 101.

PHYSICS LETTERS A

PROFESSOR J. P. VIGIER
Université Pierre et Marie Curie
Centre National de la Recherche Scientifique
Laboratoire de Physique Théorique
Institut Henri Poincaré
11 Rue Pierre et Marie Curie
75231 Paris Cedex 05
France
Telephone (14) 336 2525 ext. 3776/82
Telex: UPMC Six 200 145 F

10/11/88

V726a / V727a

Dear Dr Marinov,

I enclose 2 referees reports on your papers. In their present form they are not acceptable for publication. I will consider them further only if you are able to answer the detailed criticism of the referee.

Yours sincerely

JPV

TRANSCRIPTION

Dear Dr Marinov,

I enclose 2 referee's reports on your papers. In their present form they are not acceptable for publication. I will consider them further only if you are able to answer the detailed criticism of the referee.

Yours sincerely

JPV

Editorial note. Marinov's objections to the referee's comments which follow are given with his letter of the 23 November.

Referee's Report on "Maxwell's Displacement Current Does Not Generate Magnetic Field" - by Stefan Marinov

Marinov postulates two properties which a current must have. It must be able both to generate and to react to magnetic fields. Since the vacuum between capacitor plates is massless, it cannot react to a magnetic field. Hence the displacement current which flows between the capacitor plates must be only a fiction.

In my view, Marinov has been too limited in his definition of current. It has long been held that electromagnetic energy can be stored in a vacuum. In this sense, the vacuum can react to a changing electric field.

Ironically in their recent experiment Bartlett and Corle (ref 1) do acknowledge that the displacement current is not strictly needed for an understanding of their results. Their reason is different from Marinov's. In their closing paragraphs B &C state that for quasi-static phenomena, magnetic fields can, but need not, be viewed as arising from conduction currents alone.

Marinov does attempt a calculation of the field inside the B & C capacitor from conduction currents alone. Unfortunately his treatment on p. 3 is only valid for the case where the separation between the plates d is much graater than their radius r. This limit is the exact reverse of the B & C measurement. There the magnetic field was measured directly inside a thin parallel plate capacitor.

In my estimation, the interesting part of this manuscript begins on p. 4 with Marinov's description of hisown experiment. Unfortunately without a figure I cannot be sure whether the capacitor was cylindrical or circular. (Marinov states it was cylindrical, but then mentions "plates" whose separation could be changed from 0 to 6 cm.)

In any event, in Table 1 (p. 5) Marinov concludes that his results disagree with Maxwell and agree with Marinov. If substantiated, this would of course be an important result. Unfortunately, Marinov does not give the details of his theoretical predictions. Was he using Eq. 4 even though this eqn is only applicable if $d >> r$?

I have questions about the experiment as well:

a) By using barium titanate for a dielectric Marinov can dramatically increasing the current, but the nature of that current seems also to change. Instead of a displacement current flowing through vacuum, we now have largely a polarization current in matter.

b) The dielectric constant of barium titanate is very temperature sensitive. Did the author try to control temperature.

c) The technique of increasing the capacity of plates by etching is not known to me. A 100-fold increase is rather dramatic. Could the author give a reference for this technique.

I cannot recommend that the present paper be published.

Referee's Report on "Extremely Easy Experiment Demonstrating Violation of the Angular Momentum Conservation Law" - by Stefan Marinov

The author reopens the old controversy between Ampere and Grassmann en the proper law of force between two current elements. He notes that for Ampere's law action = reaction, whereas for Grassmann's it does not. For complete circuit loops the laws are indistinquishable. However, by breaking one circuit (with a capacitor) the laws can be distinguished. The author has done this and has found experimental evidence in support of Grassmann and believes that in the process he has shown violation of the connservation principles for both linear and angular momentum.

I have a basic difficulty with this manuscript. I agree that Grassmann's and Ampere's laws are fundamentally different. I also agree that both give the same result for the interaction of one complete circuit loop on another complete circuit loop. I differ, however, in the analysis of the case at hand: a complete circuit loop interacts with an isolated element in a second circuit. In contrast to Marinov, I believe that bohh laws give the same prediction here. My thinking is strongly influenced by the lucid summary in Whittaker's, A History of Theories of the Aether and Electricity, pp 84-87 (Vol 1), I am enclosing a copy of these pages.

In sum, it is not Marinov's experiment which is novel. He has acknowledged that Graham and Lahoz (ref. 8) have already published the results of a similar experiment. It is rather

Marinov's interpretation of that experiment that is novel. To show a violation of the law of conservation of angular momentum it is necessary to show that a total angular momentum for an isolated system spontaneously changes. The system includes the two circuits and the electromagnetic field between them. Just showing that an element of one circuit moves is hardly enough.

Marinov does give a partial description of two experiments: one linear, the other angular. Unfortunately neither experiment gives a quantitative conclusion. A repeat of Graham and Lahoz's experiment on conservation of angular momentum would be quite significant. Perhaps Marinov would consider expanding his discussion of this experiment to the point where a reader could assess its significance. (Page 5 and half of page 6 is too little). Obvious questions are:

a) What result does conventional theory predict?

b) What result is measured?

c) How does the rotating Ampere's bridge differ from G & L's apparatus?

d) Where do currents flow in figs 4 and 5? Where are the electric and magnetic fields in these figures?

At present I cannot recommend that this paper be published.

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

11 November 1988

Проф. И. Е. Дзялошинскому
ПИСЬМА В ЖЭТФ
ул. Косыгина, 2
Москва 117334

Глубокоуважаемый Проф. Дзялошинский!

Спасибо за Ваше письмо с октября 1988-го г. /в письме пропущена дата, указан только месяц, дата московского почтамта 5.11.1988/, с которым Вы отклонили мои статьи:

1. Late discovery of the motional-transformer induction.
2. Maxwell's displacement current does not generate magnetic field.
3. Extremely easy experiment demonstrating violation of the angular momentum conservation law.

В письме Вы не дали названия отклоненных статей, но следовало бы давать названия. PHYSICAL REVIEW, отклонивший за последние двадцать лет около 100 моих статей, ВСЕГДА дает названия отклоняемых статей, а американцев нужно не только обгонять /лишь бы ног на то хватило/, но иногда и пример с них брать.

Отклонение моих статей мотивировано словами, что "их содержание не соответствует современному научному уровню". Осмелюсь заметить, что нужно ЭТО показать. Опять приведу пример с нашими заокеанскими друзьями: PHYSICAL REVIEW ВСЕГДА давало мотивировки для отклонения, прилагая мнения рецензентов /второй вопрос насколько мотивировки рецензентов правильны - как Вы можете увидеть, полистав мою ТРИЛОГИЮ THE THORNY WAY OF TRUTH, все рецензии физревцев на мои статьи сплошная чушь и ерунда/.

Вы /редколлегия ЖЭТФа/ наверное сочли, что мои статьи не на современном научном уров потому что они написаны языком понятным для 16-летних пацанов и эксперименты мною сделанные для доказательства моих теорий тоже в экспериментальных возможностях тех же 16-летних пацанов. Или Вы считаете, что мои статьи плохи, ибо я в них не только великог Эйнштейна осрамил, но и по законам сохранения грязными сапогами прохаживаюсь.

А теперь я покажу, что ВАША /редколлегии ЖЭТФа/ критика слабенькая. В Вашем письме с 15-го марта 1988 г. Вы писали "О напечатании такой статьи можно бы было говорить если упоминаемый Вами мотор /мотор МАРПАП показанный на фиг. 3 статьи PROPULSIVE AND ROTATING AMPERE BRIDGES VIOLATE THE ENERGY CONSERVATION LAW, приложенная к этому письму/ действительно работал." Этими словами Вы хотели сказать, что, по Вашему, такой мотор работать не может. Я понимаю Ваши сомнения. Ведь в этом моторе только ротор, статора нет, как же он может работать. НО ОН РАБОТАЕТ - читайте приложенную статью, дайте ее потом сынишку Вашему, чтобы он моторчик смастерил и Вам вращение показал. А если мотор вращается, значит тут что-то с законами сохранения не в порядке. Писал же я Вам в моем письме с 8-го октября: "А крутится этот мотор ВНУТРЕННИМИ СИЛАМИ. ВНУТРЕННИМИ СИЛАМИ, профессор, с СИНИМ ШАПКАМИ на головах!" Если Вы знаете что такое "внутренние силы /а знаете, физик же Вы/ и если Вы знаете, что такое "синие шапки" /а знаете, не только застойные, но и некоторые другие годы пережили/, то должны остановиться и щелкнуть себя по лбу /как я старался принудить Сахарова щелкнуть себя по лбу, когда в прошлом году его на улицу Чкалова 48 посетил/. Значит, оказывается, не моя статья на несовременном научном уровне находится, а современному научному уровню до уровня моего мотора далеко. Так пора же, дорогой проф. Дзялошинский, этот современный научный уровень до современног экспериментального уровня ПРИПОДНЯТЬ.

И вторая заметка. В статье LATE DISCOVERY OF THE... я показываю, что если магнит, движется со скоростью **v**, то в точке, где он создает магнитный потенциал **A**, индуцируемь электрический интенситет будет $\mathbf{E} = (\mathbf{v}.\mathrm{grad})\mathbf{A}$, а не $\mathbf{E} = -\mathbf{v}\times\mathrm{rot}\mathbf{A}$, как СОВРЕМЕННАЯ физика считает. Более того я показываю /см. также статью ABSOLUE AND RELATIVE NEWTON-LOREN EQUATIONS, посланную 14-го октября/, что СОВРЕМЕННАЯ физика НЕ СПОСОБНА ВЫЧИСЛИТЬ интен ситет в этом случае НЕ ПЕРЕСКАКИВАЯ в другую координатную систему. Так что жа это за УРОВЕНЬ, профессор? Чепуховую задачку решить не может. В статье ABSOLUTE AND... я объявил, что если кто-нибудь в мире сможет, работая в системе, в которой магнит движетс получить формулу $\mathbf{E} = -\mathbf{v}\times\mathrm{rot}\mathbf{A}$, то я этой умнице 3,000 долларов телексом пошлю. Тут на Западе когда дело о деньгах идет, рукавчики засучивают. Так понатужьтесь, выведите мне формулу и три тысячи честным трудом заработаете. А так как Вы НЕ СМОЖЕТЕ это сделать, то, пожалоста, таких высказываний о моих статьях, как в Вашем последнем письме больше не делайте. --- Посылаю новый вариант моей статьи PROPULSIVE AND ROTATING..., котор должен заменить вариант, посланный 14-го октября. Прошу ВНИМАТЕЛЬНО читать статью и как можно быстрее сообщить решение.

Искренне Ваш — Стефан Маринов

Editorial note. This letter remained without answer.

Canadian Journal of Journal canadien de

November 11, 1988

Dr. Stefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse 16
A-8010 Grax, Austria:

Re: GR- 78 "Very easy demonstration of the violation of the angular momentum conservation law and of the failure of conventional electromagnetism."

When we received your paper in August after it had been sent on to us by Professor Rostoker, I noted that it was written in a narrative conversational, first person singular style and also included statements to the effect that "journals of the establishment refuse to print my papers."

This concerned me, for a necessary (but not sufficient) condition for publication in the Canadian Journal of Physics, is a neutral writing style.

All that notwithstanding, I have had the paper refereed and enclose a copy of all the referee's comments. I have also reviewed the paper myself and find it not to be acceptable for publication.

Your manuscript is enclosed.

Yours sincerely

R.W. Nicholls
Editor

Editorial note. Marinov has answered the above letter with his letter of the 24 November.

Department of Physics
York University
4700 Keele Street
North York, Ontario Canada
M3J 1P3

Telephone: (416) 736-5385
FAX: (416) 736-5386
Bitnet: CJP@YUSOL and FS300003@YUSOL

Canadian Journal of Physics
Referee's Comments

Paper GR-78

1. Does the introduction of the paper give an adequate motivation for the work undertaken? ✓ YES ____ NO

2. Are the conclusions and their significance adequately presented? ____ YES ✓ NO

3. Are the style and organization of the paper good ____, satisfactory ____, poor ✓? If the last, please state your specific criticisms below.

4. Detailed comments: (Please supply on a separate sheet a list of typographical, spelling, grammatical or calculational errors which you have detected.)

Vituperative, discursive and unfounded.

Referee's Report

As I understand it, the ''Bul-Cub'' machine described by the author is not different in principle from the resonant suspension of Graham and Lahose, in that a reactionless rotation of an armature is possible and demonstrated. Accepting this, what conclusion should follow? That the principle of conservation of angular momentum should be abandoned or that the Poynting theorem should be believed even for induction fields? Since the latter does not conflict with any part of Maxwell's formulation it is clearly the conservative choice. No amount of appeal to unpublished new fundamental theories or ''what every child knows'' or similar tub thumping can weigh in favor of the former.

Canadian Journal of Physics
Report to the Editor

In which of the following categories would you rate the paper:

1. An important contribution to knowledge in the field. ____
2. A useful contribution though not of fundamental importance. ____
3. A technically adequate paper of limited or highly specialized interest. ____
4. A technically adequate paper, but more appropriate for submission to another journal. (If possible, please give a specific suggestion.) ____
5. A paper too insignificant to justify publication. ____
6. A paper with important technical errors. X

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

13 November 1988

1. J. P. Wesley
2. F. Müller
3. P. T. Pappas
4. H. Milnes
5. D. Spencer
6. P. Graneau
7. H. Aspden

Dear Friend,

I intend in the near future (probably even before Christmas) to issue the fourth volume of THE THORNY WAY OF TRUTH (TWT). It will be dedicated to the ELECTROMAGNETIC problems treated in TWT-I, II, III and more precisely to the following topics:

1. Displacement current - whether it originates a magnetic field and whether it "absorbs" ponderomotive forces or not.

2. Is momentum "stored" in static (i.e., potential) electromagnetic fields or not.

3. Propulsive and rotating Ampere bridges (with sliding contacts and with displacement current). Force and energy aspects, including the induced back tensions.

4. Bul-Cub machine without stator.

5. Controversy between the Grassmann and the Ampere formulas for the interaction between two current elements.

6. Feynman paradox.

7. Motional, transformer and motional-transformer inductions.

It will be good if you will order from me the latest (September 1988) third edition of TWT-I and second edition of TWT-III where there are enough papers and documents concerning all those problems (the majority of you have these books), sending me $ 25 for a book in cash in an envelope.

I make a call for your papers on all those problems. The papers are to be written in the clear and precise manner allowing an easy understanding of the matter. The form must be the same as of my papers in TWT. There are no limits for the volume but it will be good if the 10-pages limit will be not overpassed. One contributor can submit more than one paper. If you are unable to type the paper in the style of my papers (with IBM-letter gothic), I can gladly do this for you for the price of $ 10 per page. Proofs will be not sent, but you can be sure that the paper will be retyped EXACTLY as in the manuscript and only OBVIOUS your typing errors will be corrected. I wish to issue VERY SPEEDILY this book, as it has become clear that the electromagnetic interactions violate the laws of conservation and the construction of an electromagnetic perpetuum mobile is imminent. In TWT-III (sec. ed.) I give the picture of the machine TESTATICA (Switzerland) which I saw in July and which is a FUNCTIONING perpetuum mobile. TESTATICA works on other electromagnetic principles which I could not understand.

Depending on the volumes of the submitted papers, I intend to publish in TWT-IV the following papers:

1. Bartlett, Phys. Rev. Lett. **55**, 59 (1985).
2. Sharma, Am. J. Phys. **56**, 420 (1988) (and some of the papers referred to there).
3. The pages (two) about the Feynman paradox in Feynman's book.
4. Graneau, J. Phys. D **20**, 391 (1987)
5. Allen, J. Phys. D **20**, 1073 (1987).
6. Christodulides, Phys. Lett. A **120**, 129 (1987).

I beg you to send me your contribution AS SOON AS POSSIBLE, so that it can be included in the volume. If I will be not satisfied from your paper, I preserve my right to reject it but I hope that this will not occur.

I include (for those who have not it) my address: Marinov to the participants of the aether conference. Pappas and Aspden saw that FIVE minutes after my appearance at the conference, the organizer, Dr. Duffy, called three security men who THREW me outside the Imperial College. In 1986 I was expulsed from the 11th GR conference and the policemen escorted me to Vienna. --- Mr. E. A. Maco organizes at the beginning of March a second anti-relativity conference in DEUTSCHES MUSEUM in Munich. The first took place in April 1988. --- Please, be so kind to acknowledge the reception of this letter.

Sincerely yours, Stefan Marinov

OPTICS LETTERS
A publication of the Optical Society of America

16 November 1988

Dr. Stefan Marinov
Institute for Fundamental Physics
Morellenfeldgasse I6
A-8010 Graz, Austria

Re: Ms. #599A, *Silvertooth's Experiment for Measuring the Aether Drift is Inconclusive*

Dear Dr. Marinov:

I regret having to send you yet another adverse report on your manuscript. I sent your resubmitted manuscript to the original reviewers. I am enclosing a copy of their comments which reaffirm their earlier stand on the paper.

Again, I am sorry I cannot send you a more favorable report.

Sincerely yours,

P. L. Kelley

P. L. Kelley

SECOND REPORT OF FIRST REFEREE

Ms. 599A

Author: S. Marinov

Title: Silvertooth's Experiment For .....

The author has not answered the objections raised in the previous referee report. Furthermore, I do not agree with the author's basic viewpoint: "I show that there are TWO substantially different invariance, the Lorentz and the Marinov invariances. The first is to be used when the observed particle changes its velocity, while the second is to be used when the observer changes his velocity".

Therefore, I cannot recommend that this paper be published in the Optics Letters.

SECOND REPORT OF SECOND REFEREE **QUESTIONS**

MS # 599A
REV # 2a

SCIENTIFIC CONTENT

1. Is the paper of good scientific quality? Is it an original and significant contribution?
   No.
2. Is the paper clearly written? Are the assumptions clearly stated and procedures adequately outlined?
   yes, but assumptions are questionable.
3. Is the paper reasonably self-contained?
   yes, except for absolute space-time theory.
4. Are values given for all the important experimental parameters? Are the numerical data backed up by a description sufficient for procedure replication and critical assessment?
5. Is the work placed in proper context with related work?
   yes
6. Does the title identify the subject matter clearly?
   yes
7. Is the abstract sufficiently informative, concise, and clear?
   yes
8. Are the tables and figures well used and effectively presented?
   yes

SUITABILITY FOR *OPTICS LETTERS*

1. What is novel, stimulating, or newsworthy about this work? (Explain below.) Does the author make this clear?
   Expected null result for previous experiment.
2. If you question the novelty of this work, can you cite references?
3. Would rapid publication affect the research of others?
   no.
4. Would this Letter interest a substantial part of the optics community?
   no.
5. Is there a more appropriate journal for this article? If so, which?

COMMENTS (If necessary, put on separate page and write See Attached here)

I have nothing to add to my first report and the comment of the other referee. The analysis of experiments is based on an unsubstantiated theory of doubtful validity. The author's reply does not change my opinion.

Check if the revisions you request should be optional ____ or mandatory X. Assuming revision, where required, by the author(s), please indicate your recommendation below.

X			
Strongly against publication in *Optics Letters*		Neutral	Strongly for publication in *Optics Letters*

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

18 November 1988

Dr. John Maddox
NATURE
4 Little Essex Street
London WC2R 3LF

Dear Dr. Maddox,

I write you this letter for TWO reasons:

1) The last time the English Embassy gave me an entry visa with very great difficulty (may be you were informed that the Consul spoke a couple of times with Miss Mary Sheehan before issuing me the visa). The Consul said me that the next time I have to ask for a visa at least three weeks before my departure and that I must present enough evidence for the necessity of my trip. Thus I beg you very much to write to the British Consul in Graz to the address: The Consul, British Embassy, Reisnerstrasse, Vienna, Austria an invitation letter for me and to send me a copy of this letter as soon as possible.

2) The second reason is scientific. You do not give me an answer whether you will publish my paper ABSOLUTE AND RELATIVE NEWTON-LORENTZ EQUATIONS submitted to you on the 4 October 1988. In that paper there is nothing about the violation of the laws of conservation. The logic and the mathematical apparatus is for 16-years old children. Objections CANNOT be made, as one cannot object that 2 + 2 = 4. I beg you very much to accept this paper and to compose it, so that when I shall come to London I can make the corrections in your office. This paper was rejected by PHYSICAL REVIEW LETTERS as "premature" (the rejection letter is enclosed). PHYSICAL REVIEW LETTERS rejected as premature also another extremely important paper entitled

PROPULSIVE AND ROTATING AMPERE BRIDGES VIOLATE ...

which I submit now to NATURE (the copy is enclosed as well as the rejection letter of PHYS. REV. LETT.). This is a report on the recent machine constructed by me which is FANTASTIC. Everybody will say that the machine does not rotate, but it rotates and moreover has back induced tension. PHYS. REV. LETT. motivates the rejection with the motivation that it considers three of my papers:

1) Maxwell's displacement current does not generate magnetic field (submitted to NATURE on the 18 August 1988),

2) Extremely easy experiment violating the angular momentum conservation law (where I present the report on my Rotating Ampere Bridge with displacement current - the machine is described in my paper THE MYTHS IN PHYSICS, submitted to NATURE on the 18 August 1988),

3) Physical essence of the Maxwell-Lorentz equations (not submitted to NATURE).

But PHYS. REV. LETT. considers these papers more than three months. It can consider them other three months and then send me a rejection letter with the stupid comments of some relativists (as a rule - see TWT- I, II, III (IV in press) - the relativists can write only STUPID comments).

Dr. Maddox, it is not more possible to cover my experiments and my CHILDISH theory with silence. I beg you to call me as soon as possible to London, so that I can explain to you and to your advisers the scientific truth, althouth this truth is SO SIMPLE that one becomes persuaded only by reading my papers ONE TIME, no more than ONE TIME. On the other hand this scientific truth which I have revealed (and which, as a matter of fact is CONTAINED in the LORENTZ EQUATION!!!!) offers the way to produce energy from nothing. If I shall put my RAF-machine in liquid helium, then this machine which you see on the picture will rotate eternally - of course, there will be the problem with the sliding contacts as mercury will be no more liquid, but the internal resistance will be so low that the flowing current will drive the machine as crazy. I must come to money to be able to carry out all these experiments. But I can come to money only after publishing papers, so that the world can see what have I done. You said me once on the phone that I have not to come to money. WHY? Because I will blow up the whole contemporary economic order? I shall blow it even without coming to money, but in longer time, as the scientific truth cannot be supressed.

Hoping to receive finally a letter from you, Yours,

Department of Electrical Engineering,
The University, Southampton . SO9 5NH. England
Tel. 559122
Telex. 47661

22 November 1988

Dr. Stefan Marinov,
Morellenfeldgasse 16,
A-8010 GRAZ,
Austria.

Dear Dr. Marinov,

In reply to your letter of 13 November, since I have put a lot of time into the electrodynamic law question over the past 30 years, I am ready to offer you the enclosed 10 page paper for inclusion in TWT-IV.

I will be happy to purchase one copy of that work, if you would kindly send it to me upon publication.

Having seen you briefly in the conference lobby at the September Imperial College meeting, I had assumed that you were to be present at that event. The organizer opened the conference a few minutes late, excusing the delay by saying that he had turned someone away who was projecting ideas on perpetual motion and seeking to sell books. Your name was not mentioned, if I recall correctly.

That meeting was not an 'anti-relativity' meeting, but it was open to ideas on interpretations which were tolerant of the aether and brought together some very interesting and experienced people.

Dr. Pappas had some late paper submissions which tended to be pushed out of sight. He was lucky to get a few minutes in the closing stages to put across the gist of their contents. However, I am pleased to see that, acting on my advice, he visited the Editor of a U.K. journal and that his joint paper with Obolensky on faster than light signals was accepted for publication this December. I refer to it in the paper sent herewith.

Let us hope that 1989 will see a breakthrough in attitude on the relativity front. There is just too much mounting evidence against that theory for it to survive much longer.

Yours sincerely,

H. Aspden

Editorial note. The contribution of Dr. Aspden entitled "The electrodynamic route to anti-gravitation " is published in this volume.

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

23 November 1988

Prof. J. P. Vigier
PHYSICS LETTERS A
11 Rue P. et M. Curie
F-75231 Parix Cedex 05

Papers: V726a, V727a

Dear Prof. Vigier,

Thank you very much for your letter of the 10 November which I received only yesterday.

I give my comments to the referee's reports. My comments are rather long, but I think that it is necessary. Only in this way you and your referee will understand the importance of my experiments (and theory, which is the most CHILDISH theory based on the Lorentz equation).

I send you slightly corrected versions of both papers. THESE VERSIONS must be printed.

The referee has suggested at the end of his comments to paper V727a that I "expand my discussion of this experiment (the Rotating Ampere Bridge with displacement current experiment) to the point where a reader could assess its significance." Of course, I can add one, ten, or hundred pages to explain the significance of this experiment. But I think that what is said is ENOUGH. Any person who knows who Newton was, will IMMEDIATELY grasp the significance of this experiment. I have submitted my discoveries for world patents and at the award of the patent licences will be ready for sale.

I hope that, taking into account the importance of my discoveries, you shall proceed quickly for taking your decision, so that persons who know who Newton was and what has he said can learn about my experiments and come to knock on my door for asking to buy licences.

Thus hoping to hear from you soon and hoping that you have already received the NEW VERSION of my paper PROPULSIVE AND ROTATING AMPERE BRIDGES VIOLATE THE PRINCIPLE OF RELATIVITY, sent on the 11 November, I remain

Sincerely yours,

Stefan Marinov

PHYSICS LETTERS A
Paper V726a

AUTHOR'S ANSWER TO THE REFEREE'S REPORT ON THE PAPER
"MAXWELL'S DISPLACEMENT CURRENT DOES NOT GENERATE MAGNETIC FIELD"
by Stefan Marinov

The referee begins his comments with the following sentence: "Marinov postulates two properties which a current must have. It must be able to generate and to react to magnetic fields." - Why 'Marinov postulates'? Those are the FUNDAMENTAL properties of electric current: to act on other currents with potential forces (of the kind $\mathbf{F} = \partial W/\partial \mathbf{r}$, where W is the potential energy of the currents) and to react with kinetic forces (of the kind $\mathbf{f} = m\mathbf{u}$, where m is mass and $\mathbf{u}$ acceleration) to the action of other currents. This is clear to ANY CHILD who has understood what physics is. Maxwell, however, invented the SENSELESS notion "displacement current" which, according to Maxwell, acts on other currents with potential forces but cannot react to the potential forces of other currents by kinetic forces and hundred years after Maxwell the professors cannot understand (being NOT children!) that this "displacement current" is a pure fiction. Indeed, the space between two capacitor's plates cannot react with kinetic forces to the potential forces of other currents because only MASSES can demonstrate kinetic forces, and, in general, only masses can do something in physics, thus only masses can generate potential forces (note that in my theory mass and energy are two names - with different dimensions - of the same thing, which is the ONLY thing which exists in the world - see CLASSICAL PHYSICS, or at least EPPUR SI MUOVE). Vacuum can do nothing because vacuum is a vacuum, is a vacuum, is a vacuum (Gertrude Stein).

The referee writes that I am limited (even "too limited"!) in my definition of current and that "it has long been held that electromagnetic energy can be stored in vacuum". WHO has shown that electromagnetic energy can be stored in vacuum: WHO, WHEN, WHERE, HOW? Nobody, nowhere, never and nohow has done this and we finally must throw away from our textbooks the MYTH that electromagnetic energy can be STORED in vacuum.

Electromagnetic energy exists only in the following two forms:

1) as potential electric and magnetic energies in the forms

$$U = q_1 q_2 / r, \qquad W = q_1 q_2 \mathbf{v}_1 . \mathbf{v}_2 / c^2 r, \tag{1}$$

where q_1, q_2 are the electric charges and $\mathbf{v}_1$, $\mathbf{v}_2$ the velocities, the distance between whom is r,

2) as radiated electromagnetic energy with an energy flux density (i.e., quantity of energy passing in a unit of time through a surface unit placed perpendicularly to the energy flow)

$$\mathbf{I} = (c/4\pi)\mathbf{E}_{rad} \times \mathbf{B}_{rad}, \tag{2}$$

where $\mathbf{E}_{rad}$ and $\mathbf{B}_{rad}$ are the electric and magnetic intensities radiated at the considered reference point (small space domain) because the particles of a certain system of elec-

tric charges have moved with accelerations at the moment t' = t - r/c, where r is the distance between the system and the reference point and t is the moment when the radiated by the charges energy crosses the reference point. $\mathbf{E}_{rad}$ and $\mathbf{B}_{rad}$ must not be confounded with $\mathbf{E}_{pot}$, $\mathbf{B}_{pot}$ which are determined only by the charges, their velocities and their distances to the reference point. Thus the electromagnetic energy is either referred to the charges of the considered system or leaves the system and propagating with a velocity c disperses in the world. There is NO other form of electromagnetic energy. If the referee has heard or read that somewhere somebody has established the existence of OTHER kind of electromagnetic energy, thus of ENERGY STORED IN THE VACUUM, I beg him to inform me. But I am not interested to learn what somebody has written on certain piece of paper about such stored energy, because on the paper the most monstruous stupidity can be written. I wish only to know whether somebody has EXPERIMENTALLY ESTABLISHED the existence of stored electromagnetic energy. No, dear referee, nobody has SEEN stored electromagnetic energy. If a parallel light beam will be reflected by a mirror placed perpendicularly to the beam and the interference of the falling and reflected beams is 100%, then SEEMINGLY through a cross section to the beam there is no flow of energy and one can say that energy is "stored" in the volume between the source and the mirror. However, if the light source will be estinguished, the "stored" energy disappears immediately. In such an experiment simply energy goes in two opposite directions.

Bartlett and Corle (ref. 1 in my paper) have written a paper under the title "Measuring Maxwell's displacement current inside a capacitor". One can measure current in the following three ways:

1) By ohmic heat - for displacement current not possible, as one cannot heat vacuum.

2) By acting with magnetic fields (with potential magnetic forces) and by observing the kinetic forces of the current - for displacement current not possible, as vacuum cannot move with acceleration and demonstrate ponderomotive action because vacuum has not "pondus", i.e., has not "weight".

3) By measuring the magnetic action of the current, i.e., by observing the ponderomotive motion of other currents on which the given current acts with potential forces.

Bartlett and Corle have tried to use this last and unique way for "measuring displacement current". And they have given a report (VERY BADLY WRITTEN, as are written the reports of 99.9% of the Americans), from which it follows that they have succeeded in measuring the magnetic action (on a superconducting quantum interference detector) of the displacement current whose density is given by the formula

$$\mathbf{J}_D = (1/4\pi)\partial\mathbf{E}/\partial t = (\mathbf{n}/4\pi d)dV/dt, \qquad (3)$$

where E is the electric intensity generated by the charges on the capacitor's plates in the space between the plates, V is the electric tension between the plates, **n** is the unit vector from the positively charged plate to the negatively charged, and d is the

distance between the plates. And Bartlett and Corle conclude their report with the words: "The agreement between measurement and theory is at the level of 5%".

Then Bartlett and Corle write:

> "But what if we use the Biot-Savart law? Do we need to consider $\mathbf{J}_D$ as well as $\mathbf{J}_C$ ($\mathbf{J}_C$ is the density of the conduction current in the wires along which the electrons come (go away) to (from) the capacitor's plates - S. M.)? Curiously we do not. As French and Tessman have shown, in any quasi-static (?! - S.M.) measurement **B** can be found from the conduction current alone."

Bartlett and Corle obviously have not understood that the magnetic field which one measures is generated by the SUM of the magnetic intensities generated by ALL current elements of the considered system. If the displacement current is CURRENT, then multiplying it by the distance between the plates one obtains its current element. And the magnetic field which Bartlett and Corle have measured was the SUM of the magnetic intensities generated by the current elements of the conduction current and the current element of the displacement current. The former current elements can be NOT substituted by the latter. That magnetic field is generated by conduction current, nobody argues. The problem is whether the current elements of the displacement current give additional contributions or not. Bartlett and Corle make an experiment at helium temperatures with superconducting quantum interference detector, supported by the National Bureau of Standards, the National Science Foundation and the Research Center, but have not understood the most childish aspect of the problem (this is the case with 99.9% of the American physicists).

And the referee of PHYSICS LETTERS comments: "Ironically in their recent experiment Bartlett and Corle do acknowledge that the displacement current is not strictly (!? - S.M.) needed for an understanding of their result." According to the laws of the formal logic if something is strictly not needed, then non-strictly it is needed.

And here other smelling flowers from the referee's logical garden:

> Their (of Bartlett and Corley - S.M.) reason is different from Marinov's. In their closing paragraphs B & C state that for quasi-static (?! - S.M.) phenomena, magnetic fields can, but need not, be viewed as arising from conduction current alone.

First the referee (as well as Bartlett and Corle) have to precise until how many Hertz the phenomena are quasi-static and when they begin to be quasi-unstatic - 50 Hz, 50 KHz, 50 MHz? Then I shall discuss the other monstruous illogicality of the above phrase.

Then the referee writes: "Marinov does attempt a calculation (I did not an attempt, I DID the calculation - S.M.) of the field inside the B & C capacitor from conduction currents alone. Unfortunately his treatment on p. 3 is only valid for the case where the separation between the plates d is much greater than their radius r."

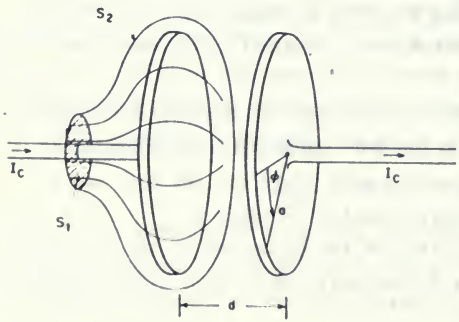
First, by r I designate the distance from the axis of the capacitor to the reference point, the radius of the plates is designated by R. Secondly, it is true that in my cal-

culation I suppose R/d tending to zero. But the referee has NOT the right to assert that at R/d not tending to zero the calculation will be wrong, as until now NOBODY has done such a precision in the calculation and that's me who first conducted an experiment showing whether my calculation will be true also at R/d not tending to zero. The calculations in my experiment have been done for R/d tending to zero but the experiment has shown that for R/d = 4/6 the results coincide (0.71 calculated, 0,71 measured) and for R/d = 4/1 there are some small discrepancies (0.95 calculated, 0.97 measured). Hence the referee has to withdraw his pathetic "unfortunately" because FORTUNATELY the measured result depends VERY FEEBLY on the relation R/d. It is always very easy to raise doubts against some calculations. But one has always to present PROOFS for one's doubts. (Не надо очень большого ума, чтоб все отвергать и хаять. Маяковский в стихотворении НЕВЕРНЫЙ ФОМА.)

But the referee showes then total incompetence in electromagnetism, adding: "This limit (the R/d limit - S.M.) is the exact reverse of the B&C measurement. There the magnetic field was measured directly inside a thin parallel plate capacitor."

This phrase shows that according to the referee the plates of the capacitor will shield the magnetic field of the conductions currents and thus if magnetic field is being measured in the space between the plates, it can be generated only by displacement current. Dear referee, take a wire and a magnetic needle. Look at the deflection of the needle when sending current along the wire. Cover then the wire with a metal non-ferromagnetic cylinder. Switch on the current. The deflection will be exactly the same. My God! A referee of PHYSICS LETTERS!

I describe my capacitor with the following words: "... a cylindrical capacitor with a variable distance, d, between its plates, to which alternating current along long enough wires was conducted..." And after a couple of sentences I write: "The distance between the plates was changed from d = 0 to d = 6 cm... The radius of the plates was R = 4 cm." But the referee writes: "Unfortunatlely (obviously, the fortune visits the referee rarely - S.M.) without a figure I cannot be sure whether the capacitor was cylindrical or circular. (Marinov states it was cylindrical, but then mentions "plates" whose separation could be changed from 0 to 6 cm)." My capacitor had exactly the same character geometrical as that of Bartlett and Corle (see the figure). Such a capacitor can be called cylindrical with circular parallel plates. I beg the referee to give a name which will suite better.



Then the referee writes: "Unfortunately, Marinov does not give the details of his theoretical predictions. Was he using eq. (4)?..."

Instead to pose pathetic questions and to consume the time of the editor and my own, the

referee had to take equation (4) and to make the following childish calculation

$$\frac{B_{d=1}}{B_{d=0}} = \frac{B_\infty - B_1}{B_\infty} = \frac{1 - d(d^2 + 4r^2)^{-1/2}}{1} = 1 - 1(1 + 400)^{-1/2} = 1 - 1/20 = 19/20 = 0.95,$$

as I have put r = 10 cm for the distance between the axis of the capacitor and the reference point. Exactly this figure 0.95 would then the referee find in the first row of table 1 in the column "Marinov's theory".

The referee concludes his report with the following questions:

a) By using barium titanate for a dielectric Marinov can dramatically increase the current, but the nature of current seems also to change. Instead of displacement current flowing through vacuum, we now have largely a polarization current in matter.

b) The dielectric constant of barium titanate is very temperature sensitive. Did the author try to control temperature.

c) The technique of increasing the capacity of plates by etching is not known to me. A 100-fold increase is rather dramatic. Could the author give reference for this technique.

My answers are the following:

a) It is true that by using medium with a high dielectric constant instead of "displacement current" we have, let us call it, following the referee, "polarization current". As the relation between displacement to polarization current in my experiment was of the order of $1:10^4$, I have practically established whether the polarization current does generate magnetic field. The answer of the experiment is: NO!

But with polarization current also a ponderomotive experiment can be done: Put a piece of cylindrical dielectric between the plates of a cylindrical capacitor with circular parallel plates, so that the dielecric can slide with small friction between the plates and whose radius is much smaller than the radius of the plates. Put this capacitor in alternating magnetic field perpendicular to the axis of the capacitor and having the same frequency as the frequency of the current flowing through the capacitor. Look whether the cylindrical dielectric will move (whether it will show kinetic forces as a reaction of the acting on it potential magnetic forces). My prediction is: NO! The dielectric will not move. Which is the prediction of the referee? His prediction in THIS case is VERY IMPORTANT.

b) I have not controlled the temperature. This was ABSOLUTELY NOT NECESSARY, as I always measured the flowing current which at ANY measurement was maintained at I = 10 mA. Dear referee, these referees' tricks with the "temperature"-questions are already very obsolete. When the referee has nothing to object, he poses the following questions: Was the experiment done in temperature controlled room? Has the author seen which will be the result in vacuum? Have been taken into account the seismic disturbances? Which was the distance from the experimental room to the toilet? Etc. etc. etc.

c) The third question of the referee is GOOD. The production of the capacitor is rather complicated and delicate problem. And this is the CLUE of the experiment, as

to have considerable current between largely separated plates, the capacitance must be high enough. This claim is not so hard for the experiment under discussion, as the Hall sond gave reliable indications also for currents of the order of milliamperes. However, for the Rotating Ampere Bridge with Displacement Current (paper V727a) the flowing current must be of the order of amperes because only such current can set the bridge in rotation, even though I did all to have a relatively light bridge and minimal friction of the pointed ends of the axles. To give more information on the production of the capacitors, I added a couple of lines to paper V727a.

Now to the questions of the referee: The contact-man of the capacitors plant Siemens in Deutschlandsberg, to whom I gave the order for producing the capacitors for my experiments told me that they use the etching method for increasing the surface until 100 times. This figure seems also to me highly exagerated. But the plant gave me a capacitor whose capacitance was 640,000 times bigger than the one which I calculated according to the geometry for vacuum. As it was said to me that the dielectric constant of the product Y5U 153 UL was $\varepsilon = 1.5\times10^4$, consequently the capacitance was 43 times bigger than this one which I obtained calculating with $\varepsilon = 1.5\times10^4$. I suppose the company has some technological secrets for the production of such capacitors. The referee can address himself directly to the company for more detail but I hardly believe that he will receive some. The address of the company is: Kondensatorenfabrik SIEMENS, Siemensstrasse 43, A-8530 Deutschlandsberg, Tel. 03462/2800, Fax 03462/2800-236.

PHYSICS LETTERS A
Paper: V727a

AUTHOR'S ANSWER TO THE REFEREE'S REPORT ON THE PAPER "EXTREMELY EASY EXPERIMENT DEMONSTRATING VIOLATION OF THE ANGULAR MOMENTUM CONSERVATION LAW" - by Stefan Marinov

After giving a pretty reasonable introduction, showing that he has understood the essence of my experiment, the referee writes:

> I differ, however, in the analysis of the case at hand: a complete circuit loop interacts with an isolated element in a second circuit. In contrast to Marinov, I believe that both laws give the same prediction here. My thinking is strongly influenced by the lucid summary in Whittaker's, A HISTORY OF THEORIES OF THE AETHER AND ELECTRICITY, pp 84-87 (Vol. 1). I am enclosing a copy of these pages.

First: I have nowhere written that the Ampere and Grassmann forces with which a closed loop acts on a current element of another loop are different. And this alternative is NOT a question of belief or misbelief, as any specialist in electromagnetism knows that these two forces are EQUAL. This was shown for the first time by R. C. Lyness, Contemp. Phys., **3**, 453 (1961-2). Christodoulides in PHYSICS LETTERS A, **120**, 129 (1987) has demonstrated a PART of Lyness' theorem, namely he has shown that these two forces are perpendicular to the current element. As Christodoulides has not cited Lyness, it is obvious that neither he nor his referees in PHYSICS LETTERS had been informed that Lyness has proved a more general theorem, namely that these forces are not only perpendicular but also equal. Consequently I do not understand the Editor of PHYSICS LETTERS: why he sends my paper to a person who is not a specialist in the field and is not well informed about the status quo. Instead to send me pages of the archaic Whittacker's book, the referee has to read the scientific production of me and of my colleagues: Pappas, Aspden, Graneau, Jolly, Mössides, Kolt Whitney, Christodoulides (now he knows the Lyness demonstration) who have published papers on the controversy Ampere-Grassmann IN PHYSICS LETTERS and to other scientists as Wesley, Allen, Deis, Sherbarth, Ferrentino, Peoglos, etc., who have published papers on this controversy in other journals or have done excellent experiments on the Ampere bridge forces. I am not obliged to teach to the referee things which he must know if he considers himself as a specialist in the field.

Thus according to Ampere and Grassmann a closed current loop acts on a current element of another loop by the same force, but according to Grassmann the current element acts on the loop by a force different than this one predicted by Ampere. Let us take for simplicity a single loop. I showed (see my paper) that the one part of the loop acts on the other part according to Ampere and according to Grassmann by forces which are equal and oppositely directed. However, if in one of the parts a certain current element will be exchanged by a displacement current element (i.e., will be substituted by a condenser), then the forces with which these two parts of the loop act on one another are NO MORE equal and oppositely directed according to Grassmann, while according to Ampere they will be also in this case equal and oppositely directed. Here is the dog buried.

Then the referee writes: "In sum, it is not Marinov's experiment which is novel." -

My God! - I construct a machine which invalidates the angular momentum conservation law, and the referee writes that this is not novel. Dear referee, it is too feeble to say that my experiment is novel, as it is a WONDER. In October 1987 I went to Acad. Sakharov in Moscow to inform him about my experiments which violate the laws of conservation and said him the following: "Andrei Dmitritch, to see an isolated body rotating by internal forces is for a physicist a bigger miracle than for a Christian to see Saint Mary." This is a MIRACLE, dear referee, a MIRACLE, although this miracle can be easily explained by the most simple Grassmann formula which is known since 1845.

Then the referee writes: "He (Marinov - S.M.) has acknowledged that Graham and Lahoz (ref. 8) have already published the results of a similar experiment." Dear referee, Graham and Lahoz have published an experiment which is similar to my Bul-Cub machine without stator (as a matter of fact, my Bul-Cub machine without stator is a very effective development of the Graham and Lahoz experiment, as I succeeded to rotate by internal forces a body of about 2 kg, while Graham and Lahoz could only bring into oscillations a capacitor of some milligrams). However, the magnet in the Graham and Lahoz experiment is solid to the laboratory and the supporters of the Ampere law (as my friend Pappas - see The Thorny Way of Truth, Part III, sec. ed. p. 254) assume that the reaction is absorbed by the cylindrical magnet which must receive an opposite torque, while in my Bul-Cub machine the magnet is solid to the capacitor and the whole system rotates CONTINUOUSLY as a single body.

Then the referee writes: "It is rather Marinov's interpretation (of Graham's experiment - S.M.) which is novel." This is true. Graham and Lahoz suppose that the opposite angular momentum of reaction (which must appear so that the law of its conservation can be saved) GOES STORED IN THE ELECTROMAGNETIC FIELD! But I have calculated that if my Bul-Cub machine without stator will rotate 10^{1000} years then the angular momentum which will be stored in the electromagnetic field will be as big as the Earth's angular momentum, or even as this one of the Sun.

Let us now leave aside the Graham and Lahoz experiment and my Bul-Cub machine without stator as my article is dedicated to my experiment which I called "Rotating Ampere Bridge with Displacement Current" (to discern it from my recently constructed "Rotating Ampere Bridge with Sliding Contacts"). The referee writes: "To show a violation of the law of conservation of angular momentum it is necessary to show that a total angular momentum for an isolated system spontaneously changes."

My Rotating Ampere Bridge shows the following: Current conducted along two infinitely long collinear wires sets in rotation a body suspended on the extremities of two axles through which the current mounts on the body. According to the referee, such an experiment is not a sufficient demonstration of the angular momentum conservation law. Well. Can the referee show another electromagnetic machine which can rotate in this way? NO! He cannot not as another such machine DOES NOT EXIST. Thus one must consent that my machine is novel. And when Prof. Vigier will print my paper, then all those who know

what angular momentum and what conservation of angular momentum is will fall on their knees exclaiming: This is a miracle! And the referee, seeing that all fall on their knees, will, of course, also do the same.

Then the referee writes: "Marinov does give a partial description of two experiments: one linear, the other angular. Unfortunately neither experiment gives a quantative conclusion."

I give the formula (formula (5)) with which one can calculate the force on a current element of the "shoulder" in Ampere's bridge. By integration one obtains the total force. There is an unpleasant aspect arising when integrating the forces at the corners, as here singularities appear. Many persons have tried to give an exact calculation for the total force (in 1983 Moysidess spent 6 months for such calculations). But it is difficult to give an exact calculation, as this calculation depends substantially on the geometry of the bridge (thickness of the wires, geometry of the bending, distribution of the current at the wire's cross-section). In TWT-II, third ed. p.97 I give an approximate calculation which splendidly coincides with the very good measurements of this force carried out by Pappas and Moysidess.

But now in my rotating Ampere bridge experiment I am not interested to calculate the magnitude of the torque, as I am interested only in one thing: to show that there IS a force and to set the body in rotation. Because, I know well that after doing this everybody who knows what is physics and who is Newton will fall on one's knee exclaiming: A MIRACLE!

Now I have constructed my Rotating Ampere Bridge with Sliding Contacts (the report is presented in the paper "Propulsive and Rotating Ampere Bridges Violate the Energy Conservation Law" which is submitted to PHYSICS LETTERS) which shows not only that something rotates in such a manner that Newton has to turn in his grave, but which is a powerfull machine where also energetic measurements can be made. And the machine has shown that the rotating Ampere bridge, being an electromotor, has back tension (conventional physics uses the wrong term "b.e.m. force").

The referee concludes his comments with the following questions:

a) What result does conventional theory predict?

b) What result is measured?

c) How does the rotating Ampere's bridge differ from the Graham and Lahoz apparatus?

d) Where do currents flow in figs 4 and 5? Where are the electric and magnetic fields in these figures?

The answers to all these questions are given in the paper. I shall only repeat them:

a) The conventional theory (Newton) affirms that an isolated body cannot be set in rotation by the help of internal forces, or more precisely, taking into account my experiment: If conducting current to a body along a very long axis, one cannot set this body into rotation about the axis as the current flowing along this axis cannot receive

the opposite torque which, according to Newton, must inevitably appear.

b) I observed rotation of the body.

c) Very much.

d) The charges come (see fig. 4) along the lower axial wire and across the pointed end of the lower small axle mount on the outer surface of the lower internal cylinder. Because of the static induction, the same amount of opposite charges gathers on the internal surface of the lower external cylinder. This amount of charges comes in the form of conduction current from the internal surface of the upper external cylinder. Because of the static induction, the same amount of opposite charges gathers on the external surface of the upper internal cylinder. These charges come along the upper axial wire from the source of electric tension to which the lower axial wire is also connected. The magnetic fields in the experiment are the fields generated by wires in which the magnetic intensity is tangential to circles perpendicular to the wires. The electric fields are concentrated only between the cylindrical electrodes of both capacitors. If electromagnetic angular momentum can be stored, then the storage place can be only the space between the electrodes of the capacitors, as in the whole other space it is E = 0. Go, dear referee, go and look whether you can find your "stored electromagnetic angular momentum" between the capacitor's electrodes. The rotation is unidirectional and the moment of the frictional forces is also unidirectional. Hence when the time of rotation tends to infinity, the stored angular momentum must become infinitely big.

STEFAN MARINOV
Mariahilfgasse 16
A-8010 GRAZ — AUSTRIA

24 November 1988

Dr. R. W. Nicholls
Canadian Journal of Physics
Department of Physics
4700 Keele Street
North York, Ontario M3J 1P3

Dear Dr. Nicholls,

Thank you very much for your letter of the 11 Nov. 1988, although the rejection of my paper GR-78 "Very easy demonstration..." was not, of course, pleasant for me.

The referee rejects the paper with very short comments giving two motivations:
1) My experiment is not different in principle from the experiment of Graham and Lahoz (although I bring 2 kg into continuous rotation, while G&L bring some mg in oscillation!).
2)My interpretation about violation of the angular momentum conservation law is wrong. Right is the "conservative" interpretation that the opposite angular momentum goes stored in the induction (I prefer the term "potential") electromagnetic fields.

I think that the report on such an important experiment cannot be rejected on the basis of these two motivations. You add in your letter as disturbing factor also the "narrative conversational, first person singular style". Also this cannot be a motivation as the disturbing sentences in my paper can be easily omitted. I do not wish to cancel them, but I am ready to make a compromise in order to see my paper published.

I like very much that the paper should be reconsidered and sent also to another referee. Why not choose as such "second referees" Graham and Lahoz (Department of Physics, University of Toronto, Toronto M5S 1A7). I expected that you shall send the paper to them, but I see that you have chosen another person. May be, after reading my report, G&L will change their opinion and will treat their experiment as violating the angular momentum conservation law. Then the glory for the first violation of this law will come to Canada.

The experiment was done at the end of the summer 1987. Until now (almost a year and a half after its execution) I cannot publish the report on it. The report was rejected by EUROPH. LETT., PHYS. LETT. A and PHYS. REV. LETT. I send you my WHOLE correspondence with PHYS. REV. LETT. on this paper which is published in my collection of documents THE THORNY WAY OF TRUTH, Part III (TWT-III), where also the correspondence with EUROPH. LETT. and PHYS. LETT. A is published. At interest I can send you also the book (a photocopy of the cover is enclosed).

I think, dear Dr. Nicholls, that "established science" has gone too far: the report on a historical experiment has been rejected by four leading physical journals. To how many journals have I to submit it? I must add that the motivation of EUROPH. LETT. and PHYS. LETT. A was exactly the same: The interpretation of Marinov is wrong, the opposite angular momentum is stored in the electromagnetic field. But when I asked, how can one reveal the existance of this stored momentum, only one of the referees of PHYS. REV. LETT. gave an answer: "By discharging the condenser". Meanwhile I calculated that if my machine will rotate 10^{1000} years the "stored" angular momentum will become as big as that of the spinning Earth. --- Dear Dr. Nicholls, reading the opinions of the referees on this experiment and the rejection letters of the editors, I become afraid: Are we thinking men? Have we lost the most elementary human logic? - There is a body suspended on two pointed axles and it rotates continuously under the action of internal forces. This is a WONDER, as another such machine DOES NOT EXIST. Is it not the most logical step to publish the report on this experiment, so that the scientific community learns about it. Let us THEN discuss the theoretical aspects. But not BEFORE having brought the INFORMATION on this experiment to the eyes of the world physicists. --- I shall be very glad if you will attentively read my correspondence with PHYS. REV. LETT. and then publish my report. I am tired to send it to a fifth journal where, I am sure, the reaction will be exactly the same, as MAN is afraid to accept a MIRACLE.

For the case that after the re-submission of my paper an automatic RE-REJECTION will follow, I submit also another paper (in two copies)

ABSOLUTE AND RELATIVE NEWTON-LORENTZ EQUATIONS.

As a reference to this paper I send you my paid advertisement in NEW SCIENTIST, for which I have paid $ 6,000. If the paper will be rejected and the referee will deduce on a piece of paper the formula $\mathbf{E} = -\mathbf{v}\times\mathbf{B}$ working in a frame in which the magnet generating the magnetic field $\mathbf{B}$ moves with a velocity $\mathbf{v}$, I shall gladly send him $ 3,000.

Hoping to receive your reception acknowledgement and then in due time also your final decisions,

Sincerely yours,

Stefan Marinov

Edit note. The letter was not answered.

TECHNIDYNE ASSOCIATES
Alternate Energy Systems

P. O. Box 11422
Clearwater, FL
34616 - U.S.A.
(813): 442-3923

Stefan Marinov
Morellenfeldgasse 16,
A-8010 Graz, AUSTRIA

November 26,1988

Dear Stefan Marinov:

We are responding to your letter to our colleague,Rolf Schaffranke,as per your letter to him of October 22,1988.

Enclosed is some nearly complete information on the excellent Swiss M-L Converter,or"Testatika",as Methernitha calls this outstanding free energy system.

Our group and others in this country have been struggling to understand this remarkable F/E technology for over two years,and have recently come to understand how this system actually works,and its various construction details.

This has been a joint-effort onthe part of several alternate energy researchers here, and particularly in Denmark,by Mr. Albert Hauser and his colleague Mr. Bjarne Glargaard who have been most helpful and cooperative in this present effort.

We now believe that we are at an approximate 90% understanding of the physical principles -behind this F/E technology, such as the Coler Effect,the Poggendorff principle,and connections to some early F/E units.

Although you may already have many of the parameters to this S.C. system,as mentioned in your letter to Rolf, some of this material is now probably outdated,in the light of the latest progress made in our prototype development efforts here.

At the present time we have five,independent researchers over here involved in the re/construction of this S.C system,and also one in New Zealand.

We now have a mini-network operating so that we exchange data and generally co-operate in this prototype effort.

At this point in all this project work we are completely convinced that this Swiss Converter system is the very best of all the various project free energy machine on the current scene!

We hope that this data and information on the Swiss M-L (Methernitha-Linden) Converter will be useful and of interest to you,at this time.

Yours truly,

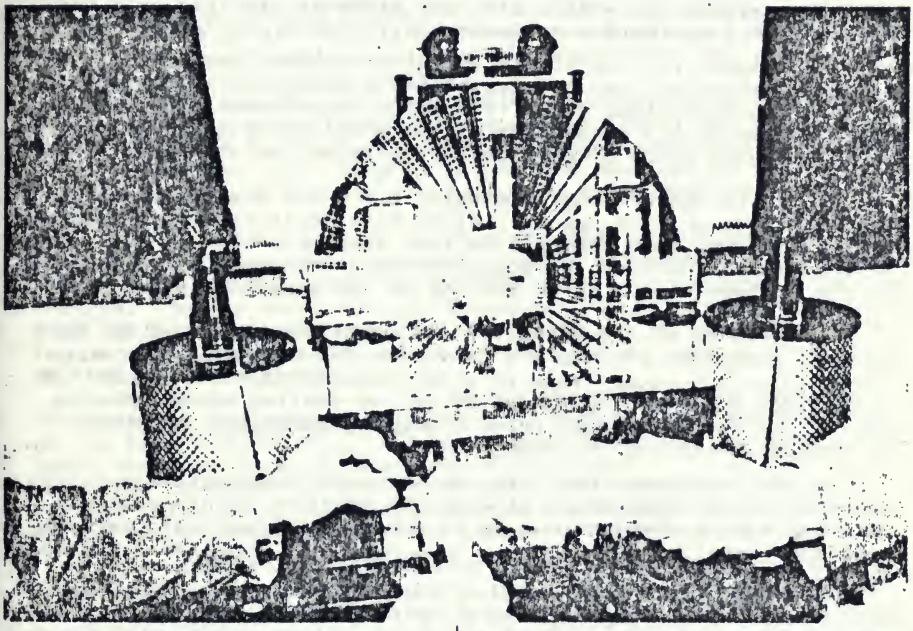
encl:(2)

D.A.Kelly

Editor's Note: The following descriptive analysis of the SWISS M-L CONVERTER was sent to us from Mr. Don Kelly of Electrodyne Corporation located in Clearwater, FL, you can contact him at (813)-442-3923. The group that has the Swiss M-L Converter is the SEVENSTAR CIRCLE group. This group apparently operates as a sort of commune and is not in the normal established system to produce a commercial product. This generator therefore has little outside knowledge, nor is the analysis considered to be perfectly accurate. This analysis was done from the available information. We present it here for information only.)

THE SWISS M-L CONVERTER

by DON KELLY



The Swiss M-L Converter is a fully symmetrical, influence-type energy converter, which is essentially based on the Wimhurst electrostatic generator with it's twin, matched counter-rotating discs. It is apparent that this unit design has been substantially upgraded over the old Wimhurst electrostatic generators, but still has the characteristic metallic foil sectors which both generate and carry small charges of electricity to be stored in matched capacitors. Each sector accumulates the charges derived by influence with the other sectors.

In the old Wimhurst units, diagonal neutralizing brushes on each opposite disc distribute the correct charges to the sectors as they revolve but in this new M-L Converter, this function is accomplished by a crystal diode at higher efficiencies than the older design. Two collection brushes collect the accumulating charges and conduct them to the storage capacitor, located at the top of this new design. Unlike the old Wimhurst design, this new converter utilizes several new and improved features, such as two horseshoe magnets with matched coils, and a hollow cylindrical magnet as a part of the diode function, and two Leyden jars or flasks, which apparently serve as the final capacitor function for the converter.

It becomes apparent that this new converter substantially increases the current (amperage) flow with the addition of the coil and magnets combination, as in the Coler solid- state devices. The use of top grade components, such as gold-plated contacts, control electrodes and dual capacitor stages insure much higher conversion efficiencies than was possible with the old Wimhurst machines.

The general specification for the operating prototype are:

1) *Efficiency: 1.10*, due to self sustaining operation. The unit is started by hand revolution, with no other input power source required.

Editorial note. See a better photograph of TESTATIKA in TWT-III, p.265

THE SWISS M-L CONVERTER, DESCRIPTION and ANALYSIS

The Swiss M-L Converter has been called the "King of the Converters" and when all the various features of this excellent free energy system are carefully considered it appears to have well earned this title.

This converter is an outstanding example of a hybrid energy conversion arrangement which utilizes both dynamic and solid-state components to achieve an extremely high over-unity output rating. Since the dynamic electrostatic generator operates as both a generator and a motor, the E/F feedback provides self-propulsion, and thus reaches a phenomenally high o/u/o level.

The dynamic portion of the converter system consists of a modified Wimshurst type of electrostatic generator, with its twin, matched contrarotating discs. The major improvement over conventional Wimshurst E/S generators is the addition of a set of "motorizing" brushes which provide self-propulsion for the dynamic twin discs.

As in the conventional Wimshurst E/S units diagonal neutralizing brushes on each opposite discs distribute the correct charge to the metallic, thin segments as they revolve. A set of two collection brushes collect the accumulating charges and conduct them to the storage capacitor at the top of the generator unit.

The choice of the Wimshurst electrostatic generator as the dynamic component for the M-L Converter has not been arbitrary, since this is a major-type of electrostatic generator which has a distinct polarity separation by way of the two contrarotating discs. The two large capacitive/transformer terminals are also polarized as (+) and (-) terminals.

It must be noted that this new converter substantially increases the current (amperage) flow by the addition of the multiple coil and magnet combinations, as in the Coler solid state devices, plus the essential high voltage transformation from the two lateral capacitive/transformers.

The Coler solid state devices (Germany/1945) were the first known devices to utilize the principle of flux enhancement by the use of permanent magnets in conjunction with coils wound directly over the matched permanent magnets. When these flux enhancement arrangements are tuned to their natural resonant frequency, the EMF output will be substantially increased, as was evident in the devices of both Coler and Lester Hendershot.

SPECIFICATIONS

Constant Power Output: 230 volts, - - at about 13 amperes for a 3KW rating, pulsed D.C.@ 50HZ.

*Dimensions: 110 cm, wide, 45 cm deep, 60 cm high
* 43,23", wide, 17.68" deep, x 23.58" high.

Weight: Approximately 20kg/or 44 lbs.

Self-propulsion by way of the E.S.F flow-principle of motorized brushes to revolve the twin Wimshurst E/S discs from fed-backed electrostatic flow, from polarized capacitors.

Starting Procedure: By hand revolving of the twin E/S discs. No other input power source required, after hand starting.

Use of a Wimshurst electrostatic generator with stl. steel segments, instead of aluminum - segments, as in some machines of this type. E/S generators of this type and size are rated at about 70KV. output (electrostatic) at about .002amperes.

Estimated Efficiency: 1: 10^6, due to self-sustained operation.

The Swiss Converter is a unique hybrid energy conversion system which combines dynamic high voltage techniques with a solid-state transformation and amplification in a continuous split-polarity output arrangement.

This is the first free energy concept which provides a fully symmetrical, split-polarity system which uses Tesla-type coil transformers and provides E.M.F. amplification, via the Coler Effect in a composite hybrid arrangement.

The major, unique feature in the solid-state portion of the system is the splitting of the transformer windings into (-) polarity for the right hand capacitive/transformer, and (+) polarity for the opposite left hand component.

The current amplification factor is provided by the addition of North pole exposed permanent magnets for the right hand transformer core, and South pole exposed permanent magnets for the left-hand transformer core. This is a modified application of the Coler principle, which is the key to the E.M.F. enhancement for this S.C. system.

Two sets of collector brushes (+) and (-) contact the twin Wimshurst E/S generator discs and conduct the accumulating charges directly to the top terminals of the large, lateral capacitive transformers. The top terminals are connected to the primary coil of the dual Tesla coil transformer, and the lower end of the primary winding is cross-connected to the opposite lateral lower, primary coil of that coil transformer.

Terminals located on the capacitive/transformer cover/cap are connected to the output secondary coil windings, and the lower end of the secondary winding is cross-connected to the opposite, lateral lower, secondary coil of that coil transformer.

The terminals on both cover/caps are connected to respective (+) and (-) binding post terminals on the base of the S.C.system, as the output terminals for the system to the respective load(s).

The elongate, hollow permanent magnet component and the two large horseshoe permanent magnets are the major permanent magnet components in this S.C. system. A major function of these magnetic components is to provide opposite magnetic fields for the two lateral capacitive/transformers.

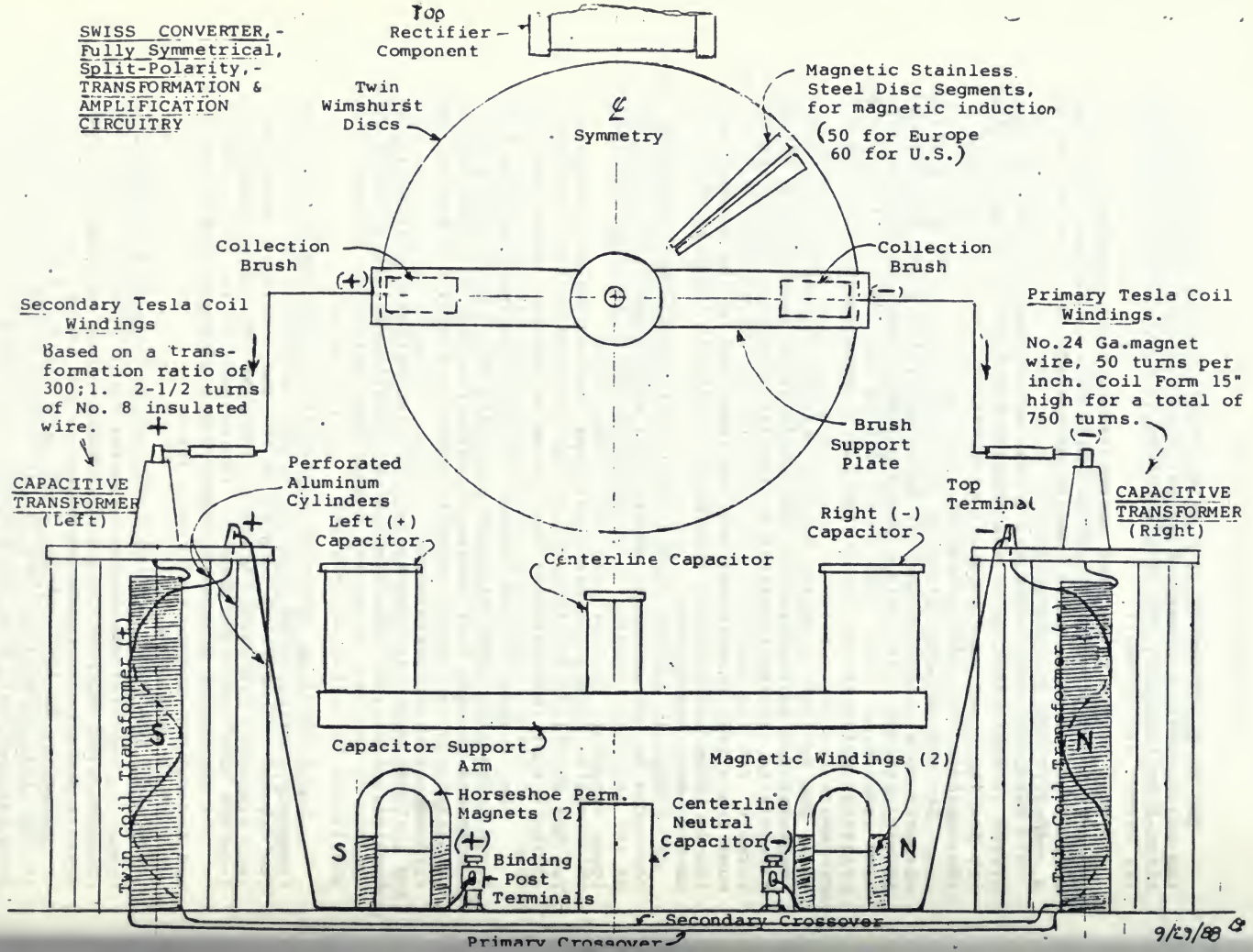
These magnetic components offer the optional possibility of providing addition transformer windings, with additional brush connections to the twin Wimshurst discs. This option would provide for additional KW output, as required.

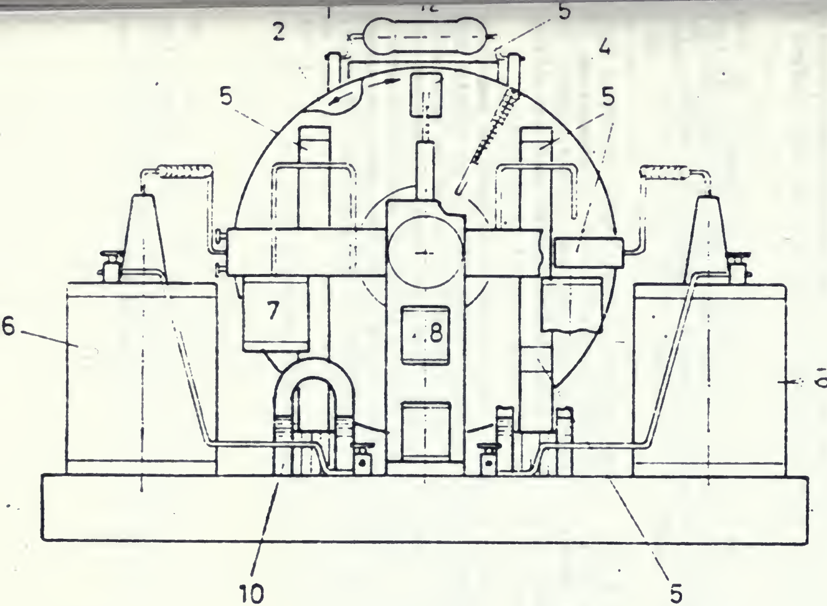
The crystal(s) component within the S.C.system provides the frequency control, rated at 50 Hertz for Europe, and 60 Hertz, U.S. The crystal component is located in the top rectifier above the twin Wimshurst E/S discs, where it controls the output frequency from the twin discs, and thus for the balance of the S.C.system.

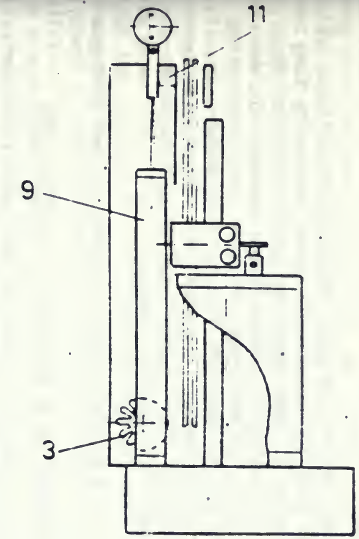
A top, center permanent magnet and a pickup electrode monitor and control the speed of the twin discs.

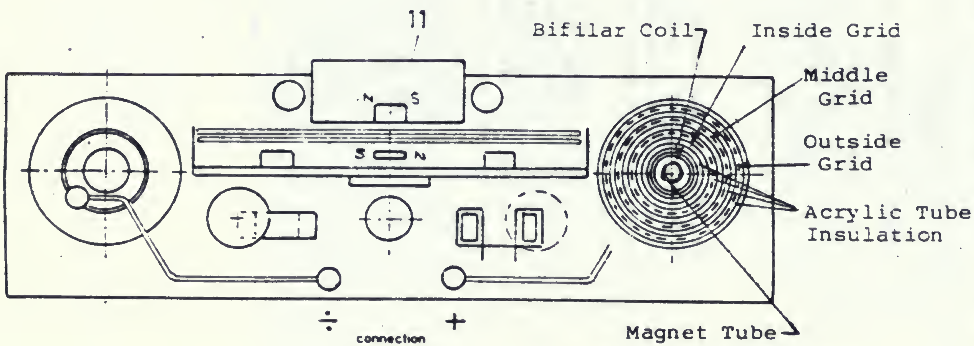
• It is most unfortunate that the specific members of the Swiss commune group that developed this remarkable converter remain uncommunicative and unwilling to release further information on its details and general operating status.

According to their stated philosophy, the World is not ready to receive this technology, and its acceptance would do more harm than good for mankind! When one ponders over this philosphy, it may be open to question, today!


SWISS CONVERTER,- Fully Symmetrical, Split-Polarity,- TRANSFORMATION & AMPLIFICATION CIRCUITRY
Top Rectifier Component
Twin Wimshurst Discs
℄ Symmetry
Magnetic Stainless Steel Disc Segments, for magnetic induction (50 for Europe 60 for U.S.)
Collection Brush
(+)
Collection Brush
(−)
Secondary Tesla Coil Windings
Based on a transformation ratio of 300;1. 2-1/2 turns of No. 8 insulated wire.
Primary Tesla Coil Windings.
No.24 Ga.magnet wire, 50 turns per inch. Coil Form 15" high for a total of 750 turns.
Brush Support Plate
CAPACITIVE TRANSFORMER (Left)
Perforated Aluminum Cylinders
Left (+) Capacitor
Centerline Capacitor
Right (-) Capacitor
Top Terminal
CAPACITIVE TRANSFORMER (Right)
Twin Coil Transformer (+)
Twin Coil Transformer (−)
Capacitor Support Arm
Magnetic Windings (2)
Horseshoe Perm. Magnets (2)
Centerline Neutral Capacitor
Binding Post Terminals
Secondary Crossover
Primary Crossover
9/23/88







Section through - 6
Big Capacitor (above)

1	Rectifier	12
1	Magnet	11
2	Horseshoe Magnet	10
2	Pipe with Spiral	9
2	Capacitor	8
2	Capacitor	7
2	Big Capacitor	6
8-16	Electrode	5
3x50	Lamella /or Segment	4
1	Gear-Wheel	3
1	Back Disk	2
1	Front Disk	1
DCS		DOS

albert hauser
ingeniør og maskinfabrikant
[illegible]

1:7

Influence converter
3-5Kw 300V DC

3279

STEFAN MARINOV
Mordtmannstrasse 16
A-8010 GRAZ — AUSTRIA

28 November 1988

Dr. Alan Mackay
SPEC. SC. TECHN.
Department of Crystallography
Birkbeck College
Malet Street
London WC1E 7HX

Dear Dr. Mackay,

Thank you very much for your letter of the 7 November, although the rejection of my papers was, of course, not pleasant for me.

You do not write any reasons for the rejection of my paper "Relativistic effects in the radiation..." and this is a little bit puzzling for me. The paper was pretty long time under examination. During my visit to you in June this year you said me that the paper is with Dr. Aspden. Dr. Aspden, surely, has given some written comments. It was good to send them to me. With Dr. Aspden we met on MANY international conferences (this year on the Aether Conference of Dr. Duffy at the Imperial College in September and on the conference "Galileo back in Italy" of Dr. Monti (together with Silvertooth) in May in Bologna). I steem very much the opinions of Dr. Aspden, and it could be profitable for me if he has presented some comments on my paper. Anway.

Now I submit to your journal my paper (in a single copy as I hardly believe that you will send it to two referees)

SILVERTOOTH'S EXPERIMENT FOR MEASURING THE AETHER DRIFT IS INCONCLUSIVE.

I submitted this paper to two journals: 1) Intern. J. Modern Phys. and 2) Opt. Lett. For your convenience, I send you the correspondence of these two journals and my comments to the first referees' comments in Opt. Lett. In this way you have already a "refereed paper" without the necessity to lose time and effort and searching for your referees. I think, it will be very easy to take a decision on the basis of this "refereeing".

On the 12 December I come to London and will stay there until the 15 December. Dr. Maddox invites me (paying trip and sojourn), so that we can have a lengthy discussion on all my theories and experiments before launching my papers in NATURE. Dr. Maddox has clearly understood that after the appearance of my papers there will be a big "earthquake" in physics.

I, certainly, will have some free hours in those days to come to Malet street to visit you and to discuss with you my present paper and the question of its acceptance in your journal. Thus I beg you VERY MUCH to acknowledge the reception of this paper and to write me whether you are interested in such a conversation and whether you will be in the Birkbeck college during the days 13, 14 and the morning of 15 December.

If you can take a quick decision on my paper, this will be very good, as now absolute space-time will be restored and, surely, certain people will try to repeat Silvertooth's experiment. My warning to be careful with the parallelism of the rays and to not fall in the trap in which Silvertooth and myself have fallen and to consider spurious effects as due to the Earth's absolute motion is, I think, of importance. Because if other scientists will publish positive reports and then in some good laboratory a negative result will be observed, this will be VERY HARMFUL to our endeavours to restore Newton's absolute space and time.

Thus hoping to read you soon and then, probably, to meet you in London,

Sincerely yours,

Stefan Marinov

STEFAN MARINOV
Morellenfeldgasse 15
A-8010 GRAZ — AUSTRIA

30 November 1988

Dr. P. T. Pappas
Marcopulioti 26
GR-11744 Athens

Dear P.,

Thank you very much for your letter of the 24th November. I suggested you to write a paper CRITICIZING my Rotating Ampere Bridge Experiment with Displacement Current (RABDC). Instead you sent me an EMOTIONAL letter. Panaiotis, write a paper criticizing the experiment. This signifies that first you have to state that THEORETICALLY, proceeding from the Ampere law, which, according to you, is the true one, the result must be null, i.e., the bridge cannot rotate. Then, if you wish you can bring some arguments that EVEN if one will theoretically assume that the bridge will rotate, the figures given in my description raise some doubts that this can be done with MY apparatus. You have to criticize the experiment taking the data from my paper published in TWT-III, p. 75. I can even help you: You can say that it is hard to believe that one can construct a cylindrical condenser with the given size which has a capacitance 580 nF (290 nF for TWO connected in series). Moreover, you can add that I have informed you that I have done an error in the calculation and the value of ANY of my condensers must be not as given in the paper but 0.9 pF. Thus the real condenser has a capacitance 640,000 times bigger than the capacitance calculated for vacuum according to the idealized formula given in the paper. Thus you can conclude that according to you even for the Condensers Plant Siemens in Deutschlandsberg, where the condensers have been produced, this seems a rather difficult task. Then you can add that coils with ohmic resistance 24 ohm and inductivity 34 H must have a weight of at least 50 kg. Then you can add that it is, according to you, also highly doubtful that a current of 9 A can produce the necessary torque to bring the bridge in rotation. And when people will read SUCH your report, they will say: "Maybe the experiment of Marinov was a pseudo-experiment." But to say only: "This is a pseudo-experiment" does not help. One must SHOW that this is a pseudo-experiment. Thus, I beg you once more, write a paper along these lines and put there anything what you like.

Everybody who wishes to refer to my experiments can do this. The reference is to be made to TWT-III. In TWT-IV there will be other amazing results of my experiments, namely that the Rotating Ampere Bridge has a back e.m. tension (you know that I dislike the term "force"). This has been observed on the Rotating Ampere Bridge with Sliding Contacts (RABSC), a photograph and a drawing of which I sent you in my letter of the 13th November. Please, write in your article whether, according to you, such a bridge (which according to you too MUST rotate) must have, according to you, a BEM tension or not. Make thus a good paper and send it as soon as possible. I send you the paper Aspden has submitted. If you cannot type it with IBM-letter-gothic, I shall gladly do it for you at the charge of 10 $ for a page. And send good figures, if you will have some. I am in London the 12 - 16 December (Maddox pays the trip) and after returning I shall begin with the print.

I have not found in my archives the papers with the titles given by you. On the Ampere-Grassmann controversy I have the following your papers: "On the Ampere electrodynamics and relativity", "Contradicting physics with Biot-Savart-Lorentz-Einstein electrodynamics", "The cardinal law of electrodynamics and the principle of conservation of energy", "The non-equivalence of the Ampere and Lorentz-Grassman force law and longitudinal contact interaction". None covers the titles given in your letter. But I should like that your paper becomes more FRESH, thus mention (and criticize) also my experiments in whose issues you do not believe. Mention also the Bul-Cub machine without stator (TWT-III, p. 48). I am looking forward for your paper and I like very much to print a paper of you but BE A PHYSICIST in your criticism, so that you can PERSUADE the reader in YOUR TRUTH! Physics is not politics and there are PERFECT means to defend one's thesis.

The machine MARPAP will preserve its name for posterity.

Yours:

PS. Give in your paper a SHORT account of your stigma experiment with the null result. And attach good figures, as I have not such. If you wish to be read, you must prepare a GOOD paper. It is not me to do the work for you, of course, if you would not pay.

PHYSICAL SOCIETY OF JAPAN
Kikai-Shinko Building, 3-5-8 Shiba-Koen, Minato-ku
Tokyo 105, Japan

December 12, 1988

Dr. Stefan Marinov
Institute for Fundamental
Physics,
Morellenfeldgasse 16,
A-8010 Graz,
Austria

Dear Dr. Stefan Marinov:

Thank you for submitting your article #3371 entitled "The Myths in Physics" to the Journal of the Physical Society of Japan.

It has been examined by our referee and our editorial board. Regretfully, we have concluded that your manuscript is not sufficient enough to be published in our journal. Referee's comments are enclosed herewith.

We are returning your manuscript to you.

Sincerely yours,

Taizo Masumi
Editor-in-Chief
Journal of the Physical
Society of Japan

Editorial note. Marinov's answer to the above letter and to the following referee's comments is given in Marinov's letter of the 9 January 1989 (TWT-V). The rejected paper is published in TWT-III, sec. ed. p. 59.

JOURNAL OF THE PHYSICAL SOCIETY OF JAPAN

Referee's report on the paper "The Myths in Physics" by S. Marinov

I regret to write you that your paper is not to be accepted in the J.P.S. Japan:

You pointed out "ten myths in physics", but most of them had come from your misunderstanding on physics and bring about no problem. As for the tenth myth, I would like to congratulate you on your success, the machine TESTATIKA, which might be the greatest invention through human history. But it is quite difficult to take it true, since it is too far from the usual concept in physics, unless crucial evidences and examinations are demonstrated.

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

Dr. John Maddox
NATURE
4 Little Essex Street
London WC2R 3LF

23 December 1988

Dear Dr. Maddox,

After returning from London I made additional measurements on my Rotating Ampere Bridge with Sliding Contacts and I attached the relevant information to the article

PROPULSIVE AND ROTATING AMPERE BRIDGES VIOLATE ...

Thus I send you now the enlarged version of this article, of which you have to make further use.

When I was in London I wished to give you also the articles

1. Extremely easy experiment demonstrating violation of the angular momentum conservation law.
2. Absolute and relative Newton-Lorentz equations.

You refused to take them, being afraid to have to reed too much (although the second article was previously sent to you on the 4 October 1988). But I make REFERENCES to these two articles in the article PROPULSIVE AND ROTATING..., and it is good for the people who will repeat my Rotating Ampere Bridge with Sliding Contacts to have also these two articles. Thus I enclose them to the new variation of the article PROPULSIVE AND ROTATING...

I suggested to you to ask Dr. Peter Graneau to repeat my experiment, as I am sure that in 10 days he will do it. I know (as I know you VERY WELL) that until now you have not sent my article with your request for repetition to Dr. Graneau. Thus I BEG YOU VERY MUCH to do this (in parallel you can also ask your friend to do the job, but your friend surely will need a year). Here is the address of Graneau:

Dr. Peter Graneau, 414 DA, Electrical and Computer Engineering,
Northeastern University,
360 Huntigton Avenue
Boston, MA 02115, USA.

Send to Graneau all THREE papers which you have in this envelope and beg him for a quick answer.

I am awaiting only for your "Christmas puzzle" in the 22 December issue of NATURE (I hope this time you have not deceived me, as usually), so that I can begin with the print of my book TWT-IV. After the publication (somewhere in the middle of January), I shall send you a copy.

After having written your "puzzle", read the paper ABSOLUTE AND RELATIVE NEWTON LORENTZ EQUATION and you will see that there is NO puzzle at all. Then give me a possibility to say this to the world. It is unfair to treat the readers of NATURE as small children and to narrate them that Santa Claus brings them the presents when it is obvious (read my paper) that there is NO "puzzling" Santa Claus.

Wishing you and your wife once again a merry Christmas,

Sincerely yours,

Stefan Marinov

Marinov's note to the second edition.

The "Christmas puzzle" of Dr. Maddox is still not published.

PHYSICAL REVIEW A

1 RESEARCH ROAD - BOX 1000
RIDGE, NEW YORK 11961

Telephone (516) 924-5533
Telex: 971599 AMPHYSSOC
Fax: (516) 654-0141
Cable Address: PHYSREV RIDGENY
BITNET Address: pra@APSEDOFF

Editor:
BENJAMIN BEDERSON
Associate Editors:
RUSSELL J. DONNELLY
C. L. SNEAD, JR.
Assistant Editor:
CAROL B. KRANER

27 December 1983

Dr. Stefan Marinov
Morellenfeldgasse 16
A-8010 Graz
AUSTRIA

Re: Manuscript No. SS3012A

Dear Dr. Marinov:

This is in reference to your paper entitled "New measurement of the earth's absolute velocity with the help of the coupled shutters experiment," recently resubmitted to Physical Review A. Please be advised that all Physical Review papers are judged by the same scientific standards. This paper has already been rejected by Physical Review D. I concur with that decision, and am therefore returning your paper.

Very truly yours,

Benjamin Bederson

Benjamin Bederson
Editor
Physical Review A

BB/bm
Enclosure

Editorial note. Marinov's answer to the above letter is given on the next page (see the bottom of the page).

STEFAN MARINOV
Morellenfeldgasse 16
A-8010 GRAZ — AUSTRIA

1 January 1989

Dr. C. Lewis Snead, Jr.
Associate Editor
PHYSICAL REVIEW A
Box 1000
Rydge
NY 11861

Dear Dr. Snead,

First I wish to acknowledge the reception of your letter of the 13 September 1988 with which you rejected my paper SV3607A. One can only regret that you have rejected this paper. Soon you will understand the reasons.

Now I submit to PHYSICAL REVIEW A my two papers:

1. ABSOLUTE AND RELATIVE NEWTON-LORENTZ EQUATIONS.
2. PROPULSIVE AND ROTATING AMPERE BRIDGES VIOLATE ...

These two papers were submitted to PHYSICAL REVIEW LETTERS and rejected by Dr. Basbas with his letters of the 9 November 1988 copies of which are enclosed. The motivation of Dr. Basbas was that he has first to take a decision on my three papers submitted at the beginning of August 1988 whose reception was acknowledged on the 18 August 1988. Those were the papers:

LV3790. Maxwell's displacement current does not generate magnetic field.
LV3791. Extremely easy experiment demonstrating violation of the angular momentum conservation law.
LV3792. Physical essence of the Maxwell-Lorentz equations.

I think, however, that five months are a too long time for examination in a journal for rapid information. Blocking these three papers, Dr. Basbas blocks my further papers. In my papers I inform the scientific community about extremely important experiments (and theory) which will change radically space-time physics and especially electromagnetism. Moreover, my experiments show the way on which reactionless propulsion can be realized and perpetua mobilia constructed. I think that these topics must not remain for so long time only in the hands of the referees and the editors. They must be presented to the attention of the whole scientific community.

Surely, on the basis of my discoveries patents can be made which will then bring Kresian wins to their holders. To invalidate any such eventual patents based on my discoveries, I have submitted these discoveries for patents and copies of my papers are sent to the Nobel committee in Stockholm.

Maybe Dr. Basbas will examine my above three papers other five months. I do not wish to lose more time and for this reason I submit the above two papers to you. I send them in single copies, as I am afraid that you may reject them "automatically". I beg you insistently not to do this. Papers as mine are long time examined and eventually rejected for two reasons: 1) Either when the referees have grasped their importance or 2) when the referees have not grasped their importance. To understand whether the referees were of the first or second class I must receive MOTIVATED opinions in the case of rejection.

Hoping to receive your acknowledgement for reception and then in due time your final decision,

Sincerely yours,

S. Marinov

Stefan Marinov

PS. I enclose a copy of the paper LV2791 which is referred to in the second of the submitted papers. The first of the submitted papers also is referred to in the second paper.

PPS. After writing this letter I received the letter of Dr. Bederson of 27.XII.1988 with which he rejects my paper "New measurement...". Your journal will soon begin to print my papers which it has rejected in the last 15 years because the establishment of the space-time absoluteness led me to the violations of the laws of conservation.

INTERNATIONAL JOURNAL OF THEORETICAL PHYSICS
GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332
(404) 894-5220

4 January 1989

(Post stamp date on the envelope, inserted by the editor)

Dear Author:

Thank you for letting us see the enclosed manuscript.

We regret to say that this paper does not meet our publishing needs for the immediate future.

We wish you good luck in your research and its publication.

Yours sincerely,

David Finkelstein

David Finkelstein
Editor

Marinov's note. With the above letter without date and without title of the manuscript was rejected my paper "Violation of the laws of conservation of angular momentum and energy" (published in TWT-III, p. 33). This paper was submitted on the day of the 199th anniversary of the Great French Revolution (14 July 1988) and was rejected by the above formal rejection slip when the world begins with the preparations for the celebration of the 200th anniversary of the said revolution.

I published three anti-relativity papers in the "International Journal of Theoretical Physics" when its editor was Dr. Yates. After Dr. Finkelstein took this post I submitted numerous papers all of which were rejected (see, for example, TWT-I, third ed., p. 112). I exchanged many letters and had lengthy conversations with Dr. Finkelstein at the 2nd Marcel Grossmann meeting (Trieste, 1979) and at the 10th International Conference on Relativity and Gravitation (Padua, 1983). I cannot understand one thing: What has Dr. Finkelstein done 6 months with my paper. As the manuscript returned in good condition, I realized that he has neither thrown it to the mices in the basement of the GIT. Thus I shall conclude this note addressing my good Atlanta-friend directly: "Dear David, you have forgotten to put the second rejection slip in your letter (see p. 16 of this volume). An editor manifests a respect to his own journal by respecting his readers and authors. Shalom!"

JEACREEN

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paolo brunetti

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marcello barbieri, jean baudrillard
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stefan marinov

VIOLAZIONE DELLE LEGGI DI CONSERVAZIONE DI MOMENTO, MOMENTO ANGOLARE E ENERGIA

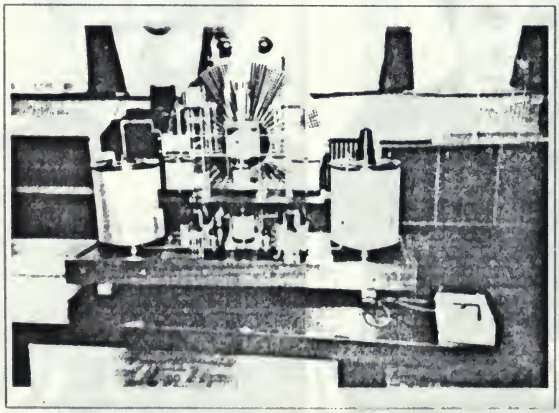
SEAGREEN, Bologna, Italy
autumn, 1988

I fuorilegge dell'Energia.
Stefan Marinov, pag. 34

Supponendo che dei quattro miliardi di persone che popolano la terra due miliardi siano analfabeti o dotati di una istruzione minima, se domandassimo a ciascuno degli altri due miliardi se può esistere il "moto perpetuo", la risposta di tutti e due i miliardi sarebbe: «Secondo le leggi della fisica è impossibile».
Ma che cosa sono queste benedette "leggi della fisica"? Chi le ha scritte? Newton? Einstein? Maometto? Javeh?
Ponendosi questo tipo di domanda, nell'ambito della giurisprudenza, Marx (dopo aver letto un quarto dei volumi del Museo Britannico) trovò la risposta: Le leggi rappresentano la volontà canonizzata della classe dirigente. Lo stesso accade nella fisica; le leggi della fisica sono le opinioni canonizzate dell' *establishment* scientifico.
Ma una "opinione", anche se canonizzata, potrebbe cambiare. Giusto?
Purtroppo fra le leggi sociali e le leggi della fisica c'è una differenza sostanziale. Le leggi dello stato dipendono solo dalla volontà della classe dirigente, e per cambiarle bisogna che quest'ultima sia spazzata via (dalla ramazza della storia o in altro modo più o meno delicato). Le leggi della fisica, peraltro, dipendono non solo dalla volontà dell'*establishment* scientifico, ma anche da un giudice imparziale, che non sbaglia mai e che si chiama "natura" o "esperimento". Devo aggiungere che questo giudice Esperimento (con la E maiuscola) è un po' strano, perchè mille esperimenti che confermino una teoria non danno la certezza che questa teoria sia giusta; ma basta un solo esperimento che la contraddica perchè questa possa essere accantonata.
Dunque, nella fisica, il dimostrare come qualcosa "deve essere" non vale tanto quanto il dimostrare come "non può essere".

La comunità Methernitha e la macchina Testatica

Torniamo dunque al "moto perpetuo" che, dicono, non si può realizzare. Effettivamente migliaia e migliaia di uomini (ma, notate, nessuna donna) hanno provato senza riuscirci a far ruotare da sola una qualunque macchinetta.
Ora guardate la fotografia (fig.1) della macchina TESTATICA (da TESla -elettricità- STATICA) che è stata realizzata nella comunità Methernitha, nel villaggio di Linden, presso Berna: ebbene, questa macchinetta, non solo ruota da sola, ma produce continuamente 3 kW di corrente elettrica continua che, dopo essere stata trasformata in corrente elettrica alternata, viene distribuita nella rete elettrica della comunità; una comunità che vive secondo le norme di un *comunismo cristiano* **assoluto**.
Invitato, in luglio, a visitare questa comunità per un paio di giorni sono rimasto stupito nel constatare come "costruire il comunismo" possa essere una cosa semplicissima, senza dover ammazzare, per questo, nè uno, nè dieci, né cento milioni di persone! Nella comunità non esiste il denaro. Non ci sono paghe. Il cibo (semplice ma ben cotto) è preparato per tutti in una cucina, e se ne può mangiare fin che se ne vuole. Dal negozio si può prendere ciò che si vuole, ma ci sono solo articoli *di prima necessità*. Loro dicono che non esiste una *seconda necessità*, o una terza, ecc., e che ciò che non è prima necessità non solo è superfluo, ma anche dannoso.
Non fanno uso di tabacco, alcolici, droghe, ecc. Non si guarda la televisione svizzera. Dicono che è dannosa. Hanno una loro propria trasmittente (su 150 uomini una trasmittente televisiva e 300 telefoni di una rete interna!). Fanno tutto da soli: costruire le case, la trasmittente TV, la rete telefonica, ecc. Per acquistare le cose che non possono produrre vendono fiori prodotti in un grande, moderno giardino. Ognuno lavora, tranne che sia malato. Non ci sono pensionati e non vanno in ferie. Non esiste alcuna gerarchia, e si sentono tutti fratelli.
La macchina TESTATICA lavora (non sgranate gli occhi) da sei anni.
Con il signor Bosshard abbiamo parlato per ore, e sono rimasto colpito dalla lucidità e profondità del suo discorso. L'atteggiamento della comunità, riguardo la macchina Testatica é il seguente: se l'umanità, nel suo stato morale attuale, scoprisse il moto perpetuo, ciò sarebbe una catastrofe: per questo la comunità non vuole rivelare il segreto della sua macchina. Ma se altre comunità cominceranno a vivere secondo gli stessi principî, a queste verrà data la macchina, sì da consentir loro di vivere energeticamente indipendenti dallo stato (v. nella fig.2, alla pagina successiva una circolare della comunità al riguardo).
Io ho promesso che non scriverò una parola sulle conoscenze tecniche che ho raccolto, anche se debbo dire che, purtroppo, non ho capito il principio di funzionamento della macchina e non sono, quindi, in grado di riprodurla.
La fotografia della macchina è distribuita liberamente (io ne sono in possesso da due anni). L'unica dichiarazione che posso fare è che la macchina lavora producendo "energia libera" senza avere alcuna sorgente energetica estranea!
Dunque questa macchina abolisce la cosiddetta "legge della conservazione dell'energia", e i famosi due miliardi di uomini di cui sopra, dovranno cambiare opinione; ma se continueranno a gridare "Allah!" e ad inchinarsi davanti al principio di conservazione dell' energia... tanto peggio per loro!



Le leggi della conservazione non conservano bene.

Penso che non si possa cambiare l'umanità. Alcune idiozie dell'umanità, certamente, possono essere cambiate. Ma l'uomo, come lo vedo nell'Iliade, nell'Amleto e nel Don Pacifico, è e rimarrà sempre lo stesso. Credo che un *perpetuum mobile*, del tipo Testatica o del tipo delle macchine che faccio io, potrà aiutare l'umanità, salvandola dalla crisi energetica,

dalla polluzione, dal rumore, liberando al contempo l'individuo dal monopolio energetico e dal predominio dei gruppi economici di potere. Condizione imprescindibile, questa, per finirla con le guerre.

Presenterò le mie macchine e le loro teorie con un linguaggio semplice, comprensibile ad ogni persona normalmente intelligente. Scriverò anche alcune formule; ma chi non ha dimestichezza con la matematica può benissimo saltarle: comprenderà ugualmente la sostanza del discorso.
Chi ricorda un po' la matematica studiata al liceo o all'università capirà, certamente, qualcosa di più.

Le leggi fondamentali della conservazione sono le seguenti: conservazione dell'energia, del momento (più precisamente del momento lineare) e del momento angolare. Ma, essendo tutte queste quantità componenti di un tensore quadridimensionale - chiamato *tensore dell'energia-momento* - possiamo affermare che esiste una unica legge: la legge della conservazione di questo tensore (chi non è familiare con alcuna parola speciale salti, salti pure!).
La legge della conservazione del momento afferma che stando su di una carrozza non sei in grado di metterla in moto se sei completamente isolato dall'altro mondo. Anche se accanto a te ci fosse S.Pietro (o, meglio, Mefistofele) e tu gli ordinassi: *dammi questo, e quest'altro, portami questa macchina, e quest'altra...* e Mefistofele ti esaudisse, nondimeno la carrozza non si muoverebbe.

La legge della conservazione del momento angolare dice la stessa cosa: se tu fossi su di una giostra neppure Mefistofele potrebbe aiutarti a metterla in rotazione se tu fossi completamente isolato dall'altro mondo.
Queste due leggi si possono così formulare: con forze interne non puoi nè mettere in moto una carrozza nè porre in rotazione una giostra.
La legge della conservazione dell'energia si spiega un po' più difficilmente, perchè la parola "energia" è un po' come la parola "democrazia": tutti la usano da mattina a sera, ma nessuno sa spiegarti cosa significhino esattamente sia l'una che l'altra.
La definizione più semplice di questa legge sarebbe: neppure Mefistofele potrà aiutarti a far ruotare una qualunque macchinetta in eterno se dopo ogni ciclo chiuso non vi è qualche mutazione. Il che, in due parole, significa affermare che il moto perpetuo non si può realizzare *(Il n'y a pas d'amour heureux!)*.
Io ho costruito macchine che contraddicono tutte e tre le leggi.
La BUL-CUB MACCHINA SENZA STATORE e il PONTE DI AMPÈRE RUOTANTE contraddicono la legge di conservazione del momento angolare. Entrambe le macchine funzionano e ognuno può verificare con i propri occhi che io metto in moto due corpi solidi in rotazione con sole forze interne.
Il PONTE DI AMPÈRE VOLANTE non è ancora costruito, ma - come il lettore vedrà fra poco - la logica più semplice dimostra che se il Ponte di Ampère Ruotante ruota, allora il Ponte di Ampère Volante deve volare.
La mia macchina MAMIN COLIU contraddice la legge di conservazione dell'energia. Finora non sono riuscito a realizzare questa macchina a ciclo chiuso, quindi a portarla alla situazione iniziale senza cambiar qualcosa.
Semplicemente, però, dimostro che la bilancia energetica della macchina ha un esito positivo. Per verificare la violazione della legge della conservazione dell'energia si devono fare misure e calcoli e dunque ciascuno ha il diritto di dubitare che nelle misure e nei calcoli fatti da me vi siano degli errori.
Mi considero uno degli uomini meglio informati, su questa Terra, sulla situazione nel campo dell'energia libera.

METHERNITHA
3517 LINDEN

Verwaltung
Telefon 031 97 11 23

Postcheck-Konto 30-29076

Ersparniskasse Konolfingen
Filiale Oberdiessbach

Kantonal Bank von Bern
Langnau i.E.

Reference:
Testatika - M/L Converter

Ihr Zeichen | Unser Zeichen FB/mk | CH-3517 Linden, 9.2.1988

Dear

If you believe that mankind could be saved through free-energy you are making an error. All the great problems which burden mankind and threaten his future and his very existence are only symptoms showing in fact there is something wrong with man himself.

Just as in human medicine, treatment of sociological symptoms such as shortage and misuse of technical energy will never lead to true health of society and man as its basic unit. The reasons for most undesiderable states are rather to be found in mans misbehaviour with respect to the divine laws. Would man recognise these as standard for all thoughts and actions, any human problems would vanish in course of time and a renewed world would bless its inhabitants with all they really need.

To surprise present mankind with a free-energy device would literally mean to pour oil into a world which is already set on fire in too many places and domains of human life. What mankind need is peace, peace of mind to start with, to have a chance to find back to nature and god, and not more and further technological support in his strive for pleasure, which would rather drown him in an ocean of noise, over-action and pollution in general.

If you can not accept this point of view please discover a new "free"-energy device by yourself. The responsibility for its publication with all its consequences will then be yours only.

May peace be with you

METHERNITHA
CH-3517 Linden

Francis Bosshard

fig.2

Secondo me la Macchina Testatica è l'unica che lavora a ciclo chiuso. Sono tante le altre macchine dove si può osservare una violazione della legge della conservazione dell'energia, ma, *to the best of my knowledge*, **non ne esiste un' altra** che lavori a ciclo chiuso.
(Forse la macchina di Moray ha lavorato in questo modo, ma non esistono più nè la macchina nè il suo principio).
Io ho osservato violazione della legge della conservazione dell'energia anche nella mia macchina ADAM *(Apparatus Discovered in Austria by Marinov)* (1), e nel mio Motore con Cuscinetti a Sfere (Ball-Bearing Motor) (1) che lavora sull'effetto di dilatazione termica provocato dalla corrente *(current thermal dilatation effect)* da me scoperto. (1)

Le formule di Ampère e Grassmann

Prima di presentare le mie macchine devo fare un po' di teoria.
Prendiamo un filo percorso da corrente elettrica I. Il prodotto Idr, dove dr è un elemento del filo (preso come vettore nella direzione della corrente) si chiama **elemento della corrente**. Ogni magnete (elettromagnete o magnete permanente) può essere presentato come somma (integrale) dei suoi elementi della corrente.
La storia ci dice che Oersted nel 1820, per la prima volta, osservò che un filo percorso da corrente agisce su di un ago magnetico. Ma questo non è vero. Il primo a fare questa osservazione fu il bolognese (se non sbaglio) Romagnosi che, nel 1802, voleva dimostrare lo strano esperimento ai suoi concittadini, ma da ciascuno venne scacciato in malo modo con qualche *"Perdio, vai via! Che ho altro da fare che guardare queste stupidaggini!..."*.
E dunque, "ufficialmente", Oersted nel 1820 scoprì che fili percorsi da corrente interagiscono. E già nel 1823 Ampère propose una formula che presenta la forza df con la quale un elemento della corrente I'dr' agisce su di un altro elemento della corrente Idr, nel caso in cui il vettore della distanza r da dr' a dr è r.

$$df = (II'/c^2r^5)\{3(r.dr)(r.dr') - 2(dr.dr')r^2\}r \quad (1)$$

La formula è scritta nel sistema CGS e c è la velocità della luce.
Questa formula è molto buona perchè, come ognuno può verificare, la forza df' con la quale l'elemento Idr agisce sull'elemento I'dr' è esattamente uguale ed opposta alla forza df; i.e., df' = - df (per verificare scrivere dr' al posto di dr e viceversa, e - r al posto di r).
Questa è esattamente l'esigenza della terza legge di Newton che dice: ogni azione provoca una reazione uguale e contraria (se il marito va a letto con un'altra donna, la moglie, secondo la terza legge di Newton, va a letto con un altro uomo).
Ma nel 1845 Grassmann (3) ha dimostrato che la formula giusta dovrebbe essere la seguente

$$df = (II'/c^2r^3)\{(r.dr)\,dr' - (dr.dr')\,r\} \quad (2)$$

Questa formula non è buona, perchè qui la forza df' non è uguale e opposta alla forza df, i.e., df' ≠ - df (verifica!).
Dunque la formula di Grassmann **contraddice** la terza legge di Newton.
Fino ad oggi l'umanità è rimasta, come l'asino di Buridano, fra le due formule, incapace di decidere quale delle due sia quella giusta. Ma in tutti gli esperimenti, e per qualunque macchina, i calcoli con le due formule portano agli stessi risultati. E la fisica di oggi dice: sono ambedue giuste.
Ma come possono essere giuste due formule che sono completamente diverse? Questa storia delle formule di Ampère e Grassmann me ne ricorda un'altra, più vecchia, quella dei due vicini che andarono dal rabbino per risolvere una controversia circa una capra. Ascoltando i contendenti, il rabbino decise che avevano ragione entrambi. Tornando a casa il rabbino raccontò la storia al figlio che esclamò: "Ma non possono avere ragione entrambi se le loro tesi sono opposte!". "Hai ragione anche tu, figlio mio!" sospirò il rabbino.

Dunque, lo crediate o no, la fisica ufficiale dice che le formule (1) e (2) sono giuste entrambe, perchè finora nessuno è riuscito a dimostrare con un esperimento l'infondatezza dell'una o dell'altra. Il segreto di questo paradosso è che per circuiti **chiusi** le due formule predicono gli stessi risultati e, finora, tutti gli esperimenti fatti e le macchine costruite erano **a circuito chiuso**.
Si dimostra facilmente con l'integrazione delle due formule che la forza con la quale un circuito chiuso L' agisce su un altro circuito chiuso L risulta la stessa

$$f = (II'/c^2)\int_L\int_L (dr.dr'/r^3)r \quad (3)$$

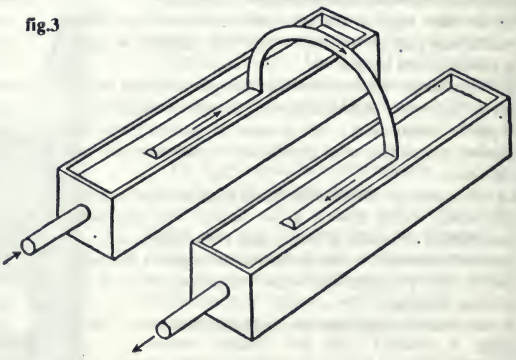
Io sono stato il primo a fare esperimenti con circuiti non chiusi. E i miei esperimenti hanno mostrato che giusta è la formula di Grassmann e sbagliata quella di Ampère.
Ma se la formula di Grassmann è giusta allora la terza legge di Newton diventa falsa?!?! E' proprio così! Ma allora, perbacco, dove andiamo a finire?
La risposta è: andiamo sulla luna con un tappeto volante.

E questo tappeto si chiama

Il Ponte di Ampère Volante

Ampère ha eseguito l'esperimento presentato nella fig.3. Nelle due vaschette riempite con mercurio nuota un "ponte" di metallo (un semplice filo). Quando si introduce corrente elettrica (continua o alternata) il ponte si sposta verso destra. Tait sostituì il metallo con un tubo di vetro riempito di mercurio. L'effetto rimase assolutamente identico, il che

fig.3



non consente di spiegarlo con alcuna forza agente sulla superficie mercurio-metallo.
Ampère spiegò l'effetto con la sua formula, secondo la quale elementi di corrente collineari si respingono (prendi nella formula (1) dr ll dr' ll r), e dunque le correnti nelle vaschette respingono le correnti nelle "gambe" del ponte.
Secondo Grassmann, l'interazione fra correnti collineari è zero (fate lo stesso nella formula (2)) e il ponte si muove perchè le correnti nelle gambe agiscono sulla corrente nella "barra trasversale" con forze parallele al movimento; ma la corrente nella barra agisce sulle correnti nelle due gambe con forze opposte, la cui somma è zero, ed è così che il ponte si mette in moto.
Dunque, secondo Grassmann, il ponte di Ampère si muove sotto l'azione di **forze interne**! Anche se ogni bambino può arrivare a questa conclusione, in nessun libro di fisica di tutto il mondo qualche professore ha avuto il coraggio di constatarlo.
Il mio amico, professor Pappas, ha ripetuto l'esperimento di Ampère con vaschette di mercurio e con gambe assai lunghe (2 metri). L'effetto rimane lo stesso. (Nella fotografia -fig.4- Pappas e il sottoscritto osservano il ponte di Ampère nel laboratorio di Pappas, ad Atene, nel settembre '83.)

fig.4

Io ho ripetuto l'esperimento di Ampère (fig.5) con contatti striscianti usando palline di metallo. La corrente, venendo dal filo IJ entrava nel ponte al punto A perpendicolarmente alla gamba AB e usciva attraverso il filo EF al punto D, di nuovo perpendicolarmente alla gamba DC. Il mio ponte (come quello di Pappas) era appeso con cavi al soffitto. Ho variato la lunghezza delle gambe AB e CD da 0 a 80 cm., con intervalli di 5 cm, mantenendo invariato il peso del ponte stesso. Il ponte si spostava da 0 a 14 mm; ma dopo aver oltrepassato la lunghezza di 35+40 cm delle gambe lo spostamento massimo di 14 mm non venne superato.
Vediamo adesso cosa dice la formula di Grassmann. Il potenziale magnetico dA generato a una distanza r da un elemento di corrente Idr secondo la **definizione** che introduce questa quantità é

$$dA = Idr / cr \qquad (4)$$

Usando (fig.5) un sistema di riferimento con ascissa lungo la retta AD e ordinata lungo la retta AB, ricaviamo che il potenziale magnetico generato dalla corrente nella gamba AB = L in un punto della barra, che si trova a una distanza x dal punto B, arriva a

$$A = \int_{AB} (I / cr)\, dr = (I / c) \int_0^L (x^2 + y^2)^{-1/2}\, dy\hat{y} = (I / c)\, \mathrm{Arsinh}\,(L / x)\, \hat{y} \qquad (5)$$

Scriviamo adesso la formula di Grassmann (2) nella seguente forma

$$df = (II' / c^2 r^3) dr \times (dr' \times r) = (I / c) dr \times \mathrm{rot}(I' dr' / cr) = (I / c) dr \times \mathrm{rot} A \qquad (6)$$

Usando (5) in (6) troviamo la forza con la quale la corrente nella gamba AB agisce su di un elemento della corrente Idx che si trova a una distanza x dal punto B

$$df = (I / c)\, dr \times \mathrm{rot} A = (I^2 L dx / c^2 x)\, (x^2 + L^2)^{-1/2} \hat{y} \equiv \equiv (I^2 dx / c^2 x)\, \hat{y} \qquad (7)$$

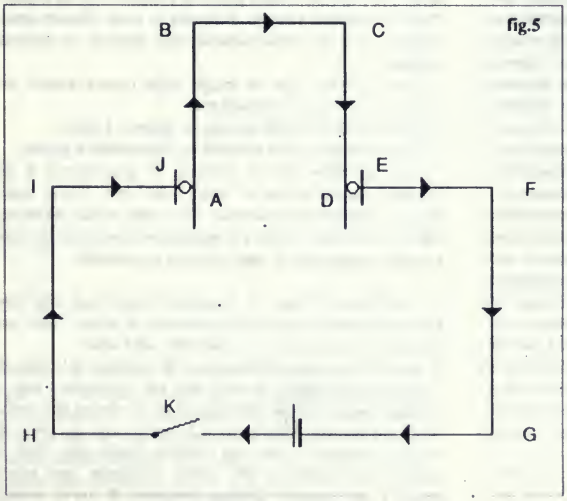


fig.5

dove il risultato a destra è scritto per L » x.

Nella fig. 6a sono presentate le forze che agiscono sul ponte di Ampère ABCD della fig. 5 nel piano (xy) nel caso che i fili IJ ed EF siano perpendicolari al piano (xy).
Si può facilmente vedere che la forza che agisce sul ponte ABCD è esattamente uguale e opposta alla forza che agisce sul resto del circuito EFG HIJ. Ciò lo si può vedere ancora più facilmente collegando direttamente i punti A e D con un filo e ponendo la sorgente fra di loro. Le forze che in questo caso agiscono sui diversi elementi di corrente sono presentate nella fig. 6b.
A me è venuta l'idea di collegare i punti A e D non con un filo, vale a dire con **corrente di conduzione**, ma mediante un dielettrico, vale a dire con **corrente di spostamento**. Secondo Maxwell, fra le armature di un condensatore corre una certa ***corrente di spostamento*** che, dice Maxwell, dovrebbe avere tutte le caratteristiche di una corrente di

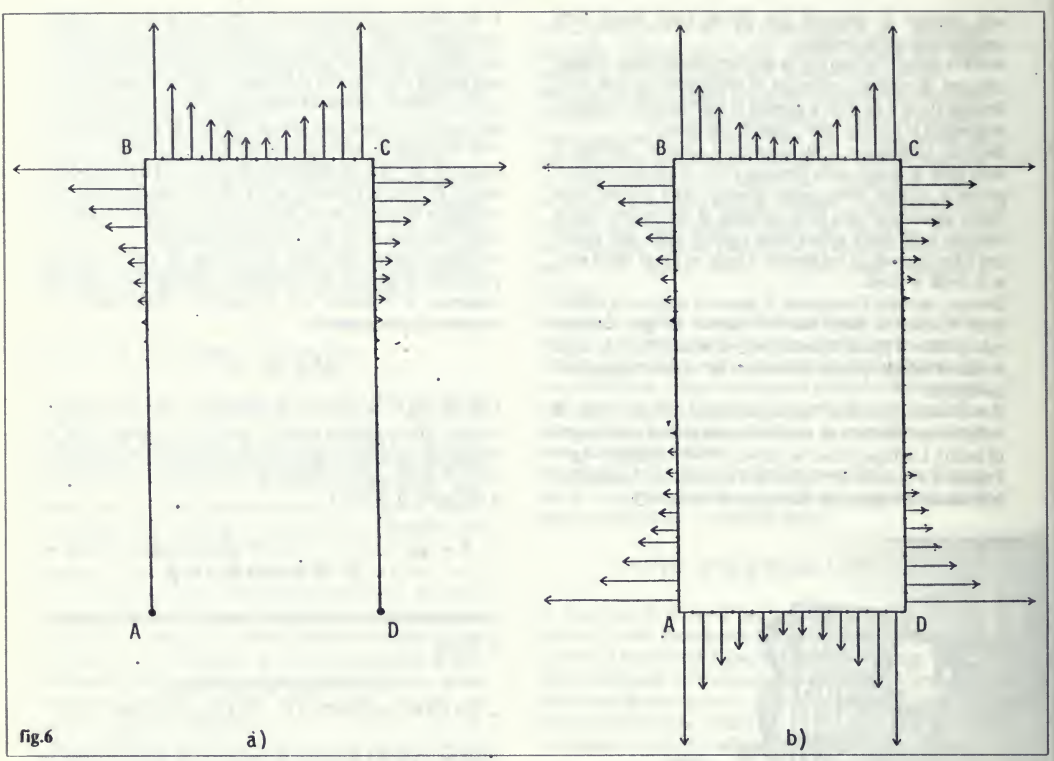


fig.6

conduzione, dunque deve avere il suo campo magnetico, deve **agire** con forze magnetiche sulle altre correnti e deve **assorbire** la loro azione.
In tutti i libri di fisica i seguaci di Maxwell (oggi tutti i fisici sono suoi seguaci) affermano queste cose, ma stranamente (molto stranamente)! finora nessuno ha verificato sperimentalmente queste caratteristiche della corrente di spostamento. Nella letteratura c'è **un** solo articolo [5] dove gli autori affermano di aver misurato il campo magnetico della corrente di spostamento in un condensatore. Il loro metodo di misurazione è completamente **falso**, perchè si sa che non è possibile misurare il campo magnetico d'un elemento di corrente (qual'è un condensatore) sapendo che **non si può isolare** l'azione magnetica dell'altra parte del circuito. L'unica cosa che si può misurare è l'azione di un campo magnetico nei confronti di un elemento di corrente. Dunque se qualcuno vuole stabilire che la corrente di spostamento è veramente una corrente elettrica **reale** con un suo campo magnetico, allora un altro campo magnetico (un altro circuito chiuso) deve esercitare forze sulla corrente di spostamento e metterla in moto perpendicolarmente alla direzione della corrente (come esige la formula (6)). Dunque i seguaci di Maxwell, se vogliono salvare la reputazione del loro maestro, si trovano a dover risolvere il problema di mettere in moto il vacuo fra le armature di un condensatore. Il che, mi pare, è come voler galoppare sull'ombra di un cavallo. E' ovvio che nessuno è mai riuscito a mettere in moto, fra le armature di un condensatore, nè il vacuo, né un dielettrico.
Si può stabilire se sulla corrente di spostamento agiscono delle forze magnetiche collegando i punti A e D con un dielettrico ad alta permittività, e mettendo una sorgente di tensione alternata nel circuito. Se il ponte non si muovesse, allora dovremmo concludere che sulla corrente di spostamento, nel percorso AD, agiscono forze secondo lo schema della fig.6b. Ma se il ponte si mettesse in moto la conclusione sarebbe che la corrente di spostamento non assorbe forze magnetiche.
Io affermo che un siffato ponte di Ampère, che io chiamo Ponte di Ampère Volante, si metterà in moto. Questo esperimento con esito positivo porterebbe, dunque, ai seguenti risultati:
1. Dimostrerebbe che la legge della conservazione del momento può essere contraddetta.
2. Dimostrerebbe che la formula di Ampère è falsa.
3. Dimostrerebbe che la formula di Grassmann è giusta.
4. Dimostrerebbe che la corrente di spostamento è un' illusione (anche se ha un certo ruolo nelle teorie matematiche dell'elettromagnetismo [4]) e non mostra alcun carattere di corrente elettrica e quindi non genera campo (potenziale) magnetico, nè assorbe forze magnetiche.

E certamente il Ponte di Ampère Volante sarà non solo l'aereo del futuro (che non avrà bisogno di alcuna "aria" per volare) ma il mezzo con cui andremo sulla luna.
Si potrebbe avanzare l'obiezione che le forze nel ponte di Ampère sono molto deboli, ma tale obiezione non è fondata. Deis e altri [6] sono riusciti ad accelerare una massa di 317 g ad una velocità di 4,2 km/sec con un ponte di Ampère classico e con una corrente molto alta. Non si conosce un esplosivo che possa accelerare una massa simile a tale velocità. Dunque l'impulso di breve durata

che agisce nel ponte di Ampère è l'impulso più alto ottenuto nella storia.
Con un ponte di Ampère si possono lanciare satelliti artificiali da un pianeta senza atmosfera "sparandoli da cannoni". Ricordo che se non ci fosse atmosfera sulla Terra e si potesse sparare una pallottola con la velocità di 7,9 km/sec, la pallottola diventerebbe un satellite artificiale. Ma il Ponte di Ampère Volante non è un "proiettile", bensì un "razzo", in quanto la forza di propulsione agisce di continuo. La differenza con i razzi convenzionali è che il Ponte di Ampère Volante non emette massa nella direzione opposta.

Io non ho costruito il Ponte di Ampère Volante, ho però realizzato una macchinetta molto simile, che viola la legge di conservazione del momento angolare e che ho chiamato:

Il Ponte di Ampère Ruotante.

Nella fig. 7 presento una variante del Ponte di Ampère.
La corrente entra nel punto B dalla direzione AB, che è perpendicolare al piano BCD, percorre il filo BCDEFG, dove il filo DE è perpendicolare ai piani BCD ed EFG, ed esce dal punto G nella direzione GH collineare con AB. Secondo la formula di Grassmann ho presentato tutte le forze che agiscono sugli elementi della corrente di questo "ponte" che sono perpendicolari all'asse ABGH, attorno al quale il ponte è libero di ruotare. E' chiaro che il ponte non comincerà a ruotare, perchè la somma dei momenti di tutte le forze è uguale a zero. Infatti la somma dei momenti delle forze f_1 ed f_2 è uguale e opposta al momento della forza f_3, tenendo conto che $f_1 = f_2 = f_3 = f$, e dunque

$$f_1 (d - x) + f_2 x = f_3 d \qquad (8)$$

Questo calcolo è approssimativo, ma un calcolo esatto porta allo stesso risultato.

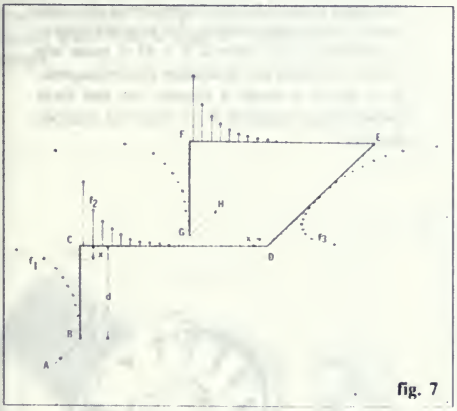


fig. 7

Per mettere in rotazione il ponte occorre sostituire, in qualche parte del circuito, le correnti di conduzione con correnti di spostamento. Io ho sostituito le parti BC e FG con un dielettrico messo fra le armature di due condensatori cilindrici, come indicato nella fig. 8, che è servita come schema al mio tornitore.

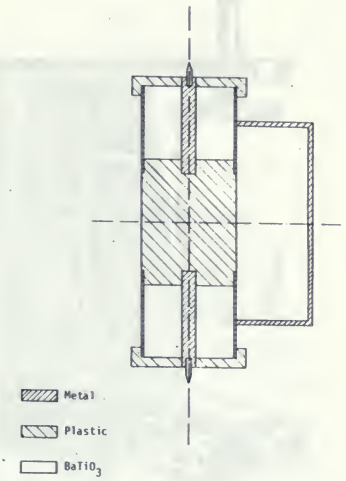


Fig. 8

fig. 8

La capacità sulla lunghezza L di un condensatore cilindrico infinitamente lungo è

$$C = 2\pi\varepsilon_0\varepsilon L / \ln(R_{est} / R_{int}) \qquad (9)$$

dove $\varepsilon_0 = 10^{-9} / 36\pi$, F/m è la costante elettrica nel sistema SI (le formule seguenti saranno scritte nel sistema pratico SI), ε è la permittività del dielettrico nel condensatore (nel vuoto $\varepsilon = 1$), R_{est} è il raggio interno del cilindro **esterno** , R_{int} è il raggio esterno del cilindro **interno** .
Ho messo del titanato di Bario ($BaTiO_3$) come dielettrico ($\varepsilon \equiv 10{,}000$) e tenendo conto che L = 3 cm, R_{est} = 1,9 cm, R_{int} = 0,3 cm, ho calcolato, per i due condensatori collegati in serie, la capacità C = 4,5 nF.
Corrodendo le armature di un condensatore si può aumentare la loro superficie, e di conseguenza la loro capacità, fino a cento volte. Io ho usato questo metodo per aumentare la capacità dei miei condensatori. Le misure hanno dato il valore di tale capacità C = 290 nF.
Per corrente di frequenza 50 Hz ho bilanciato questa capacità con bobine di filo **molto grosso** che avevano una induttività comune L = 34 H (e quindi con risonanza propria del circuito $f = 1/2\,\pi\,(LC)^{1/2} = 50{,}7$ Hz) e resistenza ohmica R = 23 Ω. La corrente alternata che ho misurato, mettendo tensione di 220 V, era I = 9A.
Con questa corrente sono riuscito a mettere il ponte in lento movimento di una rotazione per una decina di secondi.
La fotografia dell'apparecchio è alla fig. 9, alla pagina successiva.

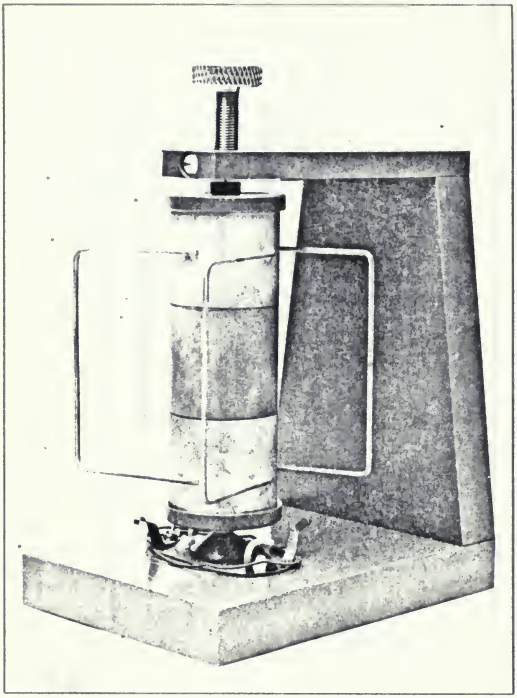


fig. 9

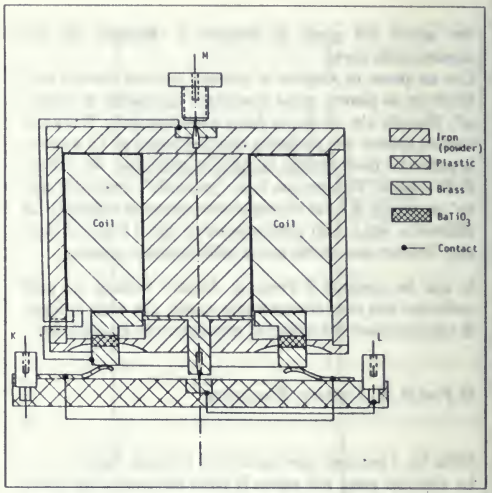


fig. 10

La Macchina Bul-Cub Senza Statore

Mi sono ormai dilungato parecchio, per questo presenterò solo lo schema (fig. 10) e la fotografia (fig. 11) della mia Macchina Bul-Cub Senza Statore. (Ricordo che qualunque macchina elettrica conosciuta ha due parti: rotore e statore).

Questa macchina viola anch'essa la legge di conservazione del momento angolare, in quanto un corpo di circa 2 kg si mette in rotazione con le sole forze interne. La macchina lavora sia come generatore che come motore. Per generare corrente alternata fra gli elettrodi K e M si mette una tensione alternata per alimentare l'elettromagnete. Se il rotore si mette a ruotare con una forza esterna fra gli elettrodi K e L esce una tensione alternata.

fig. 11a

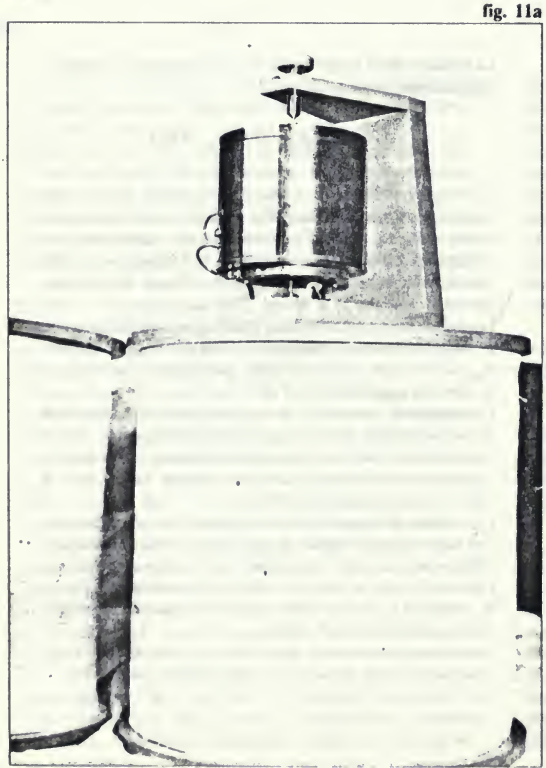
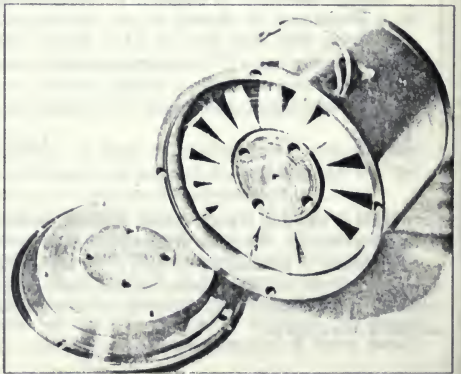


fig. 11b



La macchina lavora come motore se si eliminano i due contatti striscianti e mettendo tensione alternata agli elettrodi M e L. La corrente alternata alimenta l'elettromagnete e ne attraversa il campo magnetico due volte: una attraverso il dielettrico del condensatore del $BaTiO_3$, le cui armature sono costituite da due anelli circolari, e l'altra attraverso i raggi del corpo cilindrico del magnete. Se al posto del dielettrico si mette del filo metallico il corpo non può ruotare, in quanto i momenti che agiscono sulla corrente di conduzione in questo filo e sulla corrente di conduzione che attraversa i raggi del corpo cilindrico saranno esattamente uguali ed opposti (i calcoli sono esposti nel mio libro [7]).
Ma qualora la prima di queste correnti fosse corrente di spostamento, il suo momento delle forze si annullerebbe ed il corpo si porrebbe in rotazione.
Va detto che Graham e Lahoz [8] hanno compiuto un esperimento di questo tipo nel 1980, ma non ne hanno colto l'importanza, pensando che un momento angolare opposto si nascondesse nel "campo elettromagnetico". La fisica odierna non può ammettere che un campo elettromagnetico **potenziale** non possiede nè energia, nè momento, nè momento angolare (solo un campo elettromagnetico di **radiazione** possiede energia e momento!).
Io ho calcolato che se la mia Macchina Bul-Cub Senza Statore ruotasse 10^{1000} anni, il momento angolare che sarebbe immagazzinato nel campo elettromagnetico potenziale basterebbe a fermare la rotazione della Terra.

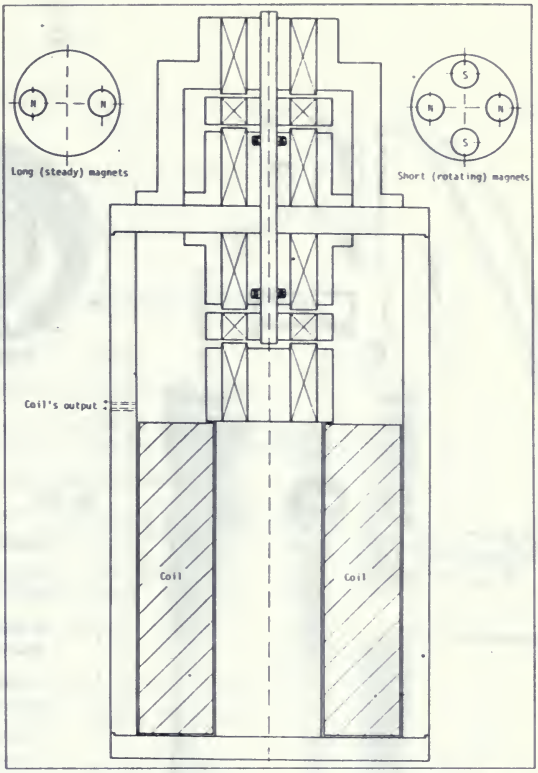
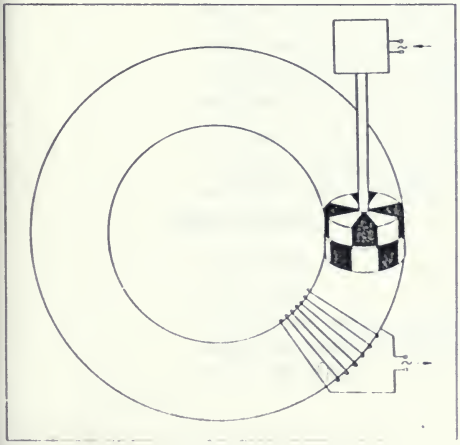


fig. 13

La Macchina Mamin Coliu

La mia macchina MAMIN COLIU *(MArinov's Motional-transformer INductor COupled with a LIghtly rotating Unit)* viola la legge di conservazione dell' energia.

fig. 12



Lo schema principale è presentato nella fig. 12; lo schema del sesto apparecchio da me costruito (che il mio tornitore ha seguito per preparne le parti) è in fig. 13 e la fotografia in fig. 14.
Uno dei dischi, nella fig. 12, è fisso, mentre l'altro può ruotare. I segmenti neri sono magneti permanenti (di neodimio) magnetizzati assialmente, ed i segmenti bianchi sono fatti di materiale non magnetizzabile. Quando i magneti del disco ruotante coprono i magneti del disco fisso, il magnetismo del toro (fatto di ferro) è massimo, mentre quando sono spostati (come nella fig. 12), il magnetismo del toro è minimo.
Dunque dalla bobina esce una tensione alternata e l'apparecchio si comporta come un generatore. Ma questo generatore non ha effetto di motore (come accade in ogni generatore con magneti permanenti che si conosca), perchè se si manda corrente nella bobina il suo campo magnetico ha una simmetria cilindrica, e sui magneti del disco ruotante non agisce alcun momento.
Questa macchina, dunque, viola la legge di Lenz. Ripeto che finora la corrente alternata che esce dalla bobina e, dopo essere stata raddrizzata, alimenta un motore di 24 V (fig. 14a), non è sufficiente a mantenere una rotazione eterna. Ci sono alcuni problemi tecnici che con una somma di 20 milioni ed un paio di mesi di tempo sono comunque risolvibili.

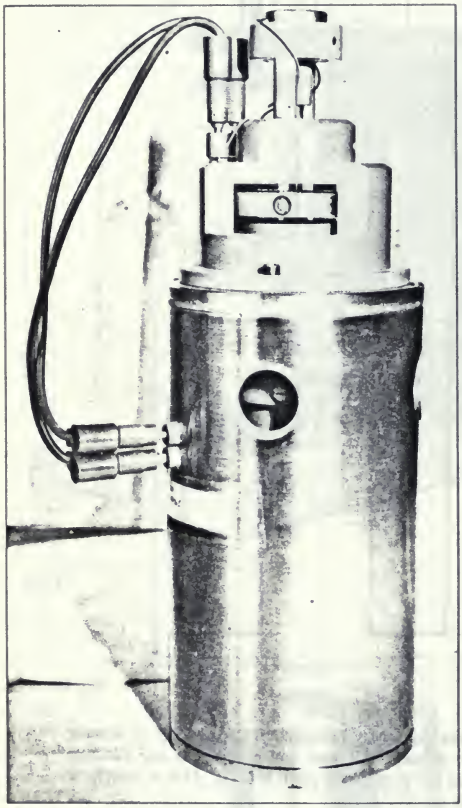


fig. 14a

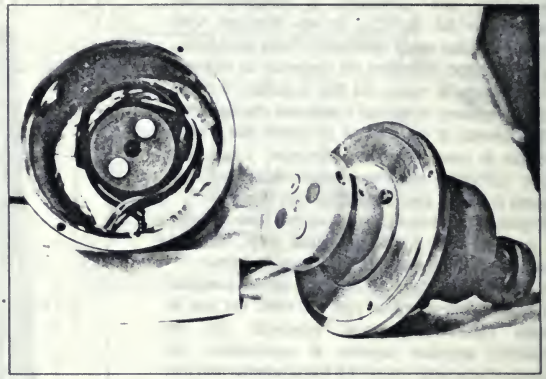


fig. 14b

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C O N T E N T S :

This fourth part of the collection of documents THE THORNY WAY OF TRUTH (TWT) offers further experimental evidence of the violation of the laws of conservation as well as "of the centurial blindness of mankind and of its frantic perseverance in it". After the second (September, 1988) edition of TWT-III, Marinov constructed the fantastic R.A.F.-machine (Rotating Ampere bridge coupled with a cemented Faraday disk generator) which can be seen above. The rotating Ampere bridge motor has only a rotor but no stator and it rotates because the magnetic interaction between current elements violates Newton's third law (fact known since 1845 which for 144 years has remained without technical applications). Indeed, in the four Ampere bridges above, the currents in the legs act on the current in the shoulder generating a moment about the axis of rotation but the action of the current in the shoulder on the current in the legs generates no rotational moment, as any child will conclude looking at the Grassmann (1845) formula. Consequently, according to the relativistic concepts, back tension cannot be induced as there is no RELATIVE motion between "magnet" and "current wire". According to Marinov, the electromagnetic interactions depend on the absolute velocities of the bodies and back tension is to be induced (the experiment confirmed Marinov's formula), otherwise the machine will produce energy from nothing. Dr. Maddox (NATURE) refuses to print Marinov's report objecting that according to contemporary physics and the theories of special, general and supergeneral relativity a Rotating Ampere Bridge cannot rotate. O Zeus, a Hephaestus, o Poseidon, looking down to the Earth you laugh so mightily that entire towns become piles of stones!

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