

*Fusion Facts* Now Reports on Both Cold Fusion and Other Enhanced Energy Devices.

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**Nothing is more damaging to a  
new truth than an old error.**

*Johanne Wolfgang von Gothe*

**A. DOE PLANS TRITIUM MANUFACTURING**

By Hal Fox, Editor

Tritium is a radioactive gas used in nuclear warheads. The tritium decays at a rate of about 5.5 percent per year (about 12-year half life). Therefore, if you want to keep your arsenal of nuclear warheads up to date, you need to manufacture tritium. **After almost six years of progress in cold fusion, including the production of tritium, the Department of Energy has not yet discovered this fact and is proposing a \$50 million budget for 1995 "to begin developing a new facility to produce tritium".** According to recent information, it would cost over one billion dollars to build a nuclear facility for the production of tritium. This facility would use a nuclear power plant to produce neutrons, which would bombard surrounding containers of heavy water transmuting some of the deuterium into tritium. After a decade or so of operation, the facility would likely cost twice as much to dismantle and dispose of the intensely radioactive wastes.

**WHY PROLIFERATE FURTHER THE NUCLEAR WEAPON ARSENAL?**

Now that the cold war is over and the former USSR is participating in nuclear arms reduction, who is the U.S. planning to overkill? With the enormous number of nuclear warheads that the U.S. has, there must be an equally enormous amount of tritium. Half of that tritium would be lost to radioactive decay in twelve years. What is so bad about allowing our hydrogen bomb capability to reduce by one-half over the next 12 years? Isn't it time our political leaders sought to wage peace and not war? Isn't it time that we find better ways to improve this world and work together for peace? It is understood that there will be madmen, on occasion, who insist on waging local war. But where is the nuclear threat that must be met with hydrogen bombs? Atomic bombs apparently can be used without the use of tritium.

### WHY NOT USE A MUCH SIMPLER METHOD TO PRODUCE TRITIUM?

Dr. Edmund Storms, now retired, worked in the tritium laboratory of the Los Alamos National Laboratory. Storms produced tritium using cold fusion devices. In another lab at Los Alamos, other scientists also worked on the production of tritium. **If it is in the best national interest to produce tritium, why not use new technology?** Rather than spend \$50 million on a planning phase for the production of tritium, it would make much more sense to spend a fraction of that amount on methods to increase the production of tritium from cold fusion cell operation. There is very little radioactivity involved except for the tritium that decays by the release of a beta particle (an electron). There is no long-term environmental disaster as there is for each and every nuclear power plant that is built and operated.

### DOE INCREASING ITS NUCLEAR WEAPONS BUDGET

According to the referenced news report, the Energy Department has asked for an increase of 8.5% in fiscal 1996 to be spent on weapons activities. **By contrast, the DOE is requesting a decrease of 9.2 percent in the funds to clean up radioactive and toxic waste!** Someone at the DOE has not been reading the message sent by the U.S. voters. Washington bureaucrats are expected to not pursue their old ways of continued pollution and warfare. They are expected to participate in the improvement of this world we live in. It is time to quit playing funding games for DOE insiders and start to solve the energy problems -- not add to them.

### SECRETARY O'LEARY: TIME TO CLEAN UP DOE'S ACT

Secretary O'Leary, several scientists at your own Los Alamos Laboratory would be highly willing **and able** to use their cold-fusion expertise to develop cost-effective methods to produce tritium. When your own laboratory scientists have had extensive experience and successes, when Dr. Edmund Storms, formerly with the tritium lab, is one of the world's leading experts in cold fusion, why do you not use that resource?

**If DOE cannot even use their own expertise, it appears to be time to dismantle the Department of Energy, close down the non-productive energy laboratories, and clean up the mess they have funded. It is time to tell America the truth about cold fusion and let corporate America solve this nation's energy problems. It is time to become world leaders in non-polluting enhanced energy sources. We don't need to spend millions of dollars on a radioactive nuclear reactor to produce tritium!**

Reference:

Staff, "Manufacture of Tritium May Resume," *Washington Post*, picked up by *Salt Lake Tribune*, 6 Feb. 1995.

Edmund Storms, "A Critical Review of the Cold Fusion Effect," 63 manuscript pages, 177 refs.

### B. DISCOVERY OF "VIRTUAL INERTIA"

By Dr. Harold Aspden

I report an anomalous energy phenomenon found in my motor experiments.

Imagine an electric machine having no electrical input itself and which, when started on **no load** by a drive motor and brought up to speed (3250 rpm), thereafter runs steadily at that speed with the motor drawing a little extra input power with a time decay rate of about two minutes. The machine rotor has a mass of 800 gm and at that speed its inertial kinetic energy together with that of the drive motor is no more than 15 joules [to overcome friction], contrasting with the excess energy of 300 joules needed to satisfy the anomalous power surge [to spin up from rest].

Imagine further that when the motor, after running five minutes or more, is switched off and the machine is stopped, **you can restart it in the same or opposite direction** and find that it now has a memory in the sense that it will not now ask for that 300 joules of excess input. 30 joules will suffice provided the time lapse between starting and restarting is no more than a minute or so.

This is not a transient heating phenomenon. At all times the bearing housings feel cool and any heating in the drive motor conductors would imply an increase of resistance and a build-up of power input to a higher steady state condition.

The experimental evidence is that there is **something spinning of an ethereal nature coextensive with the machine rotor**. That 'something' has an effective mass density 20 times that of the rotor, but it is something that can spin independently and take several minutes to decay, whereas the rotor comes to rest in a few seconds.

Two machines of different rotor size and composition reveal the phenomenon and tests indicate variations with time of day and compass orientation of the spin axis. One machine, the one incorporating the weaker magnets, showed evidence of gaining strength magnetically, as the tests were repeated over several days.

I will soon be reporting in detail on these findings, after further work and evaluation of the implications. The phenomenon was something I should have been prepared for, having regard to my years of theorizing, but **this discovery was unexpected as it has crept in loud and clear in a project aimed at testing a motor principle totally unrelated to 'vacuum spin'**. It has appeared obtrusively and I do not yet know whether, in adapting to its presence, it can serve in improving machine performance or become detrimental.

Readers who are curious about my more general research endeavors may find interest in the specification of U.S. Patent No. 5,376,184 granted to me on December 27th 1994. In connection with the subject of this particular communication I quote from lines 3 to 28 of column 21 of that patent:

"Extract from US Patent 5,376,184:

Now, in a practical device, one can similarly set up electric fields in a metal rotor by displacing those charge carriers, either by inertial action or by the action of a magnetic field directed along the spin axis. However, even here physicists have problems understanding the phenomena they observe, as one may see from the scientific paper by James F. Woodward: *Electrogravitational Induction and Rotation, Foundations of Physics*, **12**, pp 467-478 (1982). On page 472 one reads, after a statement that machine operation produced induced charge in evidence from a voltage:

*Plainly, an effect of some sort is present. Since a negative charge appears during spindown, we may infer either that (1) an initially present positive charge disappears during spindown, or (2) some process drives the sample case to negative potentials during spindown. The genuine disappearance of charge from the sample/sample-case assembly would be, of course, prima facie evidence for the existence of electrogravitational reduction.*

"What this means is that electric charge can be held displaced within a metal to set up electric field gradients in that metal. Woodward did this by inertial spin action, possibly affected by extraneous magnetic fields, such as the earth's field, but a similar result can be obtained by building a series-connected capacitor stack."

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### THE ASPDEN EFFECT

By Hal Fox

The discovery of "Virtual Inertia" (which in Aspden's honor, we name **The Aspden Effect**) is, in my judgement, the type of fundamental discovery that may force dramatic changes in our understanding of physical reality. There may be others who have noticed this effect, but Dr. Harold Aspden immediately initiated a series of events: he observed a new and unpredicted anomaly, he did not reject it, he added to his experimental knowledge by replication (different times, different motors, different magnetic orientations), he made some preliminary attempts to tie this new evidence into his understanding of the physical world, and he disclosed the information to his friends (in this case including the pages of *New Energy News*). **These are the actions of a true scientist.** One of the most important attributes of a true scientist is that he/she does not allow theory to get in the way of the experimental facts. Another important attribute is the willingness to share his/her findings.

Because of the importance of this discovery, this is my attempt to describe and understand this discovery:

Aspden is apparently working with permanent magnet rotors (he writes: "One machine, the one incorporating the weaker magnets, showed evidence of gaining strength magnetically..."). The rotor weighs 800 grams. There is a resistance to spinning up the rotor (science/engineering uses the term inertia) so that it requires energy to get the rotor up to speed. This energy is measured at 300 joules (one volt at one amp = one Watt. One Watt for one second = one Joule/sec of power).

When the machine is rotating at the speed of 3250 rpm, the **inertial kinetic energy** of the 800-gram rotor, plus the drive motor rotor, needs no more than 15 Joules to continue rotating. Apparently, that energy is being used to overcome air friction, bearing friction, and any other losses that might be occurring.

Now run the machine for, say, five minutes. Dr. Aspden found that **if the machine is started up again within a minute, from rest, only 30 Joules is required to bring the machine back up to rated speed!** I invite you to ask any high school science teacher or any college professor of physics or engineering if this observation can be explained by current physical principles. I am quite sure that you will not find anyone who will agree that these experimental results are even possible. **Therefore, it is an anomaly**, a deviation from the normal rule.

Aspden states, "The experimental evidence is that **there is something spinning**" [with the rotor, and he adds] "of an aethereal nature coextensive with the machine rotor." That something of an ethereal nature implies, **strongly implies**, that this experiment is a dramatic demonstration that there is an

ether and that our scientific model of the real world **has been wrong for over 75 years!** Unless someone can come up with an explanation based on the current model of nature, then this experiment is one of the simplest methods to demonstrate to students, of all ages, that there is an ether.

Aspden further discovers and reports, "...variations with time of day and compass orientation of the spin axis." My interpretation would include the assumption that if the ether spins with the rotor, **then there is a big chunk of ether that is spinning with the earth.** [That information could explain why the most famous negative experiment in scientific history -- the Michelson-Morley experiment measuring light speed -- did not find a difference in the speed of light with and perpendicular to the earth's motion.] Also, if there is a rotating ether around the earth, then there could be an interaction between rotor-ether spin and earth-ether spin. Therefore, suggesting some interesting new experiments that could be made to find out precisely how much interference one could measure between differently oriented ether spins.

If our understanding of the ether is correct, it is the sum total of the universe's electromagnetic radiations and it has the characteristic of not being discernable **except from a rotating frame of reference.** We also understand that the energetic ether is the ultimate source of that effect which we label as inertia. (See Puthoff's report, *NEN*, February 1994). What is so fascinating about this discovery is that "something" that is affiliated with electromagnetic fluctuations (moving at the speed of light) can maintain an imparted motion **"and take several minutes to decay."** One might ask, "If you introduced a strong stationary magnetic field into this space, would the effect dampen quickly?" In other words do ether effects interact or would it be like trying to get two beams of light to interact?

Aspden says the following: "...you can start it in the same or opposite direction and find that it now has a memory in the sense that it will not now ask for that 300 Joules of excess input." **If it is true that the effect is non-directional, then the implications could be that for a period of a few minutes some ether effect has become a part of that rotor. Because this effect appears to be related to inertia, could the effect also be related to gravity within that local region?**

In Science, the credit goes to the man who convinces the world, not to the man to whom the idea first occurs.

-- Sir Francis Darwin

### C. EDITORIAL

#### COMMERCIALIZATION OF NEW ENERGY - NOW?

[Information courtesy of Dr. Robert Bass, Dick Liebel, John Eriksen, information received Jan. 27, 1995.]

By Hal Fox, Editor

**Giant Bay Resources Ltd., of Vancouver, B.C.** under the direction of Catherine Stauber, President, has entered into the **New Energy Age.** Here is the story: Giant Bay has acquired the Sam Leach patent on "Electric Arc Plasma Steam Generation" (U.S. Patent 4,772,775, issued Sept. 20, 1988). Here are excerpts from their latest letter to shareholders (courtesy of Dick Liebel):

"Giant Bay Resources Ltd. has had a very eventful and interesting year. The main focus of the Company is now dedicated to the development and commercialization of our new technology so we can focus on earning income.

**"Steam Power Generation Technology - H<sub>2</sub>O as Fuel.** Many shareholders are already familiar with our involvement in this exciting technology. However, as few of us have a degree in Physics, the description and potential of this process has now been simplified for easier understanding.

"In our more technical literature this process has been referred to as **Electric Arc Plasma Steam Generation.** This technology performs a highly efficient method of producing super-heated steam (thermal energy) using electricity and water as a primary fuel. The super-high temperatures achieved (over 10,000 - 20,000°F) compare to fossil fuel flames in the 3600°F range. These high temperatures can only improve the existing speed, efficiency and drastically reduce pollution levels of the steam-making process. This process should prove to be highly efficient and very economical.

"...After achieving encouraging results, Giant Bay has engaged Crossbow Electronics Inc. of Toronto, Canada, to perform an independent study of the technology in California. Crossbow has enthusiastically embraced the technology with confidence and stated **with their professional expertise Giant Bay can have a working proof-of-principle prototype in just 60 to 90 days. ..."**

"Sincerely /s/ Catherine Stauber, President.

Excerpts from the December 6, 1994 News Release:

"...Crossbow Electronics Inc. of Toronto, Ontario has conducted an independent on-site testing and review of the technology's development to date. With encouraging results, Crossbow has now agreed to a contract development agreement to complete a proof-of-principle prototype in Toronto. **The**

goal is to complete and design the system to operate in an efficient, non-polluting closed-loop manner and generate more electricity than it consumes."

Editor's Note: I talked to John Eriksen, President of Crossbow Electronics. He confirms the statements attributed to him. He also stated that tests of a much cruder system were made at Georgia Tech with the preliminary results indicating that the thermal power measured 157 percent more than the input power. Eriksen expects that the improvements will provide additional efficiencies. To meet their stated goal of being able to create more electrical output than used on the input, the conversion to steam and then back to electrical output would imply that the steam-generating process is providing thermal power from two to three times the input electrical power.

#### COMMERCIALIZATION?

In addition to Giant Bay Resources the following companies are also involved in new energy systems: Hydro Dynamics Inc. in Georgia is manufacturing and installing electric-powered **Hydrosonic™ pumps** which have been measured to be over 100 percent efficient **not including losses**. The HydroCatalysis Power Corporation of Lancaster, Pennsylvania is developing an electrolytic cell that produces excess power. ENECO, Inc. of Salt Lake City, Utah has obtained rights to intellectual property representing over thirty patents pending in the cold fusion and enhanced energy areas. UTAHKOMET is a joint venture manufacturing company in the Republic of Belarus which has been established to help provide a manufacturing base for new energy devices and systems.

Conclusion: Commercialization has begun.

#### ELECTRIC ARC STEAM GENERATION PATENT

Inventor: Sam L. Leach, "Electric Arc Plasma Steam Generation," U.S. Patent No. 4,772,775, Date of Patent, September, 20, 1988, 19 claims, 7 figures.

Abstract: An electric arc plasma steam generator includes a pair of electrodes for generating the arc plasma, and a housing for enclosing the arc plasma. Jets of water are directed into the arc plasma to convert the water into steam and to ionize the hydrogen and oxygen components of the steam. Arrangements including coils and water jackets are provided for circulating water in proximity to the arc plasma and for superheating the water contained in the water jacket and/or the coils, which are preferably mounted within the housing. An expansion chamber is connected to receive both the superheated water, and also the superheated steam from the arc plasma, as the hydrogen and oxygen recombine to form steam once again. The arc plasma in one embodiment may be formed by electrical conduction through a spray of water containing an electrolyte; and in another embodiment

electrodes may initially form the arc plasma in air or other gas, and as the electrodes are consumed, they may be advanced by a suitable mechanical arrangement including threads on the electrodes, keyway slots on the electrodes, and stepping motors which serves to advance the electrodes as needed.

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#### D. NEWS FROM THE U.S.

##### CALIFORNIA - SUPERCOLD FUSION

Mark Goldes, "Supercold Fusion, The Pion Drive, and Nanoscale Robotic Trips to the Stars," *Cold Fusion*, no 6, Jan. 1995, pp 14-15.

#### SUMMARY

Supercold fusion, at temperatures close to absolute zero, was the subject of a rejected U.S. patent application by Dr. Robert L. Carroll in 1971. It was a secondary effect of an even more fascinating invention, a propulsion system intended to open a practical path to visiting the stars.

Carroll was one of the few physicists to immediately applaud Pons and Fleischmann following their controversial press conference. He believed he could explain why they had probably achieved fusion. He stated that their experiments produced a catalytic reaction resembling that between platinum and hydrogen which he had tried to patent eighteen years earlier.

In Carroll's opinion, a craft of suitable design, leaving earth at dusk, would be orbiting the bright star Arcturus by the time dawn arrives at the point of departure. Later, experiments at Lawrence Berkeley Laboratory in 1947 demonstrated that proton-antiproton annihilation yields highly energetic neutral pi mesons (pions). Carroll decided to try to develop technology that would induce a controlled variation of the spontaneous collapse of specific atoms in a manner that would release all of the enormous internal energy, i.e., a pion drive.

If the galaxy is truly open to relatively low-cost voyages of exploration by earthlings, many millions of people could conceivably live elsewhere in space by the end of the twenty-first century. Realization of Carroll's pion propulsion system may supersede expensive chemical rocketry and make possible the late Gerard O'Neill's vision of a number of large satellites with average populations of 10,000 orbits between Earth and Mars.

Carroll's analysis of the structure of the atom led him to an alternative source of propulsion based on induced electron capture. A secondary reaction suggested to him that a fusion reaction, involving spongy-platinum and -hydrogen, would be

possible at a temperature close to absolute zero. This was the subject of his 1971 patent application.

A device that Carroll terms a Resonance Absorber, which can reduce the temperature of the fuel to a couple of degrees above absolute zero, might induce a controlled collapse of the structure of the helium atom (or other suitable fuels). The super cold fusion and space propulsion applications, submitted about the same time, were denied patents.

It may be possible to build a Resonance Absorber within the next few years. If electron capture is achieved, an extremely small (nanotechnology) spacecraft might be designed and constructed. Should it successfully reach Arcturus (or some other destination star) and rapidly return with proof in the form of useful data consistent with physics and cosmology.

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#### COLORADO - ON FREE ENERGY PROJECT

Dr. Timothy A. Binder, "A Further Report on the Russell Science Research -- The World Balance Through Free Energy Project," *Fulcrum*, vol 3, no 2, pp 32-36.

An overview of the Free Energy Project and its impact.

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#### COLORADO - THE MAKING OF <sup>5</sup>LITHIUM

Ron J. Kovac, "Plasma Shaping Reveals New Atomic Transformation Technique and Cold Fusion at Chemical-Molecular Levels," *Fulcrum*, vol 3, no 2, Dec. 1994, pp 19-29.

##### EXCERPT FROM AUTHOR'S CONCLUSION

<sup>4</sup>He (the commonly accepted ashes of cold fusion) was obtained at 3.75% concentration of the parent gas, nitrogen (<sup>14</sup>N). Even more profound: The "Missing Link" element, <sup>5</sup>Li was created in the same apparatus. Standard literature proclaims that there is no element of atomic weight 5. The cold fusion process that gave these results uses only plasma of N<sub>2</sub> and magnetic shaping. The plasma tube has no constrictions or capillary fusion facility. The plasma tube has only two needle point stainless steel electrodes, no platinum, nickel or palladium cathodes. The <sup>5</sup>Li was obtained at 2.50% of the parent gas <sup>14</sup>N.

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#### MARYLAND - RADIO BROADCASTS ON C.F.

##### EDITOR'S SUMMARY

Drs. Robert R. and Zohara M. Hieronimus operate the Hieronimus & Co. 21st Century Radio/TV News. They have

been supportive of cold fusion since March, 1989. On January 15, 1995, Robert Hieronimus had Hal Fox, Editor of *Fusion Facts*, and author of Cold Fusion Impact in the Enhanced Energy Age, discussing some of the recent cold fusion developments. The radio station is WCBM, Baltimore, Maryland. As is often the case, the reticence of the scientific community to recognize the value of cold fusion was questioned. Also the question, "What happened to Pons and Fleischmann?" was asked and answered. Fox provided some latest information about new developments in cold fusion world-wide. The lack of the U.S. participation in developing new energy sources was discussed. Dr. Robert Hieronimus is an excellent interviewer and many of the pertinent topics concerning cold fusion were discussed.

On February 7, 1995, Dr. Zohara Hieronimus interviewed Hal Fox on another program from the same WCBM - Baltimore radio station. In this short thirty-minute broadcast, the role of the scientific lobbyists was again mentioned. The idea that the government's energy department would be so unwilling to fund and support a new energy science is nearly always a topic of conversation on a radio broadcast. Fox was able to explain that it was not the incompetence of the Secretary of Energy (Hazel O'Leary) but the staff that is to blame. The staff of the DOE are so heavily involved in the support and funding of the search for hot fusion that cold fusion is treated as anathema. Some of the functions of government and business that will be strongly impacted by the development of cold fusion were discussed during this broadcast.

*Fusion Facts* may not support all of the views presented by Robert and Zohara Hieronimus, **however, we applaud them for their willingness to provide information on cold fusion and other enhanced energy systems.** If you are in or around the Baltimore area, tune into WCBM, you just may hear someone talking about cold fusion.

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#### NEW YORK - GLOBAL WARMING

Courtesy of Dr. Win Lambertson

David Schneider (Staff Writer), "Global Warming Is Still a Hot Topic," *Scientific American*, Feb. 1995, page 13.

##### EDITOR'S SUMMARY

David J. Thomson (AT&T Bell Laboratories) has carefully tracked the annual cycle of the timing of the seasons between 1651 and 1991. He has concluded that there was a gradual shift in temperature cycle of about one day per one hundred years, until about 50 year ago. Since about 1940, there has been a pronounced increase in the timing of the seasons in the Northern Hemisphere. Thompson suggests that this change is due to mankind's increasing production of vapors, such as

carbon dioxide, that result in global warming. This is just another bit of evidence that should be considered by government agencies who should be funding alternate, non-polluting, energy production methods, such as cold fusion.

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### NEW YORK - ULTRASONIC SOURCES

David Deak, Ph.D., "Theory and Design Concepts of Ultrasonic Sources," *Cold Fusion*, no 6, pp 22-31.

#### AUTHOR'S ABSTRACT

The philosophy of designing ultrasonic transducers has over the past two decades evolved, in the author's opinion, primarily from the contributions of medical ultrasound research. Although ultrasound is used extensively within the industrial area for nondestructive testing applications, medical ultrasound research still provides for important innovative techniques. An attempt will be made to explore that research path and provide current design methods relating to more general applications, especially relating to cold-fusion research. Acoustic radiation forces are discussed along with a briefing of Lagrangian and Eulerian coordinates, in an attempt to explain these acoustic forces and their importance in transporting momentum into a liquid from an ultrasonic transducer. Various transducer types are presented.

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### NEW YORK - NEW THIN-FILM ALLOYS

Courtesy of Dr. Samuel P. Faile

I. Peterson (Staff Writer), "New Alloys: Mixing it up on Metal Surfaces," *Science News*, 28 Jan. 1995, page 53.

#### EDITOR'S SUMMARY

Some metals that do not mix well to make alloys, such as gold and nickel, can be made to form a single layer atomic alloy. This discovery was made by Jerry D. Tersoff of the IBM Thomas J. Watson Research Center in Yorktown Heights, New York. Mixing atoms of different sizes such as gold atoms on the surface of nickel may promote the development of new or better catalysts. If cold fusion involves the catalysis of nuclear reactions, some of these metal thin-film alloys may be of importance in experimental work.

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### PENNSYLVANIA - HYDROGEN RESEARCH FUNDS

Courtesy of Dr. Samuel P. Faile

Andrew Lawler, "Walker Bill to Boost Hydrogen Sparks Democratic Grumbling," *Science*, Vol 267, 3 Feb, 1995, page 613.

#### EDITOR'S COMMENTS

This article reports on H.R. 655, a bill supported by Representative Robert Walker (R, Penn.) to provide \$40 million on hydrogen research by 1998. Walker noted that hydrogen research as an alternative energy fuel received only \$10 million while solar energy received \$240 million. This compares to the current budget expenditures of \$zero for cold fusion and other enhanced energy systems. **However, we urge our grant-seeking friends to come up with some proposals if the H.R. 655 passes, however do not use the term cold fusion.** It would be best to call it thermal conversion of hydrogen.

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### TEXAS - ELECTROCATALYSIS REVIEW

*Chemical Abstracts*, vol 121, 3 Oct. 1994

J.O'M. Bockris and Z.S. Minevski (Dep. Chem., Texas A&M Univ., College Station), "Electrocatalysis: Past, Present and Future," *Electrochem. Acta*, vol 39, no 11-12, 1994, pp 1471-1479.

#### AUTHORS' ABSTRACT

A review with 20 references is given. The word "electrocatalysis" was first used by Grubb (1963) in connection with the investigations of fuel cells. However, the first interpretation of electrocatalysis came before that in a famous paper by Horiuti and Polanyi (1935). In this paper, examples of application of this theory will be given in the form of recent progress made and then the discussion will change to a presentation of near future tasks. Finally, an attempt will be made to predict some possible electrocatalytic situations beyond 2050.

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### VIRGINIA - RADIATIONLESS FUSION

T.A. and S.R. Chubb (Research Systems), "Fusion Reactions in Deuterided Palladium," *Cold Fusion*, no 6, p 21.

#### INTRODUCTION

This note describes a theory of cold fusion that explains how radiationless fusion can occur in metal deuterides. Cold fusion theory can be summarized as follows:

#### Ground state palladium deuteride

D atoms, when introduced into a Pd lattice under chemical equilibrium conditions, occupy octahedral sites in a face-centered cubic lattice of Pd atoms. The D atoms exist as D<sup>+</sup> ions oscillating in separated potential wells in which charge neutralization is provided by the charge density of the electron

cloud furnished by the metal-atom lattice. In this configuration the  $D^+$  ions see mostly the local trapping environment, though they have a substantial hopping rate into neighboring vacant octahedral sites. The spatial distribution of the  $D^+$  charge density is largely described by the zero point motion of single  $D^+$  ions in separated "harmonic" wells. This normal condition, however, does not permit fusion. The positive charges on the  $D^+$  ions keep the nuclei too far apart for nuclear reactions to occur. For fusion to occur, it is necessary to excite some of the  $D^+$  ions into a higher-energy, less localized state. These excited deuterons (excited  $D^+$  ions) then behave much like electrons in a metal. The theory says that these excited deuterons are the active ingredients in heat-producing reactions.

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#### VIRGINIA - MORE ON CAVITATION FUSION

Talbot and Scott Chubb (Research Systems), "More on Cavitation Fusion," *Cold Fusion*, no 6, p 17.

#### SUMMARY

This short article is a continuation of discussions on cavitation fusion by Bruce Klein and David Deak, in *Cold Fusion*, nos 4 and 5. They call attention to a recent Hickling paper published in the 21 Nov. issue of *Physical Review Letters*, p 2853, entitled "Transient, High-Pressure Solidification Associated with Cavitation in Water." [see abstract in *FF* next month] The article models and explains the cavitation process. The dynamics of bubble-collapse results in a final compression of the liquid at the bubble surface to pressures exceeding 50,000 atm for a period of the order of  $10^{-9}$  s.

Speculating, the authors say the excess power reported for the Hydrosonic Pump and at least 2 other cavitation devices seems to be as well established as the excess power observed in classical cold fusion studies of palladium deuteride. Also, cavitation-induced cold fusion shares with other forms of cold fusion two common characteristics: (1) excess heat without significant radiation, and (2) the presence of a crystal lattice or surface. Contrary to many scientists' opinions, they support the research claim that the Coulomb barrier problem goes away if one has ions excited into band states in a crystal size greater than about  $10^5$  unit cells, and the nuclear reaction becomes distributed throughout the crystal so that there is no energy concentration into a single unit cell as required for production of radiation.

#### E. NEWS FROM ABROAD

##### CHINA - ANOMALOUS NUCLEAR PHENOMENA

*Chemical Abstracts*, vol 121, 19 Sep. 1994

XingZhong Li, DaWei Mo, Li Zhang, ShiCheng Wang, TieSun Kang, S.J. Liu, J. Wang (Dep. Phys., Tsinghua Univ., Beijing), "Anomalous Nuclear Phenomena and Solid State Nuclear Track Detector," *Nucl. Tracks Radiat. Meas.*, vol 22, no 1-4, 1993, pp 599-604.

#### AUTHORS' ABSTRACT

The puzzle of anomalous nuclear phenomenon is reviewed, and the role solid state nuclear track detectors (SSNTDs) might play in solving this puzzle is considered. Related experiments are presented and improvements are discussed. Many references.

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##### POLAND - HIGH PRESSURE EXPERIMENT

*Chemical Abstracts*, vol 121, 3 Oct 1994

A. Stroka, B. Baranowski, S.M. Filipek (Inst. Phys. Chem., Polish Acad. Sci., Warsaw), "Search for  $^3\text{He}$  and  $^4\text{He}$  in Pd-D<sub>2</sub> System Long-Term Cumulation Experiment in High Pressure," *Pol. J. Chem.*, vol 67, no 2, pp 353-354.

#### AUTHORS' ABSTRACT

A high-pressure experiment was conducted, which had the advantage that the products of an eventual "cold fusion" could be accumulated in the closed high-pressure working volume. The results present an additional method confirming the previous numerous negative findings of the "cold fusion" proposal.

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##### RUSSIA - DKDP CRYSTAL STUDIES

*Chemical Abstracts*, vol 121, 5 Sep. 1994

B.V. Deryagin, E.I. Andriankin, A.G. Lipson, E.V. Metelkin, D.M. Sakov, G. V. Fedorovich (Otd. Teor. Probl., Russ. Akad. Nauk, Moscow), "Possibility of Nuclear Fusion Initiation of Polarization Reversal Generated in Deuterated Ferroelectrics at  $T < T_c$ ," *Dokl. Akad. Nauk*, vol 334, no 3, 1994, pp 291-295, in Russian.

#### AUTHORS' ABSTRACT

A theoretical mechanism is described, creating the condition for cold nuclear fusion in deuterated ferroelectrics at  $T < T_c$ . At its basis lies the phenomenon of acceleration of deuterons in the repolarization wave of the ferroelectric, initiated by an



external electric field with a large coercivity ( $E > E_c$ ). Preliminary experimental results are presented, as obtained during stimulated repolarization of DKDP crystals, which support the theoretical conclusions. This allows one to detect the optimal types of ferroelectrics, which one can use in future studies.

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#### RUSSIA - HYDROGEN ELECTRODE REACTION

*Chemical Abstracts*, vol 121, 3 Oct. 1994

Oleg A. Petrii, Galina A. Tsirlina (Chem. Fac., Moscow Univ., Moscow), "Electrocatalytic Activity Prediction for Hydrogen Electrode Reaction: Intuition, Art, Science," *Electrochim. Acta*, vol 39, no 11-12, 1994, pp 1739-1747, 97 refs.

#### AUTHORS' ABSTRACT

The factors which determine the electrocatalytic activity of metals in the hydrogen reaction are reviewed with 97 refs. The problems are formulated which arise when plotting the volcano relationship between the current density logarithm and the metal-hydrogen bond energy. Experimental data on exchange currents and electron work function  $W_e$  were selected. The scatter in electrochemical data and the absence of reliable results for metals with low  $W_e$  are the deciding factors for plotting the correlating relationships. It was concluded that, to date, one can only suggest that there is a tendency for the exchange-current to increase with the increase in  $W_e$ , without giving any quantitative relationships.

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#### UKRAINE - DEFLAGRATION

*Chemical Abstracts*, vol 121, 5 Sep. 1994

A.V. Basteev, L.A. Nechiporenko (Inst. Probl. Machinery, Kharkov, Ukraine), "Activation of Solid-Phase Deflagration of Hydrogen-Containing Energy-Storing Substances," *Int. J. Hydrogen Energy*, vol 19, no 9, 1994, pp 739-741.

#### AUTHORS' ABSTRACT

The effect of generation and stabilization of gaseous products in the periodic structure of irradiated hydrogen-containing energy-storing substances  $NH_2NO_3$  and  $NH_4ClO_4$  is reported. The investigated products of gamma-radiolysis create mechanical strains in the lattice and lead to solid-phase deflagration [vigorous exothermic reaction involving flame or sparks] after rapid heating. The prediction of possible DD-reaction in deuterium-containing solids  $ND_4NO_3$  and  $ND_4ClO_4$  is made.

#### F. PATENTS PUBLISHED IN 1994

Courtesy of Peter Glück

1. CN 1,077,563, "Induced cold nuclear fusion," Jaijun Wang, 20 Oct 1993, 24 Apr 1993. The title technique comprises energy transmission from the inducing particle to the fusion material by collision. The following particles or their combination can be used as the inducing particle:  $\alpha$ -particle, neutron, proton, ion, electron, and  $\mu$ .

2. CN 1,077,816, "High-efficiency reaction vessel for studying the anomalous effect in a metal-deuterium system," Hequin Long, 27 Oct 1993, 29 Sep 1992. The title reaction vessel comprises a couple of metal electrodes in a closed container made from insulating material; the metal layer lines the inner wall of the container which is separated from the electrodes; and an outlet exiting to air is provided.

3. DE 4,203,094, "Cold fusion of hydrogen nuclei," K. Philberth, B. Philberth, 05 Aug 1993, 04 Feb 1992. The title process comprises formation of microclusters or materials in presence of D and carrying out fusion under strong charge where the strong charge also allows measurement for fusion products. The microclusters are produced by evaporating, e.g., Pd in presence of D and cooling where the microclusters contain 3-100,00 atoms of the component.

4. DE 4,307,693, "Methods for cold fusion of hydrogen nuclei in a self-excited process," H. Rautenhaus, 02 Sep 1993, 11 Mar 1993. Methods for fusion of hydrogen nuclei in metal lattices entail carrying out the fusion as a self-excited potential hydrogen fusion (PHF) process to generate charged highly energetic end products which, in turn, produce electron cascades in the host lattice of electrons having high kinetic energies which can initiate further PHF reactions. The host metal may have a large negative charge applied to it while the PHF reaction proceeds.

5. EP 576,293, "Energy production from the control of probabilities through quantum level induced interactions," Nelson Lee Len Ying, C.W. Schultz, II, 29 Dec. 1993, 26 June 1992. A cold fusion reaction is initiated on demand in a cell containing  $D_2O$  in which electrolysis occurs between a Pt and a Pd electrode. The Pd electrode collects D ions which are then caused to fuse by incident radiation from gamma and alpha radiation sources.

6. ES 2,037,628, "Electrochemical nuclear reactors based on hybrid (H,D) cold fusion in a solid matrix," C. Sardin, 16 June 1993, 03 Aug. 1990. The cathode of the reactors is charged with H formed by the electrolysis of water, and contains a cavity into which pressurized D, obtained by electrolysis of heavy water and stored in a receiver, is injected. The tube, connecting the receiver for D with a cavity in the cathode serves also as electric conduit. The metal of the cathode consists of Ti, Th, V, Zr, Pd, Nb, Ta, or of alloys with each other or other metals. Preferably the cathode consists of Ti, Pd, or Pd alloyed with Ag, and may be coated with a material that is impervious to H. The H is used as the combustible material, and the D as combustion-inducing agent.

7. FR 2,689,298, "Method for eliminating corrosion deposits in the secondary part of a vapor generator of a pressurized water cold nuclear reactor," Marie Helene Clinard, Pierre Saurin, 01 Oct 1993, 24 Mar 1992. The deposits are contacted with an alkaline chemical solution to oxidize and dissolve Cu contained in the deposits, and ozone is bubbled into the solution at the interior of the secondary part of the vapor generator.

8. JP 05 107,376, "Energy generation by cold nuclear fusion," T. Matsumoto, H. Harada, 27 Apr 1993, 14 Oct 1991. In the process, H<sub>2</sub>O containing an electrolyte decomposed through electrolysis using Pd (or its alloy) heated at  $\geq 800^\circ$  in vacuum as a cathode and Pd as an anode to cover the surface of the cathode material with H atoms so that nuclear fusion, **with the H atoms as a catalyst**, is caused on the surface of and/or inside the cathode.

9. JP 05 203,775, "Apparatus for cold nuclear fusion," M. Watanabe, A. Takahashi, T. Iida, Matsushita Electric Ind. Co. Ltd., 10 Aug 1993, 24 Jan 1992. In the app., in which an anode and a cathode from a H-adsorbing metal are immersed in a D<sub>2</sub>O-containing electrolyte, and nuclear fusion is caused by current flow, the anode consists of  $\geq 2$  parallel plates with a constant interval between them, and thin cathode plates are plated in between. In carrying out nuclear fusion by the apparatus, D is expelled from the cathode during electrolysis.

10. JP 05 302,988, "Energy generators based on cold fusion," K. Kunimatsu, 16 Nov 1993, 31 Oct 1990. In a cold-fusion-based energy generator, which applies voltage between an anode and a cathode from an H-adsorbing metal (e.g., Pd) or its alloy in D<sub>2</sub>O containing an electrolyte, a O gas is supplied to the anode to cause the reaction:  $D_2 \rightarrow 2D^+ + 2e^-$ . The applied voltage can be substantially low.

11. JP 05 333,176, "Electric Generators using Heavy Water," Arahori Toshio: 17 Dec. 1993; 02 Jun 1992. The chemical reaction which occurs in electrolysis of water when Pd is used as a cathode is converted into electric energy by a semiconductor. A small, quiet electric generator can be prepared which is easy to carry.

12. JP 06 18,683, "Cylindrical Vibrating Electrodes for Room Temperature Nuclear Fusion," Dōke Masaaki, 28 Jan 1994, 03 July 1992. A room temperature nuclear fusion material, such as Pd or Ni is plated onto a nickel plate which is then used as a cathode in heavy water, and it is vibrated at high speed using magnetostriction vibrator to bring about nuclear fusion. By adjusting the amplitude of the vibration, the nuclear fusion can be controlled and the output power can be controlled. The probability of room temperature nuclear fusion is promoted.

13. JP 06 34,776, "Room Temperature Nuclear Fusion Heat Generating Apparatus, Steam-generating Apparatus, and Power Generating Plants," Makoto Takagi, Tokyo Electric Power Co., 10 Feb 1994; 15 Jul 1992. In a fusion heat-generating apparatus having a power source circuit for the electrolysis connected

between the anode and the cathode in D<sub>2</sub>O and absorbing D<sub>2</sub> at the cathode, generating by applying a voltage to generate excess heat, a power circuit for excitation is installed separately from the power source for electrolysis to increase the current density of the cathode to promote the absorption of the D<sub>2</sub>. In the same vessel, an electrolytic chamber and a steam-generating chamber are separated by a partition, the electrolysis chamber is sealed and contains D<sub>2</sub>O inside it, an anode and a cathode are immersed in the D<sub>2</sub>O and connected to the power source circuit for electrolysis. The steam-generating chamber accommodates light water and there is a water supply port at its lower part and a steam outlet at its upper part and at least part of the partition is in the cathode to form a heat exchange wall of the 2 chambers. Separated from the power source circuit for the electrolysis, a power source circuit for excitation is connected to the cathode to form the steam-generating apparatus. The plant comprises (1) the steam-generating apparatus, (2) a steam turbine connecting the water-supply port and a steam outlet at the steam-generating chamber via steam pipes and condensing pipes, and (3) a power generator operated by the steam turbine. Heat can be generated efficiently.

14. JP 06 34,777, "Method for Anomalous Generation of Heat," Tanaka Precious Metal Industry; Akihito Takahashi; 10 Feb 1994; 17 Jul 1992. In injecting D into a Pd cathode plate by the electrolysis of an aqueous solution comprising heavy water and/or light water, low current density electrolysis is carried out alternatively with high current density to uniformly inject D both into the front and rear sides of the Pd plate to concentrate D in the Pd metal lattice. It provides a method for generating abnormal heat with good reproducibility.

15. JP 06 75,072, "Pons/Fleischmann Cold Fusion Effect Apparatus," Aisin Aw Co., Kunimatsu Keiji, et al., 18 Mar 1994, 24 Jun 1991. The title apparatus comprises an electrolyte (KCl, LiCl, and LiD molten salts) in a pressure container, an anode made from a D<sub>2</sub>-adsorbing metal immersed in the molten salt, a cathode made from a porous catalyst such as Pd immersed partly in the molten salt, and a space above the molten salt surface. Compressed D<sub>2</sub> gas is fed into the space and contact part of the cathode, and a power source is connected to both electrodes. The electrolyte is a molten salt so that it can be operated at high temperature, the energy efficiency is high and it is unnecessary to replace the cathode.

16. JP 06 88,887, "Room-temperature Nuclear Fusion," Nobuhiko Wada, Toshiaki Goto (Nagoya Daigaku Gakucho), 29 Mar 1994, 20 Apr. 1992. The process comprises the steps of (1) preparing a D<sub>2</sub>-adsorbing material, (2) positioning the material, (3) activating the surface of the material, (4) adhering a substance which can trigger room temperature nuclear fusion on the activated surface, and (5) placing the material in a container with D<sub>2</sub> to carry out room temperature nuclear fusion. The trigger substance contains Si (such as SiC, or silicone grease). The efficiency of the room temperature nuclear fusion is improved.

17. JP 06 138,269, "Room Temperature Nuclear Fusion Materials for Fusion Reactors," Kubota Hiroshi, 20 May 1994, 27 Oct 1992. The title material is obtained by coating a compact film (e.g. Au) uniformly on the entire surface of a H-adsorbing material (e.g. Pd) containing highly absorbed heavy hydrogen (e.g. D). The reactor comprises a heater, the material, and a heating medium in a vessel. Heating efficiency is very high.
18. JP 06 148,366, "Encapsulation of Heavy Hydrogen and Method for Cold Nuclear Fusion," Choichi Furuya, Tanaka Precious Metal Industry, 27 May 1994, 30 Oct 1992. A heavy hydrogen-absorbing metallic cathode (such as Pd alloy, Ti) is used to conduct electrolysis of heavy water. After heavy hydrogen is absorbed by the cathode, a barrier layer (such as Hg, Au, Ag, Cu, Sn, In, or Zn) is deposited on the cathode by electroless or electrochemical deposition. A local temperature difference is imposed at the cathode to bring about cold nuclear fusion. A high heavy hydrogen absorption state can be maintained and the cold nuclear fusion can be brought about easily.
19. JP 06 160,559, "Palladium Electrodes used for Cold Nuclear Fusion," Masamichi Itsuhonmatsu, Minoru Suzuki, Osaka Gas Co. Ltd., 07 Jun 1994, 20 Nov 1992. The greater part of the surface of a Pd electrode is coated (by electrodeposition or vapor deposition such as >1 of Zn, Cd, Ni, Hg, and their alloys) whose H-generating activity is lower than that of Pd. The D/Pd ratio in the electrode is increased and the heat presumably generated from nuclear fusion is increased sharply.
20. JP 06 160,560, "Electrolysis of Heavy Water. Cold Nuclear Fusion, and Extraction of the Energy Produced from Cold Nuclear Fusion," Furuya, Choichi; Tanaka Precious Metal Ind. 07 Jun 1994, 20 Nov 1992. A barrier layer which does not allow permeation of heavy H is formed on one side of a pipe- or plate-shaped heavy H absorbing alloy to form a cathode. A wire- or plate-shaped Pt is used as an anode. A heat-conducting medium is passed to, or in contact with, the barrier layer side of the cathode, and with control of the temperature, heavy H is produced and absorbed on the other side of the cathode. Cold nuclear fusion is carried out by controlling the current density and the temperature at the barrier layer side during electrolysis, and excess heat is generated from the cathode with absorbed heavy H. The excess energy of the cathode generated by cold nuclear fusion is extracted from the barrier layer side by using the heat conducting medium.
21. JP 06 167,585, "Heat-generating Apparatus using Pons-Fleischmann Cold Nuclear Fusion Effect," Masanao Hotsuta (Erionikusu KK), 14 Jun. 1994, 30 Nov 1992. The title apparatus comprises (1) a means to adsorb O with the generation of excess heat from the Pons-Fleischmann cold nuclear fusion effect by electrolysis of a heavy water-containing electrolyte in an electrolytic cell containing an O-adsorbing structure, a Pt or Ni anode, and a H-adsorbing metal such as a Pd or Ti plate, one side of which is a cathode. The D<sub>2</sub> which is generated is absorbed by the H-adsorbing metal and (2) a means is provided for generating excess heat by the Pons-Fleischmann cold nuclear fusion effect by forming a vacuum vessel at another side of the H-absorbing metal plate and colliding accelerated charged particles on the surface of the H-absorbing metal plate and local heating of the H-absorbed metal to bring about the Pons-Fleischmann cold nuclear fusion effect of the D<sub>2</sub> in the H-absorbing metal. A large amount of heat can be obtained stably with good reproducibility, and the wasteful loss of D<sub>2</sub> can be prevented.
22. JP 06 180,382, "Acceleration of Cold Nuclear Fusion and Palladium Electrode for It," Masamichi Itsuhonmatsu, Minoru Suzuki, Tadayuki Sogi, Osaka Gas Co., 24 Jun 1994, 11 Dec 1992. In the acceleration, Pd containing an alpha-decay-inducing nuclide absorbs D. The radionuclide may be <sup>190</sup>Pt or <sup>147</sup>Sm. The electrolysis showed high efficiency of heat generation.
23. JP 06 186,363, "Method for generating anomalous heat," A. Takahashi, H. Ikegami, Tanaka Precious Metal Ind., 08 July 1994, 18 Dec. 1992. Heavy hydrogen is injected into a Pd cathode plate by electrolysis of heavy water and/or light water solution. A low-current density electrolysis and a high-current density electrolysis were alternately carried out to inject D ions uniformly from both sides of a Pd cathode plate with D<sub>2</sub> gas shielding membranes on both sides of the cathode plate (which shield D<sub>2</sub> gas but are permeable toward D ions so that only D ions are absorbed) to concentrate the D<sub>2</sub> in the lattice of the Pd metal. Thereby anomalous heat is generated. The method can be used for open or closed electrolytic cells, and the reproducibility of the generation of the anomalous heat is good.
24. JP 06 194,472, "Cathodes for low-temperature nuclear fusion and their manufacture," Seiji Ogino, Sumitomo Electric Ind., 15 Jul 1994, 22 Dec 1992. The cathode comprises materials which easily occlude H isotopes and materials which do not easily occlude H isotopes. The cathodes are manufactured by (1) forming resist patterns with opening on substrates, (2) depositing 1 of the 2 materials to mask the openings, (3) removing the patterns, and (4) depositing other materials on the substrates. The cells contain anodes and cathodes.
25. JP 06 207,993, "Excess heat-generating materials, manufacture of electrodes and apparatus for electrolysis of heavy water, apparatus for measuring and utilizing the excess heat," R. Yabuno, T. Terasawa, T. Ooi, 26 July 1994, 20 Nov 1992. The excess heat-generating material is Pd or a Pd base alloy having fine pores within it. The electrode is made of Pd or Pd alloy having uniform pores running from the outer surface of the electrode to a finite length within it. When the Pd or Pd alloy is melted to cast it into a definite shape, voids are formed and the formed metal is subjected to plastic forming manuf. the electrode. Apparatus for electrolysis of heavy water comprises (1) a vessel containing a heavy water electrolyte solution, an anode, and a cathode made from Pd or a Pd alloy having a density of 11.5-11.9 g/cm<sup>3</sup>. The apparatus can generate excess heat and serve as an electric power source to apply electrical current to the electrodes. The apparatus for measuring the excess heat contains a heater for calibration, a temperature sensor inserted in the electrolyte solution, and a calculator to calculate the excess heat generated by the cathode

from the output of the temperature sensor, based on the heat coefficient. The apparatus for utilizing the excess heat contains a heat-utilizing appliance in the cathode. Excess heat which is more than what was input can be generated, cracking of the electrodes can be suppressed, and the excess heat can be measured accurately.

26. JP 06 214,068, "Method and apparatus for nuclear fusion of hydrogen," H. Yonezawa, Y. Ishii, Nippon Telegraph & Telephone, 05 Aug 1994, 18 Jan 1993. More than 2 kinds of metals (one of which is Pd) having different capacity for absorbing H or its isotopes are laminated, and the H or an isotope of H is absorbed by each metal. The sample is heated to transfer the H or its isotope to the metal having the higher absorption capacity to enrich it in the metal for nuclear fusion ( $\geq 1000^\circ$ ). The probability of nuclear fusion can be improved by this simple procedure.

27. JP 06 214,069, "Apparatus and method for verification of nuclear fusion of hydrogen at  $<1000^\circ$ ," H. Yonezawa, K. Kano, T. Shigematsu, F. Yamaguchi, Nippon Telegraph & Telephone, 05 Aug 1994, 20 Jan 1993. In the app. comprising a vacuum chamber, a  $D_2$ -satd. metal sample, and a heater to heat the sample, the periphery of the vacuum chamber is shielded with a metal  $\geq 1$  window for transmitting  $\gamma$ -rays in the vacuum chamber, and  $\geq 1$   $\gamma$ -ray detector in the outside vicinity of the windows. The occurrence of nuclear fusion can be detected effectively and easily.

28. JP 06 249,982, "Ordinary temperature nuclear fusion," Tanaka Precious Metal Ind., 09 Sep 1994, 25 Feb 1993. The method involves electrolysis in  $D_2O$  by using Pd electrodes wound by wire electrodes via polyethylene or teflon plates by applying interrupted current in the initial step for one hour and applying pulse current to accelerate nuclear reaction and to generate extraordinary heat."

29. JP 06 256,986, "Manufacture of hydrogen storing materials," Nippon Telegraph and Telephone, 13 Sept 1994, 08 Mar 1993. When hydrogen generating voltage is applied to an anode and a cathode in a solution containing Pd ions, H ions or D ions, Pd in which  $H_2$  or  $D_2$  or both  $H_2$  and  $D_2$  are absorbed is deposited on the cathode.

30. JP 06 258,468, "Power generator using cold fusion," Nippon Telegraph and Telephone, 16 Sep 1994, 03 Mar 1993. The power generator has a cold fusion unit consisting of a layer of H isotope-occluded substance sandwiched with (1) a substance having a low diffusion coefficient for H isotopes and (2) a substance which reacts with the H-occluded substance to form a solid solution. The fusion is accomplished at  $<1500^\circ C$ ."

31. JP 06 258,469, "Radiation induced nuclear fusion in a solid and energy generation," Japan Atomic Energy Research Institute, 16 Sep 1994, 04 Mar 1993. Radiation induced nuclear fusion is described. The method may involve electrolysis of  $D_2O$ ,  $T_2O$  or their mixture, by occluding generated H isotopes in a cathode, and by then irradiating the cathode. The cathode may be Pd or Ti.

The energy is generated from fusion by heat-exchange of the heated electrolyte."

32. JP 06 265,662, "Cold fusion and apparatus for achieving it," Nippon Telegraph and Telephone, 22 Sep 1994, 10 Mar 1993. The title apparatus involves the following: (1) laminating a thermoelectric semiconductor layer with low diffusion coefficient of D and a D occluded Pd or Ti plate, (2) applying current both sides to cool the interface, and (3) generating a temperature gradient in the Pd or Ti plate. The thermoelectrical semiconductor may contain Fe-Si,  $B_4C$ , or SiC. The method is applied for achieving fusion at  $<1000^\circ C$ ."

33. JP 06 265,663, "Cold fusion and metal material for fusion," Tanaka Precious Metal Ind., 22 Sep 1994, 15 Mar 1993. Pd with Li alloyed surface for electrolysis of Li-containing electrolyte claimed for the material. The method is characterized by (1) using the metallic material as a cathode, (2) electrolyzing Li containing  $D_2O$  solution in a catalyst-equipped sealed cell, and (3) recombining generated  $D_2$  and O for reclamation of formed  $D_2O$ . H-isotope-induced embrittlement of the Pd cathode is prevented.

34. US 5,323,011, FOR INTERNAL USE - "Fiber optic ionizing radiation detector," Joseph H Suter, Jay C. Poret, Johns Hopkins Univ., 21 Jun 1994, 04 Nov 1991. An ionizing radiation detector employs optical fibers as the medium for sensing ionizing radiation emitted by a radioactive source. Light in the IR region is pumped continuously through an optical fiber located in an area or region where the unintentional discharge of ionizing radiation may be expected, so that such emission is detected the moment it occurs. The source of optical light emits a constant output within a specific wavelength band which changes only when irradiation of the fibers by ionizing radiation causes their internal color centers to change. The output of the fibers is optically coupled to a photomultiplier via a light pipe. A single light source, detector, and associated electronics complete the system. A hand-held unit unique for remote sensing may house these components. Owing to safety conditions, these components are located at a point remote from the position liable to become under the influences of the radiation exposure field. Annealing of that portion of the optical fiber influenced by the irradiation, field restores the exposed portion of the optical fiber to substantially its previous level of sensitivity, thereby reversibly establishing the fiber optic for any subsequent exposure. In response to particle bombardment from a  $^{60}Co$  source, the detector reacts to the energy remaining after passage of the beam through a shielding enclosure, thereby giving a reliable indication of the shielding effectiveness of the enclosure.

35. WO 93 17,957, "Control system for occlusion power in hydrogen-absorbing metals and neutron emission capacitor for cold nuclear fusion," S. Uozumi, 16 Sep 1993, 10 Mar 1992. In the system electrolysis is conducted in a pressurized liquid phase on a cathodic pole containing artificial micro-gaps, where applied pressure ratio (applied pressure/saturated vapor pressure) is set  $\gg 1$ , so that  $H^+$  density is substantially increased. The surface  $H_2O$  pressure of the cathode adsorbing D is periodically increased

and decreased, while negative-pulse high voltage is applied to drastically increase the plasma oscillation frequency occurring in the D plasma in the micro-gaps. As a D thermonuclear reaction burst is thus initiated, neutron emission capacity is enhanced and controlled.

36. WO 94 03,902, "Cold fusion method and apparatus for producing energy, tritium, helium, and free neutrons," V.A. Kirkinsky, 17 Feb 1994, 03 Aug 1992. A method for producing energy, based on the phenomenon of cold nuclear fusion with sorption-desorption of D in metals, is characterized by the use, as the metals, of elements or alloys forming 2 crystal phases with different content of D existing in equilibrium within a certain temperature and pressure range and mutually isostructural, e.g. Pd, Nb, V, rare earth elements, and the intermetallic compounds TiFe and TiCr<sub>2</sub>. The metal is prepared as powder (with particle size <0.1 mm), thin foil, a film on a substrate, a wire, or compact mass with pores and microcracks with the largest possible total surface. The techniques for preparation of the metal and for carrying out the method are elaborated. Sorption is carried out at a D pressure exceeding that of 3-phase equilibrium of the isostructural phase with the gas at given temperature which is below the critical temperature, whereas desorption is carried out under conditions of 2-phase equilibrium of the crystal phase with the gas at a pressure which is below the critical pressure of the equilibrium of the isostructural phases. The cycle is continuously repeated. The method makes it possible to accelerate the process of cold nuclear fusion by several orders of magnitude.

37. WO 94 06,122, "Enhanced d-d interaction overlap for fusion and neutron generation," Keith H. Johnson, 17 Mar 1994, 28 Aug 1992. A metal deuteride and process for its formation are described, in which the deuteride atoms are loaded or stored in Pd to a level which induces a Jahn-Teller degeneracy effect, resulting in a symmetry breaking of the lattice structure that places selected D atoms in sufficiently close approximation to create usable levels of fusion as an energy and/or neutron source. The Pd is placed in an environment in which D atoms are loaded into the Pd cell by electrolysis, implantation or diffusion technologies, to a loading ratio of one or slightly above, at which point a symmetry breakage occurs from the degeneracy resulting from the existence of matched electron orbital energies in a D-D bonding relationship, in which the orbitals assume different energy levels. This shift is coupled to the D nuclei, forcing them into close association as a part of the symmetry breaking effect.

38. WO 94 06,123, "Material symmetry breaking for reversible energy storage," Keith H. Johnson, 17 Mar 1994, 28 Aug 1992. An energy storage system and process and apparatus for its utilization are described, in which stored energy is released in an induced symmetry break in a material lattice structure. An absorbable atom such as H or its isotopes is loaded into a material such as Pd or Ti or alloys thereof to a high degree, to the point where an electron orbital degeneracy is induced, placing the crystal in an elevated but stable potential state. This system is triggered out of the elevated stable state with the resulting release of energy in the form of heat which is captured, through a heat

exchanger, by a heat engine where it is turned into work, electricity or some other energy medium.

39. WO 94 14,163, "Method for forming films on cathodes," Michael C.H. McKubre, et al., Electric Power Research Institute, Inc., 23 Jun 1994, 10 Dec 1992. A method is described for forming a film on the surface of a cathode to facilitate the loading of a H isotope into the cathode. The cathode and an anode are immersed in an electrolyte containing a H isotope and conducting ions, and the electrodes are connected to a current source. The conducting ions may be formed by inclusion of LiOH, LiOD, or LiOT in the electrolyte. The addition of other elemental species or compounds to the electrolyte further promotes the film formation and enhances the loading of the H isotope into the cathode.

40. WO 94 15,342, "Apparatus for Storing Isotopes of Hydrogen," Steven Crouch-Baker, Michael C.H. McKubre, Stuart I. Smedley, Francis I. Tanzella (Electric Power Research Inst.), 07 Jul 1994, 23 Dec. 1992. An electrolysis system for altering the storing capacity of a metal cathode for H isotopes has a direct current source coupled between an anode and a cathode, with both electrodes at least partially immersed in an electrolyte. The current source drives electrical current through the electrolyte from the anode to the cathode. The electrolyte is typically a solution of LiOD and H<sub>3</sub>BO<sub>3</sub> in D<sub>2</sub>O. The metal cathode is typically Pd. The current flow through the cell causes the Pd to become loaded with B and D which substantially increases the efficiency of excess heat production and lowers the current threshold for excess heat generation. In an alternative version, the surface of the cathode is fabricated from an alloy of B in Pd.

41. WO 94 16,446, "Self Catalyzed Nuclear Fusion," Jerome Drexler, 21 Apr. 1994, 07 Jan 1993. A method and apparatus are described for nuclear fusion of <sup>6</sup>Li and D ions at ambient temperatures yielding alpha particles and thermal energy. Ion pairs of Li and D are accumulated and densely packed into a metallic lattice, approaching each other closely or combining into LiD molecules. The alpha particles are then emitted into the lattice which have an energy sufficient to cause the nuclei of the Li and D atoms to fuse by compressive interaction of their nuclei within the lattice. Upon fusion, secondary high-energy alpha particles are emitted which cause additional fusions and alpha particle emissions. In this manner, a continuous cycle of fusions and high energy alpha particle emissions is initiated, resulting in self-sustaining nuclear fusion chain reaction occurring at or near room temperature.

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## JUST FOR FUN

We were sent a copy of a patent application which was sent to a patent agent with the following added object: "It is the primary object of the invention to inspire the patent examiner to allow the patent, quit his job, leave his home and family, crawl on his hands and knees from Washington, D.C. to

Seattle, WA, and beg the inventor for a job polishing the inventor's tools. This object is entirely optional and is inserted into this otherwise dry and boring document purely for entertainment value. No claims or warranties as to its efficacy are expressly implied or inferred." This "object of this invention..." did not survive the patent agent's rewrite.

## G. ARTICLES FROM OUR READERS

### MEMO ON IAP COLD FUSION DAY AT MIT

January 21, 1995

by Eugene F. Mallove, Sc.D., meeting organizer

The Cold Fusion Day IAP (Independent Activities Period) meeting at MIT on Saturday, January 21, which I organized, was in my view, a spectacular success. About 150 attendees in rapt attention for about 10 hours in the main Physics Lecture Hall (Room 6-120). Several high points came at the end of the day:

(A) Jim Griggs of Hydrodynamics, Inc. (Rome, Georgia) gave a magnificent presentation with new data on "**massive melting**" that has occurred on the periphery of his Hydrosonic Pump aluminum rotors on several occasions. He also described re-welding of melted material to the rotor surface -- an even higher-temperature effect, he said. He had one such rotor unit there and you could see and feel it. Fantastically high temperatures would be required to do that and this is NOT ordinary cavitation. Among other observations, if it were simple cavitation, why would that not occur as a regular feature of Hydrosonic Pump operation? -- it does not. Cavitation experts at Georgia Inst. of Technology have now become involved. They say it is NOT cavitation. Griggs presented some stunning photomicrographs. Meanwhile, the over-unity effect continues to be seen, even as Griggs continues to sell in recent months several hundred thousand dollars worth of Hydrosonic Pumps for standard applications up to 250 HP.

(B) Bert Werjefelt from PolyTech(USA) in Hawaii spoke about his work on magnetic motors and the theory behind them. He reported that experiments have seen output powers of 450 watts electric, with only 150 watts electric going in. Attempts at self-sustaining have been successful for periods of minutes. The company now thinks it knows how to make a self-sustained operation continue indefinitely and is building one right now, expected to be ready in the next month or two. He showed gorgeous CAD diagrams of the 100-200 watt "self-sustainer" now under construction in Hawaii. He explained how it worked (the precise balancing of repulsion and attraction systems to substantially reduce torque). It was obvious that many, if not most, in the audience accepted his apparently very solid experimental conclusions -- even some

I would have thought would have left in disgust. Werjefelt put forth his theoretical ideas, which are based, in part, on suggestions made by several (now) Nobel laureate physicists in the 1950s regarding nuclear magnetic spin systems (Pound, Purcell, and Ramsey). Others in the audience were extremely excited by this report, and put forth their theoretical ideas. Werjefelt is a solid mechanical engineer, whose company manufactures pioneering FAA-certified safety equipment. He is deeply involved in aviation safety issues and would have much credibility to lose if he were not on absolutely solid ground with this magnetic energy technology. He has been working quietly in this field for about ten years. On the advice of his patent attorneys, he published his general ideas in an article titled, "Magnetic Battery," in that counter-scientific culture journal, "Extraordinary Science" (Tesla Society), May/June/July 1993, which is available in places like Barnes & Noble book stores. Don't let your prejudices about the Tesla Society fool you, this is a very carefully crafted scientific article with some excellent possible avenues to explain concrete experimental results.

The 8-minute video tape of the Japanese developments in this area of "Dream Energy" (Magnetic Energy) was shown. This had aired on FUJI TV in Japan on October 20, 1993. There are four major corporations involved under MITI aegis: Sumitomo, Hitachi, Mitsubishi, and Matsushita. Werjefelt's company appears to have a very strong patent position in his area, however. The chief engineer of the Aerospace Division of Sumitomo has visited Werjefelt and told him that this discovery is "the greatest discovery of the 20th century."

Gene Mallove, who has been working with others who are getting similar, related results with smaller units, will co-author a paper with Bert Werjefelt that will be presented at the Fifth International Conference on Cold Fusion (ICCF5) in Monte Carlo, Monaco (April 9-13, 1995). This paper will present both experimental evidence and a suggested theoretical framework. It is expected that several working self-sustaining units will be brought to ICCF5. There is a possible (likely!) connection with cold fusion thermal effects that have been seen.

The MIT IAP proceedings of 1/21/95 were professionally videotaped. An edited full-version of the day-long program (8-10 hours) will be distributed by Cold Fusion Technology. Also, a shorter version summary (less than two hours) will be prepared by Mallove, working with a video production corporation in Manchester, NH. Due to schedule overload, it may be another 4 weeks before the tapes are available. Every effort will be made to accelerate the process. A transcribed version of some of the talks is also being planned by Cold Fusion Technology.

This is only the "tip of the iceberg" of the incredible events at MIT Cold Fusion Day. In retrospect, this was an extremely

historic meeting. It was the first time that present and imminent commercial-level power production from cold fusion/free energy was discussed in a completely scientific manner at a major university. The message was apparently very well received. Mallove received numerous compliments on the decorum and solidity of the sessions.

The former editors of "Cold Fusion" Magazine have joined forces and put out an interim "Cold Fusion/New Energy Technology" (CFNET) Update, a 36 page compendium -- mostly on cold fusion. This was distributed free of charge to attendees at the MIT IAP meeting. Others wanting this document should send a nominal \$5.00 to Cold Fusion Technology to obtain a copy for themselves:

Cold Fusion Technology  
Box 2816 Phone: 603-228-4516  
Concord, NH 03302-2816 Fax: 603-224-5975  
USA

This CFNET Update is a precursor to the continuation of a **reliable** Cold Fusion/New Energy Technology magazine (title yet to be finalized).

National Public Radio aired a one-hour cold fusion program (1/20/95) the day before the MIT IAP program, as part of the Ira Flatow "Science Friday" show. Featured for the "pro" side were Dr. Edmund Storms, formerly of Los Alamos National Laboratory and Dr. Eugene Mallove of Cold Fusion Technology, who gave a brief overview of what the next day's MIT Cold Fusion program would be about. Also on air were two members of the "Flat Earth Society"-- Gary Taubes, author of "Bad Science: The Short Life and Weird Times of Cold Fusion" and Professor David Goodstein of Caltech, neither of whom obviously knew what they were talking about in the matter of cold fusion. Neither have been seen at any cold fusion conferences in recent years, but that did not stop them from calling cold fusion research "lousy science." A copy of this tape can be obtained from National Public Radio in Washington.

Sincerely,  
Eugene F. Mallove, Sc.D.  
Cold Fusion Technology

#### INFORMATION ON SUPER MAGNETS

Courtesy of Takeo Sawai, Corporate Secretary

Yasunori Takahashi, president of Sciex Co. Ltd. in Tokyo, Japan is the inventor/developer of the Y.T. Magnets. Takahashi graduated from Tokyo University in 1963 and had post-graduate engineering studies at Washington University. He has worked for Sony Corporation, Murata Manufacturing

Co., and Automeix. In 1984 he resigned from Sony and Founded Scitek Co., Ltd. (name changed to Sciex in 1986.)

The Y.T. Magnet is based on a new magnet concept proposed by Kneller, etc. in 1991. The magnet consists of a two-phase magnetic materials. One phase is a hard phase and maintains magnetic strength. The other phase material is a soft magnetic phase. The combination provides the basis for this superior magnet. The soft phase is based on Fe or CoFe. The hard phase is proprietary but is based on the use of FeNdB plus other ingredients.

Takahashi states the following about the characteristics: "I have obtained crystal compositions of the attached drawing for heating the doping materials with very small needle state crystals. This manufacturing process is very simple with good characteristics and is suitable for bi-directional bonded magnets."

These new magnets are about twice as strong as the previous best magnetic materials. The company was kind enough to send us the following plotted characteristics of the magnet as shown on Fig. 1. In this plot the magnetizing forces is Oersteds (x-axis) is plotted versus the retained magnetic force in Gauss (y-axis.) As a magnetic material is exposed to a series of strong magnetizing forces beginning at zero and going to high positive forces. The magnetizing forces are then reduced back to zero and then continued in a negative (opposite polarity) for high negative x-axis values. At the same time the magnetism appears in the magnetic material under test. Normally the magnetic material reaches a degree of magnetization and stays at some maximum level (y-axis) as the

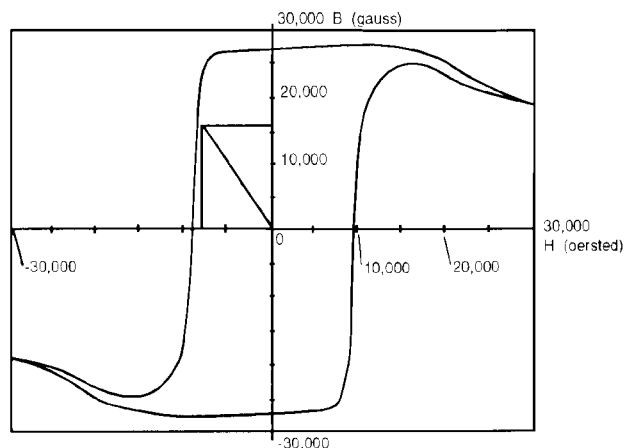


Fig. 1 Plot of B versus H

magnetizing forces (x-axis) increases. **The unusual curve shown in Fig. 1 can be interpreted by assuming the presence of a paramagnetic material that, at very high magnetizing forces, begins to effectively reduce the**

**magnetic field retained by the magnet at the highest magnetizing forces.** You will note that the B-H curve is highly symmetric as the magnetizing forces go to maximum (plus x-axis) to high values of opposite polarity (negative x-axis).

Magnets are normally fabricated and stored before they are magnetized. The magnets are magnetized just before shipping to the customer. Otherwise, they are very hard to handle when they have high magnetic fields. Usually a strong electromagnet is used to magnetize the magnets before they are shipped.

Readers of *New Energy News* who desire to do some experimental work may want to make some of these B-H curves on selected magnetic materials. It is suggested that super strong magnets may play a big role in the future development of enhanced energy systems.

*New Energy News* commends Yasunori Takahashi and his staff on this remarkable development. We have been told by Takeo Sawai that the first production of magnets from their new plant will all go to Japan to fill back orders. Initial production from the new factory in the U.K. is expected about the middle of 1995.

#### SOME IMPORTANT KINDS OF PLASMOID TRACES PRODUCED BY "COLD FUSION"

##### APPARATUS

By Edward H. Lewis

In October of 1992, I found the article by Nardi and Bostick et al. (1) about that which they called "EB-filaments." Bostick and Nardi discharged through electrodes and reported neutron emission when the discharge was in deuterium gas, but most importantly to me they showed pictures of plasmoid marks that were very similar to traces that Matsumoto had already shown both in size, shape, detail, and associated features. I thought that this was evidence that proved that Matsumoto was producing EVs or tiny ball lightning in CF apparatus, and I started to inform people about this idea then. Matsumoto has produced many kinds of plasmoid traces during the various kinds of electrolysis and discharge that people have usually used for cold fusion including nickel-water and palladium-heavy water electrolysis. Several of the major kinds of plasmoid traces have been produced by all the kinds of apparatus. This shows that electrolysis is similar to discharge. All of the traces that he produced seem to be identifiable as plasmoid phenomena, but I would like to write about only a few important ones.

Many people have produced plasmoid phenomena. It is a fairly large field of research. Nardi, Bostick, et al. produced

plasmoids by discharging through electrodes, and they used plastic and semiconductor material as targets to learn about them. The marks all look much like the many kinds of traces and marks that Matsumoto produced by various kinds of discharge and electrolysis which he showed in his many articles, and they range in size from less than 1 to almost 100 micrometers, which is about the average size of the traces and marks that Matsumoto has shown, and which is about the average size of the plasmoid rings that Shoulders has produced by discharge that he describes in his patent (2).

Matsumoto has produced and shown many kinds of ring traces, which are marks that ring plasmoids leave on nuclear emulsions, in many articles in *Fusion Technology*. It may be that some of the ring traces are due to the explosions of plasmoids, but I am not sure. Anomalous traces that are combined rings that are all the same size (3, see also ICCF4 handout) are due to a plasmoid repeatedly hopping up and down one spot of an emulsion, just as tornadoes and ball lightning are sometimes reported to do, and this is very substantial evidence that the ring traces are due to plasmoids that are like ball lightning. Matsumoto reports that, unlike the other ring traces on the emulsions that he has used (most of the emulsions seem to be about 100 micrometers thick), the combined rings are superficial; the others extend deeper into the emulsions. Ball lightning has been reported to hop in this way on things, leaving empty holes. Evidence that the rings are not due to explosions is a Fig. 7 (in *FT*, Aug 1992) in which is a trace of a broken ring. Marks of explosions don't look like this.

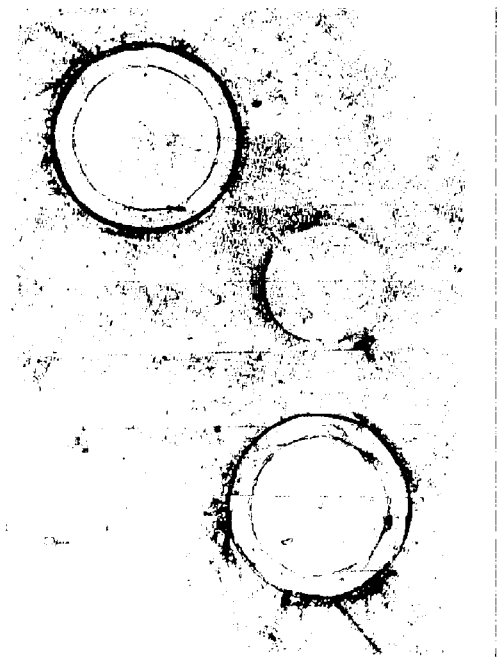


Fig. 1. Three Ring Traces and perhaps a Boring



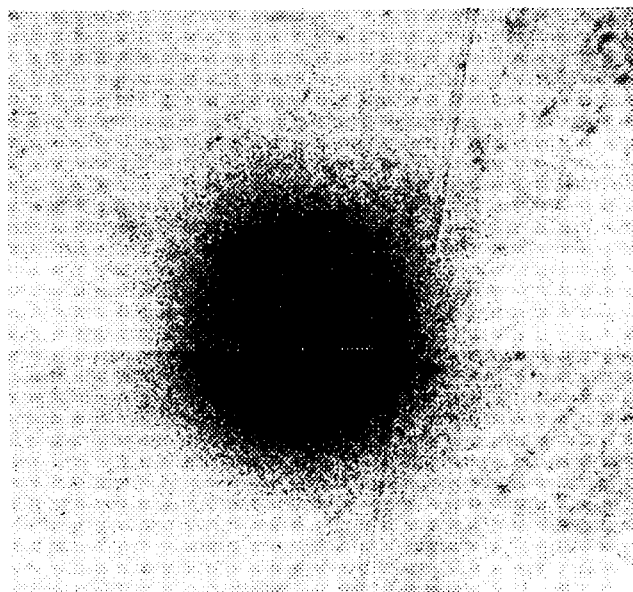


Fig. 2. Trace of a Clumpy Plasmoid

He has produced pictures of trail traces on emulsions and trail marks in palladium electrodes (*FT*, May 1991) and on copper electrodes (*FT*, Nov. 1993), some of these are very long; and Silver et. al (*FT*, Dec. 1993) have shown a trail mark on a palladium electrode. The trails are due to the moving of tiny plasmoids on a surface; these are often more like ditches, and this is a common plasmoid and ball lightning phenomena. Some of the trail marks are obviously due to the moving of a ring plasmoid or a cylindrical plasmoid on a surface (3).

He has produced interesting anomalous star traces (*FT*, Dec. 1992), some of which show a combination of the disruption of a plasmoid or a plasmoid cluster and the movement of a plasmoid or a cluster on surfaces. There are also traces of plasmoid strings and conic plasmoids and plasmoids that are disrupting, and these are all common plasmoid phenomena.

I suspect that the "mesh-like" traces (*FT*, Jan., 1993) are discharge patterns like those in some of the marks shown by Nardi and Bostick and like lightning. Some of them are associated with ring traces. However, others are not, and some of the photos show ring shaped discharges. It seems to be highly anomalous that a discharge would be ring shaped or travel through layers of emulsions intact the way that these did. It may be that ring plasmoids transformed to the ring discharges. However, I have read about many kinds of lightning that either abnormally slowly extended or maintained their shape for a long time.

Matsumoto showed some traces of bands that he called "interference patterns" in another article that was published in



Fig. 3. Trace of a Conical Shaped Plasmoid?

*Fusion Technology* (March 1992). Plasmoids may exhibit wave phenomena such as water waves and earthquakes. Maybe the bands are the effects of plasmoid waves of the emulsion that originated in an electrode and continued as waves of the water and of the glass of the container of the apparatus and of the air, and then of the emulsion. I suspect that earthquakes and tsunamis are both plasmoid waves.

The whirling mark in the electrode that is shown in Fig. 11 of (*FT*, Nov. 1993) seems to be a mark of a plasmoid whirling, and it may be a vortex like hurricanes, tornadoes, and galaxies. It is like those that Bostick produced which look like spiral galaxies(4). Recently, by using the Hubble telescope, people have reported vortex phenomena in the center of galaxies M87 and Cygnus A that I identify as plasmoid vortices. From these there may be light beams (quasars) or "space lightning bolts."

- 1) V. Nardi, "Internal Structure of Electron-Beam Filaments," *Physical Review A*, 22, no. 5, p 2211 (Nov., 1980).
- 2) K. Shoulders, "Energy Conversion Using High Charge Density," Patent Number 5,123,039.
- 3) Matsumoto, "Observation of Tiny Ball Lightning During Electrical Discharge in Water," sub. *FT*, Jan. 23, 1994.
- 4) W. Bostick, "Plasmoids," *Scientific American*, 197, 87 (October, 1957).

All photographs from booklet: T. Matsumoto, "Reproducing the Nobles in the Universe," Oct 22, 1992.

## THE CONFUSION OF PHILOSOPHERS

The Confusion of the Philosophers - The Progression from Modernist, to Post Modernist, to Post Relativist Physics  
A Chronology by Dana Rotegard, Irish Holdings, Ltd./MCFA.  
First published in *Future Trends*, vol 26, no 1, Jan. 1995, p 1.

### Introduction -

Nineteenth century physicists theorized that light moved through an energetic medium as a wave and postulated "luminescent ether" as the ultimate frame of reference for the material universe. Most of western physical thought rested on the assumption of a Euclidian absolute frame of reference.

In 1881 A.A. Michelson a U.S. Navy scientist, and later E.W. Morley (1887) attempted to discover the relative motion of the earth through the luminescent ether by measuring interference with light waves at various angles to the motion of the earth through this hypothetical frame of reference

With repeated runs (1902-21-23-24-24-25-26-27-29-30) of the Michelson - Morley experiment by many physicists, no motion and no frame of reference could be detected. This failure threw turn of the century physics into confusion.

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1905 Albert and Milova Einstein publish the first of several startlingly brilliant papers in Ann. Physik reconciling the Michelson Morley results with other physical theory and observations. This theory, which is mathematically elegant (Milova's work) but staggeringly counterintuitive came to be known as "Special and General Relativity". The Einsteins make five empirical predictions that are later borne out by repeatable observations.

1907 A. A. Michelson is awarded a Nobel prize in physics, becoming the first American to win this honor.

1921 Albert Einstein is awarded a Nobel prize for his still controversial work. Milova receives the prize money as her divorce settlement. A.W. Morley continues to do variations of the Michelson-Morley experiment, convinced that the instrumentation or interpretation of the results are wrong.

1927 Heisenberg announces the principal of "indeterminacy" in the movement of electrons around atoms.

1928 N. Tesla, the inventor of alternating current and co-founder of Westinghouse Electric Co. predicts in *Popular Science* that planes will someday be powered by radio waves.

1931 German critics of relativity publish One Hundred Authors Against Einstein (Leipzig 1931). N. Tesla and

several quantum theorists are among the most prominent and sincere scientific critics of the emerging consensus for relativity. This raises an otherwise academic debate into the political arena. Einstein moves to Princeton, New Jersey and becomes an American citizen. Einstein becomes an opponent of quantum mechanics protesting, "God does not play dice with the Universe!"

1935 Working at the **Princeton Institute of Advanced Studies**, Einstein, Rosen and Podolsky (ERP) attempt to refute quantum mechanics by *reductio ad absurdum*. Their ERP paradox mathematically demonstrates that the premises of quantum mechanics directly contradict special relativity. Despite this "refutation" quantum mechanics survives and the emerging industry of solid state electronics thrives due to the fact that however anti-relativistic, quantum mechanical equations work in practice.

1939 Einstein is picked by his peers as the designated writer to President Roosevelt warning him of the possibility of Nazi Atomic weapons. Roosevelt starts the Manhattan Project.

1942? Free-Norwegian ski commandos blow up the German heavy water plant at Telemark. This is a major if not decisive setback to the German atomic weapons program.

1945 American fission strategic weapons, developed at Los Alamos, New Mexico, are successfully tested and used to destroy Hiroshima and Nagasaki, leading to a Japanese unconditional surrender. Subsequently, the U.S. successfully tests more powerful hydrogen fusion weapons triggered by fission.

1947 A vindicated secular prophet in the popular mind, Einstein is offered the honorary Presidency of the new state of Israel.

1949 On his 70th birthday Einstein writes his friend Maurice Solovine. "There is not a single concept of which I am convinced that it will stand firm and I am not sure that I was on the right track after all."

1951-present The AEC/DOE begins research to harness hydrogen fusion for civilian use by seeking to control some of the same reactions used in hydrogen fusion warheads. Hundreds of millions of dollars a year flows from Congress to Princeton, MIT, and the AEC labs to harness fusion energy, deemed by most of the worlds physicists and futurists as the only realistic plan for a sustainable energy future. The effort becomes internationally headquartered at CERN in Geneva, Switzerland. Despite 40 years of effort hot fusion is still projected by its supporters as being practical only by the middle of the next century.

1964 Stefan Marinov performs an experiment in Vienna demonstrating variations in the observed speed of light. Despite low cost no other experimenter attempts to duplicate the results. See Marinov's Divine Electromagnetism available through the Fusion Information Center.

1970-72 Dr. Robert L. Carroll attempts to obtain patents on a series of inventions based on an original non-relativistic physics. He states that the speed of light should vary within an inertial frame of reference. The patents are for a pion powered space drive, cold fusion in Platinum, and solid state electronic cooling including room temperature superconductors. Only the last, "Heat Transfer Device," U.S. Patent 3,664,143 (1972) is granted.

1981 Graduate students at the University of Colorado, Boulder organize the first "Case for Mars" conference to refocus interest on human entrance into the Solar System. Grass roots interest in Mars grows in "Case for Mars II, III, IV, and V" coordinated by Dr. Meyer of the University of Colorado Center for Science Policy in Boulder.

1985 Dr. Carroll publishes The Energy of Physical Creation a comprehensive discourse presenting a complete non-relativistic mechanics. Carrollian mechanics is based on a reinterpretation of the Michelson / Morley experiment, defining space in relation to centers of mass. It is a complete break from the Euclidian/Descartian notion of absolute space but also of Einstein's postulate of the total relativity of all frames of reference.

1987 Dr. Stephan Jones of Brigham Young University coins the term "Cold Nuclear Fusion" in an article in *Scientific American*.

Oct. 1987 The Canadian government, using American technology, flies a small drone aircraft powered by microwave transmissions confirming Tesla's predictions made in 1928.

Dec. 1988 SANE-FREEZE, the largest grass roots nuclear policy group in the world (168,000 members), decides at its annual convention in Atlanta to focus on political corruption and pollution by the U. S. Department of Energy.

At the same gathering, a Union of Concerned Scientists workshop advocates the launching of a Reuters or U.N. earth surveillance satellite to break the U.S. intelligence establishment's monopoly on technical information.

March 23, 1989 After five years of privately financed experiments Drs. Fleischmann and Pons give a press conference at the University of Utah announcing that they have obtained nuclear fusion in solid matter at room temperatures,

producing significant excess heat. This is front page news in most of the world's newspapers and magazines.

April 19, 1989 The Fusion Information Center is incorporated in Salt Lake City and begins to publish *Fusion Facts* as a forum for journal abstracts and hard news in the field. Dr. Harold Fox comes out of retirement to edit *Fusion Facts* and *Fusion Briefings*.

May 2, 1989 The American Physical Society, at its convention, gives cold fusion a highly hostile reception and mobilizes its membership to squelch funding for new energy research. Scathingly critical articles are published by physics lobbyists in most major American media led by the *New York Times* and the magazines *Science* and *Nature*.

July 1989 Two hundred scientists from several disciplines meet at the First International Astronautical Federation Conference on Space Power in Cleveland dedicated to finding a solution to the greenhouse effect. Several speakers comment on the hostility of the APS to "cold fusion".

1989 The Energy Research Advisory Board of Department Of Energy, chaired by Dr. John Huenzinger of the University of Rochester, denounces cold fusion and acts to prevent any public monies from being spent on this line of research. Despite this, six DOE teams publish positive findings in peer reviewed journals. The U.S. patent office subsequently denies the Fleischmann and Pons / University of Utah patent application and the scores that follow.

1990 Dr. Peter Beckman of the University of Colorado's Electrical Engineering Department starts a journal *Galilean Electrodynamics* exclusively devoted to non-relativistic physics.

1990 Drs. Oriani, Broadhurst, Lee, and Nelson from the University of Minnesota, Minneapolis, publish an excess heat experiment using palladium and heavy water in the major *Journal Fusion Technology*. This joins dozens of other published cold fusion confirmations led by Texas A&M chemist John O'M. Bockris' work.

August 1, 1991 ACTURUS BY DAWN, a draft edition by Dr. Robert L. Carroll, is privately printed in California by the Aesop Institute. This is a 100 page non-technical essay on non-Einsteinian physics in which Dr. Carroll explains the basic concepts of his system non-mathematically.

"We are now able to state: for measurements made within a system there always exists a preferred reference frame as applied to that system."

**This postulate puts the observer back into macro physics and is at odds from the disembodied perspective implicit in relativity.**

The manuscript's title comes from Dr. Carroll's contention that faster than light travel is, in fact, theoretically possible and technically achievable, along with cold fusion, superconductivity and other marvels.

August 14, 1991 The U.S. patent office examiner, Harvey Behrend, denies the University of Minnesota's cold fusion patent application. Citing articles in the *New York Times*, *Newsday*, and *The Washington Post*, Mr. Behrend's boilerplate language denies the existence of cold fusion.

Sept. 1992 Science/national security staffer Charles Monford, writing over DFL [Democratic Farm Labor Party] Congressman Martin Olav Sabo's signature in a letter to Dana Rotegard, states " The Committee [Space Science and Technology] has been unable to locate a major researcher who is willing to allow DOE the data access that would be needed to replicate the claims that have been made for cold fusion." After a further exchange of letters Rep. Sabo agrees to put the name of Dr. Edmund Storms, a DOE radiochemist from Los Alamos before the committee for consideration.

Feb 1993 The Minnesota Cold Fusion Alliance is formed in Saint Paul and publishes its mission statement in the Minnesota Futurists' *Future Trends Newsletter*.

April 1993 A conference in Estes Park, Colorado, merges cold fusion research with emerging research on zero point energy and other non-relativistic fields. Former astronaut Dr. Brian O'Leary (Case for Mars II and III) and Dr. Hal Fox (Fusion Information Center) are participants. *New Energy News* is launched with Dr. Fox as editor.

May 1993 Dr. Ed Storms of Los Alamos, the peer designated spokesman for the emerging field, testifies before the House Science committee. Rep. Dick Swett of New Hampshire becomes the major cold fusion advocate and DOE critic on the Space Science and Technology Committee. Rep. Robert Walker promotes the testimony of Dr. Randell Mills, a lightweight researcher from Pennsylvania.

July 1993 Rollie Hron, a retired CDC/Honeywell engineer (U of MIT '60) presents the MCFA with a draft of a non-relativistic body of physical theory similar in most respects to Carrollian mechanics but completely independently derived. The theory is mainly mathematical in exposition.

Sept 15, 1993 Irish Holdings Ltd. is incorporated in Minnesota.

Oct 1993 The principals of Irish Holdings Ltd., including Rep. Don Frerichs IR of Rochester, tour the cold fusion labs at the University of Minnesota, Amundson Hall, hosted by Dr. Oriani.

Dec 5-9 1993 The Fourth International Conference on Cold Fusion is held in Hawaii with 155 papers, mostly from the USA, Japan, Russia, China, and Italy. Press coverage is minimal. Dr. Dennis Cravens delights the assembled with a toy rocket powered by a cold fusion boiler: The first practical fusion device! Dr. Oriani keynotes the segment on Material Science and Cold Fusion.

This author presented a draft of Hron's paper to Dr. Jean Pierre Vigié, the editor of *Physics Letters A*. His comment was, "I don't believe it but I'll read it."

December 10, 1993 The Princeton University Plasma Physics Laboratory stages a major hot fusion experiment at a net loss of megawatts, effectively contaminating the reactor for further research. Positive publicity for this demonstration is carried by the wire services to most daily newspapers. This cynical stunt is the only "fusion" news carried that year by most newspapers.

Jan 17, 1994 Dr. M. Swartz, publisher of *Cold Fusion Times* organizes a cold fusion interim term seminar at MIT. Posters for the seminar are vandalized by critics.

March 21, 1994 Reps Dick Swett of (D-NH), with support from Tim Penny (DFL-MN), call the DOE's hot fusion program "cargo cult science" and denounce the December Princeton demonstration but fail to garner the votes to redirect the DOE hot fusion spending. Neither the House Democratic leadership nor the administration show any movement on this issue.

April 1994 *Cold Fusion Magazine* of New Hampshire publishes its first issue. Dr. Storms is on the first cover.

May 23-28 1994 The Franco-Russian International Conference on Space, Time, and Gravitation in St. Petersburg (21 monographs) centers on criticism of relativity, the Michelson experiment, and intolerance in the American Physical Society. M. Bohm shows that with better instrumentation, Michelson would have detected variations in the speed of light.

A major Cold Fusion/New Energy conference is held in Minsk, co-chaired by Dr. Hal Fox. According to Belarussian scientists the health of over 90% of the children of Belarus (White Russia) has been effected by the Chernobyl disaster. Dr. Fox begins the "Children of Chernobyl" Project.

June 4, 1994 The Minnesota Democratic Farmer Labor Party becomes the first major political organization in America to endorse cold fusion research in its permanent platform.

July 14, 1994 Dr. Dennis Cravens' garage cold fusion labwork is celebrated in a front page article in the *Wall Street Journal*.

November 8, 1994 Rep. Dick Swett is defeated for his third term to Congress. Rep. Robert Walker, the ranking Republican, is the probable chairman of the House Committee on Space, Science, and Technology.

November 1994 Images from the Hubble Space Telescope show results at variance with established theories of cosmology and some aspects of relativity. This is widely commented on in the press.

November 19, 1994 The Minnesota futurists hold a SIGS on cold fusion and non-relativistic physics at Earl Joseph's home. The featured presentation is R. Hron's abstract and the convergence of independent theoretical visions.

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A technological revolution is developing centered around cold fusion research in a number of major corporations around the planet.

A revision or the outright junking of relativity, arguably the single most important intellectual influence of the 20th century, may also be in the wings. While cold fusion has significant backing and advocates, this revolution in theory is still a voice in the wilderness. The technical prescience and moral courage of non-relativists going back to Tesla is an important signpost to intellectuals seeking to create the 21st century.

See also:

French, A. P. Special Relativity, The MIT Introductory Physics Series, Norton, New York, 1968

Fox, H. Cold Fusion Impact, Fusion Information Center, Salt Lake City, 1993

Carroll, R. Arcturus By Dawn, Aesop Institute., Sebastopol Ca. 1991 Draft

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## H. LETTERS FROM OUR READERS

### LETTER FROM DR. TIMOTHY A. BINDER

The enclosed copy of Fulcrum, the University of Science and Philosophy's science journal, contains two reports about the University's science research project of transmuting elements at ordinary temperatures and pressures. We believe the results

of this research to be among the most significant in this decade, if not in several decades.

The University's team verified Walter Russell's earlier successes in 1927 of transmuting water into five different elements. More importantly, we have created lithium-5, an element which until now was a 'missing element' in the naturally occurring elements. [Li-6 (7.42%) and Li-7 (92.58%) are the naturally occurring isotopes -Ed.]

While much work still remains to be done and there are unanswered questions, these results compel me to send these reports to you for re-publication so that other scientists throughout the world can become aware of our findings and contribute to the further development of these principles.

If I can add further clarification, answer any questions, or in any way assist you in evaluating these reports and publishing them, in this format or another, please contact me at your earliest convenience.

Dr. Timothy A. Binder

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### LETTER FROM BILL COLLIS

I, too, was intrigued by Professor Chris Illert's claim to predict the binding energies of "all isotopes of light nuclei, and all their low-lying excited states, up to <sup>24</sup>Magnesium to an accuracy of four or five significant figures." (see *Fusion Facts*, 12/94, p 15) Such accuracy would exceed the precision of measured atomic weights in many cases. So I ordered a copy of Alchemy Today volume 2, directly from the author. This paper back book is remarkably well printed considering it appears to be published by the author personally at his home address. The tone of the work is given in the foreword written by Dr. George Cockburn, fellow of the Royal Society of Medicine, "This present text could rank amongst the most significant books of our millennium alongside Isaac Newton's Principia, and Richard Feynman's Path Integrals,..."

Illert's thesis is that a ball and stick nuclear model can be used to predict nuclear sizes, shapes and binding energies. This is not unreasonable because the most significant factor in nuclear binding energies is the short range nuclear force. The basic idea is not new. Dr. Roberto Monti (Consiglio Nazionale delle Ricerche, Bologna, Italy) has similarly proposed that an integral number of mono-energetic 'bonds' between alpha particles accurately explains the binding energies of <sup>12</sup>C, <sup>16</sup>O, <sup>20</sup>Mg, etc. In Illert's model there are some four 'bonds' and binding energy is given by the sum of four terms: Binding Energy = "1<sup>a</sup> + α2<sup>a</sup> + 3<sup>π</sup> + 4<sup>b</sup>" where α = -2.333, π = -4.7, ππ = -.3, and b = -.035 MeV. It is not surprising that any such a complicated formula with four arbitrary integer coefficients

for every nuclide should not be capable of predicting binding energies to four significant figures! Alas, in many cases Illert himself fails even to achieve 3 figures. In addition to the inevitable coincidences with the states of a few light nuclei, the models predict a host of non-existent states.

The Illert model normally treats protons and neutrons as equivalent and consequently predicts binding for the diproton and dineutron although these have never been detected as well as deuterium. Indeed the cold fusion reaction is speculated to be the simple fusion of two protons producing  $^2\text{He}$  (which decays by electron capture to deuterium). Any reasonable reaction rate for this would have very substantial implications for astrophysics and would be incompatible with solar neutrino measurements. One reason why the model fails is that no account is taken in the model for coulomb repulsion and nucleon pairing. The former becomes increasingly important for nuclei heavier than magnesium. For the time being the Illert model cannot compete with more traditional models in predicting nuclear properties.

Yours sincerely, Bill Collis

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#### LETTER FROM BRUCE VICKNAIR

I absolutely agree with Dr. Gary L. Johnson on the importance of technical writing skills. Proper documentation of our discoveries will accelerate the acceptance of "New Physics." A sign of maturity is being open to guidance and correction. On the subject of my experiments, I'm working in the biomagnetic area now due in part to having a heavy travel schedule. I can set up a test and not worry about mishaps while out of town. In my opinion the same theory will ultimately apply to biological processes, cold fusion and ZPE interactions.

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#### LETTER FROM PETER GLUCK

Fusion Facts/Jan.1995 is interesting and useful, the choice for the scientists of the year is excellent, both Mike McKubre and Bob Bass will remain in the history of CF.

It would be very interesting for me to discuss with Dr. Bass at ICCF-5, because my opinion regarding the possibility of theory to predict practical solutions for achieving a reproducible heat generating process is exactly the opposite of his opinion. I am representing a kind of "Technology First!" movement, based on my own professional experience. Such a discussion could be inspiring for me. I am always eager to know other ideas.

Another difference in opinions is due to the fact that I don't believe that all kinds of CF systems are based exclusively on

nuclear reactions. You were more than inspired when you made a junction with the "free energy", (ZPE) devices; it seems that this is the main source of energy in these systems. Normal water/ hydrogen isn't prone to genuine fusion reactions, and we have to find different explanations for the excess heat. Cold Fusion is more and more a generic name... but the essential point is that it is the source of energy of the future...

Is my opinion a "paradigm too far"? We will see this in the near future, however thank you much for the prompt publication of my rather heretical article.

I was very happy to read in *FF* (Dec 94, p 11) your comment: "The concept of catalysis of nuclear reactions on or near the surface of a metal lattice can be used to explain "sonofusion" as can much of the large body of the experimental data for cold fusion."

Perhaps even in my very unfortunate circumstances I was able to contribute to the solution of the cold fusion puzzle, and what is much more important I shall continue to work in this field.

I have now a direct possibility to confirm or "infirm" the concept of nuclear + free energy catalysis with the aid of the Arata cathode. This is a brilliant device, it links the wet and the dry systems; eliminates all the negative effects of the impurities on the active surfaces of the cathodes. I wrote to Prof.Arata and have asked him to try very active Pd based catalysts instead of Palladium black inside the protecting Pd cylinder.

The strong metal support interaction is well known to the catalysis experts, and is used in the industrial practice. Such a crucial experience could open new ways toward perfectly reliable, reproducible, intensive heat generation. Could you help me with finding other colleagues able to perform such trials?

In principle it is an easy job, however the activation of the catalyst inside a metallic envelope, the nature of the support material, the electrical parameters etc, plus a lot of surprises which equally generate happiness and discouragement, add to the real complexity of the experimental system, which is the beauty and quintessence of our profession.

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#### I. BOOK REVIEWS

##### THE HYDROGEN-FILLED EARTH

Reviewed by Hal Fox

Vladimir N. Larin (Russia), Edited on Translation by C. Warren Hunt (Canada), Hydridic Earth, the New Geology of

Our Primordially Hydrogen-Rich Planet, c1993 by Polar Publishing, PO Box 4220, Station C, Calgary, Alberta, Canada T2T 5N1, 247 pages, illus., 263 refs.

Vladimir N. Larin graduated from Moscow University in 1961 with degrees in geology and mineral prospecting. He developed special techniques, as a result of field work, to aid in the search for rare metal deposits. In 1968 he got a revolutionary idea about the earth being formed from a hydrogen-rich plasma. The consequences are reported in this book.

He opens with a new concept of earth formation, starting with a plasma that differentiates on the basis of the Coulomb forces between atoms of various elements that result from their respective ionization potentials. (This is the process in a proto-solar system in which plasma creates differing plasma groups that later coalesce into various types of planets.) Next, Larin theorizes that the plasma condensed and coalesced into the sun and the known array of planets. Plasma filaments radiating out from the sun are able to distribute the momentum of the central "proto-sun plasma rotation" during this phase into the various proto-planets. Thus the differentiation of both angular momentum and chemical composition among the newly-formed planets has the highly different forms we recognize today. Intense enrichment in hydrogen, the predominant element in the universe, characterizes all of the planetary bodies because of the unique behavior of the hydrogen [as described in the book], and is the essence of this remarkable new view of how planets and their basic core matter are formed. Larin moves from these revolutionary deductions to their consequence for the formation of the earth and for its subsequent evolution to the present geological structure.

Larin does an excellent job of discussing the role of magnetic separation of elements in the proto-planet plasma body and shows that our current ideas suffer from lack of suitable correspondence to reality. Further, he discusses the origin and acceptance of the **current dogma** of an "iron core and a silicate mantle." The new geochemical model is for a silicate and oxide crust, a metal mantle, and a core of hydrides surrounded by metals with dissolved hydrogen. Larin has buttressed his theory with experiments in high-pressure to show what happens when hydrogen under near-earth-core pressures is dissolved in metals -- the metals become fluidized.

Larin cites experimental data that "fully substantiates the hypothesis that hydrogen is present in metallic lattices as atomic nuclei, single protons, which have penetrated the outer electron shells of metallic atoms." Or, elsewhere, "became understandable as **proton gas within metal atoms.**" Also, "Only hydrogen can enter metals to create structures by penetration or replacement." As a result of his experiments, Larin patented a process by which selected metals, **not**

**otherwise easy to form**, can be fluidized and extruded into desired shapes.

In Chapter VII, Larin suggests a solution to the earth's potassium problem "the discrepancy between the relatively high crustal abundance of K and its presumed lesser abundance in the earth's mantle." In Chapter IX, **Isotope geochemistry and the new model of the earth**, Larin delves into such exotic topics as the process by which the observed  $^{87}\text{Sr}/^{86}\text{Sr}$  ratio is now explained.

Of considerable interest to readers concerned with energy is the discussion in Chapter XII, **Energy resources on earth and its ecology in the light of the new model**. He writes, "...to obtain clean fuel, we have been compelled to burn a **foul** energy in quantities greater than what we would recover when we burn the produced hydrogen. ... Tapping intermetallic lodes for hydrogen may produce it [the hydrogen] with no net energy input. This procedure could be a wonderful alternative to the seemingly dead-end contradiction between the need for ...[energy] and the necessity of keeping the environment clean." Larin ends with the suggesting that hydrogen from the earth's interior may be working its way to the surface and **slowly replenishing abandoned oil fields**. His last sentence: "**Depleting oil and gas fields may yet see better times in the future.**"

If you are trained in geology and want to ruin your current concept of the earth, then read Hydridic Earth. It may do for your ideas of geology what cold fusion and tapping space energy has done to your concepts of physics. At any rate, we are indebted to Vladimir Larin and C. Warren Hunt for a new picture of the importance of hydrogen in our lives and within our world.

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## BOOK REVIEW

By Bruce Vicknair

Chemical Generation and Reception of Radio- and Microwaves, Anatoly L. Buchachenko and Eugene L. Frankevich, N.Y., VCH Publishers, 1994, 180 pages, ISBN 1-56081-630-9.

This is a must-have book if you are working with molecular magnetics. Most of the experimental work appears to have been performed at the Institute of Chemical Physics, University of Moscow. One of the most interesting concepts explained by the book is semi-empirical RYDMR (Reaction Yield Detected Magnetic Resonance). It allows fast analysis of chemical processes that are normally "illegal." That is, the electron spin state blocks molecular interactions. The application of an external magnetic field at specific gauss levels allows an otherwise impossible chemical reaction.

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