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

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CONTENTS FOR MARCH 1995

Did you know that in 1900 a Japanese commissioner said, "We have looked about us to see what nations are the greatest so that we can be like them. What is it that makes the United States such a great nation? We investigated and found that it is patents. We will have patents."

Now, who is making the best use of them?

A. WELCOME TO ICCF-5 AND THE THIRD WAVE

By Hal Fox

Alvin Toffler [1] saw today's energy problems and solutions about fifteen years ago and wrote about them in his book The Third Wave. The **First Wave** was the use of human power, animal power, limited water power, and wind power for grinding grains. Beginning in the late 1800s the **Second Wave** was the developing use non-renewable fossil fuels. Still in the **Second Wave**, we have depleted our oil reserves and polluted our planet. The **Third Wave** of energy is perceived as a solution by Toffler but, of course without the details of how the new energy systems would be accomplished.

Six years ago this March, Pons and Fleischmann were called by the University of Utah to announce their discovery of cold nuclear fusion. In my optimistic way, I started telling others that within about two years we would see some commercial applications of this amazing discovery. However, I am sticking to my forecast, **I still forecast that within two years we will witness the commercialization of cold nuclear fusion.** This fifth international conference on cold fusion will, undoubtedly, bring additional reports demonstrating both problems and successes with the Pons-Fleischmann discovery and with the several other methods that have been found to produce and control nuclear reactions and/or produce thermal energy with relatively simple devices or systems.

The Third Wave of the development and distribution of energy is close at hand. As Toffler [1] has expressed: "...though the forces of the Second Wave may **seem** powerful and their Third Wave critics feeble, it would be foolish to bet too many chips on the past. Indeed, **the issue is not whether the Second Wave energy base will be overthrown, superseded by a new one, but how soon.** We can now provide Toffler with one of the answers to the **Third Wave** energy base: cold nuclear fusion.

Those of us who have attended all five conferences have witnessed the following:

1. The continued successful replication of the Pons-Fleischmann discovery and the ferreting out of its mysteries.

2. The fading of the vociferous critics who, at the first conference, were eager to deny every report of successful experimental data.

3. The improvement in measurements, in theory, in experimental protocols, and in understanding.

4. The discoveries that cold nuclear fusion is rich in new phenomena and the experimental demonstrations that several other means of producing and controlling nuclear reactions were possible and feasible.

5. Remarkable new discoveries in hydrogen-condensed matter interactions.

6. An ever-growing and expanding number of scientists, laboratories, and countries involved in the study of cold nuclear fusion and other enhanced energy devices.

We still understand the problems facing the **Second Wave** energy base: rising fuel costs; high capital costs; heavy inputs of capital to produce marginal increase in output; pollution control problems; the nuclear risks of nuclear reactors and hot fusion systems; the rising thirst for abundant, clean energy; the higher prices for energy-affiliated resources; and the rising demands of the world's population for cleaner energy. "The moving finger writes and having writ, moves on." The **Third Wave** energy base is being formulated by the attendees at the ICCF-5 and their associates.

The world's media will little note nor long remember the details of this conference. The productive results of this, and similar conferences, is destined to change the world. The pages on which these words are reproduced will descend to dust, however, the ideas upon which these conferences are based will change this world. A few of us may become footnotes in future publications, but the technology that we are developing will soar. Not just on this earth, but on other planets, and around other stars, the technologies of this conference will be developed and carried. First on earth and later spreading with man through space itself, your work will travel. **No important changes for the betterment of man have come without conflict and struggle. You, the presenters at the ICCF-5, long may you win! The world owes you their praises. The detractors owe you their apologies.**

REFERENCES:

Alvin Toffler, The Third Wave, Bantam Books, c1980, 537 pages, indexed, 534 references.

My thanks to Reed Huish, President of **The Energy Group** of Chandler, AZ for introducing me to Alvin Toffler's book. Huish and his company are dedicated to reducing energy costs for management and business and are among the growing number of corporations who are commercializing **The Third Wave.**

B. *CFNET*

Cold Fusion/New Technology News Update

A new newsletter/magazine is on the market, looking forward to giving people the details behind the Cold Fusion research going on around the world. The editor is Eugene Mallove, Sc.D., and the contributing editors team is composed of Lawrence P.G. Forsley, Jed Rothwell and Christopher Tinsley. Together they have produced a simply presented newsletter aimed at the general populace who are moderately informed scientifically and want to know what is really going on in the realms of energy research. Here we present an over-view of the first issue.

Eugene Mallove's Editorial welcomes you to the issue, and gives a short look at the state of cold fusion research today. In the last five years there has been much negative press on the subject, but "Now it is abundantly clear that their widely denied discovery was but the "tip of an iceberg," in which the boundary between chemistry and nuclear physics will be blurred forever." Mallove mentions a researcher at a well-known university who has been highly skeptical of cold fusion, who did some experimenting on his own, and got some very unambiguous positive results. This researcher hasn't reported his findings yet, but Mallove believes he soon will. Most important, the researcher is now open-minded to other research developments. Other cold fusion breakthroughs cited are in the area of media acceptance and publications, and more are expected.

'News Briefs' covers some current gatherings in the field. MIT's Independent Activities Period (IAP) on January 21st, 1995, where about 150 interested people gathered to hear new research findings from nearly a dozen other scientists and engineers working in new energy fields. An introduction is made to the upcoming Fifth International Conference on Cold Fusion, presentation subjects are listed and contact information given. The prestigious Annual Meeting of the American Chemical Society has made tentative arrangements to include a Cold Fusion Session with lectures, posters, and demonstrations.

One article covers the **E-Quest experiments on ultrasonic-activation in cold fusion.** The results listed include: helium production verified in excess heat producing experiments that range from 50 to 500 watt excesses. These gas samples were

measured at the US Bureau of Mines in Amarillo, Texas, SRI International and Rockwell International. Ten runs have been analyzed and all gave positive results. One sample measured the helium-4 at a remarkable 552.0 ppm (that is not a typo, it is normally around 6 ppm) with an error range of ± 1 ppm. Further, there was a highly significant enhancement of the measured helium-3/helium-4 ratio (usually on the order of 10^{-6}). The measurement from Rockwell showed this ratio to be enhanced to around 10^{-3} -- about 1000-fold increase, virtually ruling out any possibility of it being the result of "contamination." Multiple measurements had been made at Rockwell on each of several gas samples and background gas samples submitted.

In another article, the spotlight is on Jim Griggs Hydrosonic Pump™ and tests that are reported to have confirmed its excess power production. Figuring from the mechanical input power of 65.65 HP (167,084 BTU/hr.) and thermal addition to the water (output) that is added by the pump as it runs, 185.845 BTU/hr., the computed COP (Coefficient of Performance) is 1.112. Note that this is a *very* conservative number, because no account whatsoever is being made of the thermal radiation and convective air heat transfer from the very hot pump housing to the external environment. This was one demonstration made at the MIT IAP in January.

Other articles highlight Prof. Yoshiaki Arata's research involving his double-cathode cold fusion cell design, Prof. F. Piantelli of the University of Siena and further hydrogen gas and nickel experiments, a message by Dr. Peter Glück given to the attendees of the MIT IAP meeting, a memoriam of Dr. Julian S. Schwinger and a reprint of his talk at a physics colloquia at MIT and at the U. of Penn. in 1991, "A progress report: Energy Transfer in Cold Fusion and Sonoluminescence."

A "Cold Fusion and New Energy Technology Resource Guide - 1995" makes nearly 2/3 of the newsletter, and includes a feast of information: Frequently Asked Questions answered, a layman's explanation of Cold Fusion and its implications, Basic Resource Information listing books, compendia, publications and media resources; a large list of Seminal Articles: Experimental Evidence which names papers, researchers and where to find them; and a contents of the *Fusion Technology* Special Transactions issue (Dec. 1994) which highlights cold fusion. A Time-line is printed containing pertinent past discoveries which lead up to the level of chemistry and physics that preceded and formed the discovery of Cold Fusion, and what has gone on since.

If this is any indication of what *CFNET* will continue to publish, it will be a great addition to the library of anyone dedicated to staying abreast of the scientific developments in the area of energy research.

Summary by D. Torres

C. NEWS FROM THE U.S.

CALIFORNIA - DEUTERIUM LATTICES

W. Bass (Scientific Advisory Board, ENECO, Inc., Salt Lake City, UT, Technical Advisory Board, Fusion Information Center, Salt Lake City, UT), "Resonant Transparency Spectrum of Deuterium Lattices in Pd·$D_{1.0}$ Cold Fusion Reactors," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHOR'S ABSTRACT

A simplified grossly electrically neutral one-dimensional linear-array model of electrons and deuterons bound in a *beta-phase* palladium-deuterium lattice PD·$D_{1.0}$ with a periodic length L = 2.83 Å is derived. A new Coulomb/Madelung/Fermi-Thomas potential $V_{CMFT} = V(r) \equiv V(r \pm 2L)$, $-\infty < r < +\infty$ is derived to be applicable to a free deuteron formerly bound at r = 0 but considered to have been excited and now located on $-L < r < L$. Outside of this fundamental interval, deuterons are bound and *averaged* electrons alternate between them; for neutrality, a Fermi-Thomas cloud of 3 electrons is included on the same interval as the unbound deuteron. The Zero Point Fluctuation (ZPF) of this deuteron have an expected rms amplitude $\Lambda = \langle r^2 \rangle^{1/2}$ measured empirically by x-rays or neutron scattering to have the value $\Lambda = 0.1002$ Å. The new potential V_{CMFT} is validated by correct theoretical prediction of the empirical Schwinger Ratio $\sigma = L/\Lambda = 28.24$ within one-third of one percent! Then a globally valid proof of the Schwinger Conjecture, which in his theory of "Nuclear Energy in an Atomic Lattice" (NEAL), he had proved only $|r| \ll L$, namely that this single ratio sums up "albeit crudely" *all* of the forces at work in the lattice, is proved for *all r*; specifically: the denumerable *energy levels* E_n and their corresponding *line-breadths* δE_n, are functions ONLY of σ and the fundamental constants of physics and pure mathematics, where the E_n are the energies of meta-stable bound states if the periodicity is ignored, and are here the energies of Resonant Transparency of the Coulomb Barrier. For $0 \le n \le 600$, 6.28 eV = $E_0 \le E_n < E_{n+1} \le E_{600} = 145.6$ eV, although the δE_n are not monotonic and the lowest value of n for which $\delta_n = \delta E_n/\Delta E_n$, $\Delta E_n \equiv E_{n+1} - E_n$, exceeds 0.49 is at $n = 88$, for which $E_{88} = 16.173$ eV; δ_n attains its maximum $\delta_{max} \cong 0.57$ at $n \cong 150$; $E_{100} = 17.691$ eV; $E_{200} = 32.5$ eV. A definitive "5 needles" (k = 0,1,2,3,4), $k \cdot \tau$ seconds, τ = 1 μ-sec, current-pulsing experiment on frozen "loaded" Pd·$D_{0.95}$ sample rods is proposed, for which the preferred pulsing voltage of 17.7 Volts corresponds to E_{100}, although more conservative is 32.5 volts, (because $\delta_n \ge 0.50$ for $95 \le n \le 360$ and thus $n = 200$, at which $\delta = 0.55$, is closer to the maximum of these [overlapping!] lines). The prescience of Schwinger's insight about the all-important nature of the (empirical) Schwinger Ratio σ is demonstrated by a Quantum Resonance Triggering (QRT) *proof* that a particle-lattice pair is a suitable cold-fusion reactor if and only if $\sigma_{QRT} \equiv \sigma/\pi$ is

closer to an ODD than an even integer! In five of seven separate instances of validation, this QRT™ Process Criterion (Patent Applied for in June, 1991) predicted *later*-measured reality *before* experimental confirmation.

CALIFORNIA - LIGHT WATER DEMO

R. Bush and R. Eagleton (Phy. Dept., Cal-Poly Univ. CA, ENECO, Inc., Salt Lake City, Utah, Proteus Processes and Technology, Inc., Denver, CO), "A Demonstrator for the Light Water Excess Heat Effect," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHORS' ABSTRACT

A demonstrator to convince critics of the reality of the light water excess heat phenomenon is being constructed. It employs closed cell calorimetry and an integrative heat design, and is based upon a theoretical model by Bush for the impurity promotion and inhibition of the excess heat effects of cold fusion. Initial data should be vailable by conference time.

CALIFORNIA - ELECTRON CATALYZED FUSION

R. Bush (Phys. Dept., Cal-Poly. Univ. CA, ENECO, Inc., Salt Lake City, UT, Proteus Processes and Technology, Denver, CO), "The Electron Catalyzed Fusion Model (ECFM) Reconsidered with Special Emphasis Upon the Production of Tritium and Neutrons," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHOR'S ABSTRACT

The ECFM ("Electron Catalyzed Fusion Model") first presented at the ICCF-4 is re-examined with special reference to the production of tritium and neutrons. [The model is of some interest in being the first model to fit data of McKubre et al. (SRI International/ EPRI) and, independently, that of Kunimatsu et al. (IMRA), on excess power versus loading fraction.] A simplified expression is also given for the theoretical lower limit of the neutron-to-triton branching ratio, which yields a value in good agreement with that found empirically.

CALIFORNIA - IMPURITY PROMOTION & INHIBITION

R. Bush (Phy. Dept., Cal-Poly. Univ. CA., ENECO, Inc., Salt Lake City, UT, Proteus Processes and Technology, Inc., Denver, CO), "A Model for the Impurity Promotion and Inhibition of the Excess Heat Effects of Cold Fusion," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHOR'S ABSTRACT

A theoretical model describes impurity promotion and inhibition of the light water and heavy water excess heat effects of cold fusion based upon the effects upon the magnetic properties of Ni and Pd, respectively, produced by alloying with different metals. For Ni (light water case), promoters, in increasing order of efficiency, are predicted to be Cu, Zn, Al, and Sn. Inhibitors, in increasing order of effiency, are predicted to be Co, Fe, and Mn. Ag, Au, and Cu are indicated as promoters in the case of Pd (heavy water case). Empirical evidence impacting the model will be presented.

CALIFORNIA - LISTEN TO CATALYSIS EXPERTS

Courtesy of Dr. Peter Glück

Colin D. Stanners, Denis Gatdin, and Gabor A. Somorjai (Dept. of Chemistry and Materials Sciences Division, Lawrence Berkeley Laboratory, University of California, Berkeley) "Correlations of Atomic Structure and Reactivity at Solid-Gas and Solid-Liquid Interfaces" *Journal of Electrochemical Society*, vol 141, no 11, November 1994.

AUTHORS' ABSTRACT

The electrochemical community provides the greatest number of users of experimental information obtained at solid-liquid interfaces. Molecular scale surface science studies have been carried out mostly at solid-gas and solid- vacuum interfaces although recently several optical and scanning tunneling techniques have become available that can scrutinize solid-liquid interfaces on the molecular level as well. In order to correlate structure and chemical behavior at solid-liquid and solid-gas interfaces, we suggest investigations of the same or similar systems in sequence at the solid at the solid-gas, solid-liquid, solid-solvent, and reactant interfaces with an external potential. In this paper we review the information accumulated from solid-gas interface studies on the effect of changing coverage, on bonding, and on trends of bonding across the periodic table. We discuss what is known about the surface structure, the surface chemical bond, the dynamics of surface atoms (diffusion, growth), and the reactivity of metal surfaces from solid-gas interface studies. In each section the available solid-liquid interface studies are also indicated. We hope to provide directions for future studies for those interested in correlating phenomena at solid-liquid and solid-gas interfaces.

LOUISIANA - Ni & Pt ELECTROLYSIS

Gary R. Boucher, Frank E. Collins, Rex L. Matlock (Louisiana St. Univ., Dept. Chem. & Phys., Shreveport), "Separation Factors for Hydrogen Isotopes on Nickel and Platinum During Electrolysis," *Fusion Technology*, vol 27, no 2, Mar. 1995, pp 183-186, 3 refs, 2 figs, 2 tables.

AUTHORS' ABSTRACT

When a nickel cathode is used during electrolysis, the separation factor γ of D_2O/T_2O is measured and found to be 2. When a platinum cathode is used, the value of γ is found to also be 2. This value is the same as the value that was measured and reported in an earlier paper that dealt with the use a palladium cathode. A mathematical model that predicts the tritium concentration in the electrolysis cell finds the predictions to be in agreement with the measured values of tritium concentration in the cell. Excess tritium concentration is observed in the recombined off-gases in the case of the nickel cathode.

MASSACHUSETTS - DR. JOHNSON SPOTLIGHTED

Gayle Verner, "Power Profile of the Month: Prof. Keith Johnson," *Cold Fusion Times*, vol 3, no 1, p 3.

SUMMARY

After teaching MIT courses on condensed matter and quantum chemistry for the past 25 years, the Pons-Fleischmann announcement in 1989 hardly came as a shock. The shock was the subsequent furor and criticism against it. This harsh controversy kicked his creative instinct into gear, and the wrote a movie script on the subject called "Excess Heat." The movie is now in production.

But a movie is not his only input into the cold fusion arena. Last year he presented papers on his theory of cold fusion at both the Minsk Conference and at ICCF-4. Due to the very small amount of nuclear byproducts in cold fusion, Johnson theorized that "the excess heat that they were observing was not nuclear but was connected with internal chemical bonding effects, the some sorts of effects that explained the superconductivity at lower temperatures." His theory depends upon the physical structure of the palladium loaded with the hydrogen.

MASSACHUSETTS - MAGNETIC ENERGY

Bertil Werjefelt, "Energy from Magnetic Materials/Magnetic Fields," for the IAP on Cold Fusion, January 21, 1995, at MIT, Cambridge, Mass, 02139, USA. [Mr. Werjefelt is the President of Poly-Tech (USA) Corp, P.O.Box 5011, Kaneohe, Hawaii, 96744, USA. (Phone: 808-235-0849; Fax: 808-247-6313)] The following is the introduction to his presentation that day.

As Dr. Mallove explained, the reason I am here concerns my work in physics and engineering over the last 20 odd years and my efforts to find ways of extracting energy from magnetism. The common and incorrect belief is that it is not possible to do so. That is my focus today.

Don't get alarmed, I am a firm believer in conservation of energy!

Almost a decade ago I was satisfied that it was possible to extract energy from magnetism, based on my own experimental results. I conducted many experiments, most of them for the purpose of ascertaining and or ruling out a multitude of concepts, possibilities and of course, experimental error. Several years (and I might add, lots of money) were consumed in this effort. And, as I am sure many of you can appreciate, many months would be consumed just designing and manufacturing the parts, before setting up an experiment, only to find in a few minutes of testing that it did not work as planned. Some experiments did work, however. But most commonly we had internal control or interference problems because we were trying to be too fancy in devising self sustaining apparatus. In any event, we had several experiments with excess energy and short periods of self-sustained operation, enough to satisfy me that my time, money and efforts were being spent wisely. I recall, for example, that there was one experiment with an input of 160 watts and the output was 450. This lasted for several minutes. But at that time we were unable to solve the problems of recycling the requisite energy for self sustaining operation. It was a very frustrating period, but we now believe we have resolved those issues completely. Our testing involved all kinds of load conditions, from lights and salt baths to motors. In any event, from all these experiences I could see what the requisite design parameters would have to be for the applied technology and for the purpose of seeking patent protection on the basic governing technology. But, what was lacking was a valid explanation of the results and technology. This is particularly needed in order to seek broad patent protection which, after all, is one of the basic business objectives. And it was clear that the scientific community would demand at least some level of physical explanation.

Subsequently I started to search the literature for precedents in the field. What I first found was that, in all the literature concerning magnetics, it was dearly stated that it is impossible to obtain energy from magnetism. It was said to violate the laws of conservation of energy. However, quite obscurely, in the area of thermodynamics I discovered that reputable

researchers had reported on excess energy experiments in the 50's and later explained the perplexing results as being of magnetic origin. I then spent several years researching this and working on explanations. And in 1990 I unsuccessfully attempted to publish my findings in the mainstream journals. In due course, naturally, I discovered that such heretical ideas - as with cold fusion - were not accepted there.

Now we are back to setting up experiments which we will disclose publicly. This should occur in the next few months. Because of the controversial nature of our results and what we are proposing, I am sure you can understand our need for indisputable documentation and results. We have therefore refrained from releasing the results of our earlier proof of concept experiments and in the interim, instead disclosed the basic principles so that others may experiment on their own. Meanwhile of course, as you saw on the video, the Japanese, and I understand others, including two electrical engineers in England, have now proven my point.

NEW MEXICO - NEUTRINO WEIGHT PROBLEM

"The Weight of the Evidence," *The Economist*, Feb. 11, 1995, pp 71-73.

SUMMARY

According to claims by researchers at Los Alamos National Laboratory, the neutrino has recently given up one of its secrets - its weight. Since its theoretical discovery in the 1930s, the neutrino has been ubiquitous but elusive. They have been detected, labeled as electron-, muon- or tau-type neutrinos, and stopped by nothing short of a dead-on collision with a quark or electron - which is rare. Now, however, they may have been weighed, too. The significance of this is that it could answer some bothersome questions, such as the cosmologists' heretofore undetectable "missing mass" of the universe, or the solar physicists' theoretical prediction discrepancies.

If Los Alamos' claims stand up to scrutiny, it could be a physics-changing discovery. No technical details have yet been released, the story was just reported in January of this year by the *New York Times*. That alone upsets some other neutrino physicists. The usual current means of spreading the research is through carefully written, detailed papers, circulated on the InterNet and/or published in some recognized journal. The Los Alamos team confirmed that it had the results, but won't be putting a complete paper together until the finalized interpretation of the data is done at a meeting later this month. They are still debating over the best interpretation of some of the data.

If neutrinos have mass, theory says that one type of neutrino could change into another type, for instance an electron-type could change into a muon-type and then change back. You can infer the difference in mass between two types of neutrino by measuring such oscillations. Experiments at Los Alamos done in a special tank have detected the signs of electron neutrinos.

There will be scrutiny, with both eagerness and caution, to be sure. Earlier data from Brookhaven National Laboratory may cast doubt on the reported neutrino masses, although the Brookhaven team said that may not rule out the validity of the new findings, in the end. Other labs are also conducting like research. Cosmologists may like the new results, they suggest that perhaps 20% of the universe's mass could be neutrinos, but they want room for newer findings also. On the other hand, if tau-type neutrinos turn out to be too prevalent, they could make the universe weigh too much.

NEW MEXICO - RESEARCH UPDATE

Edmund Storms, "A Brief Cold Fusion Update," *Cold Fusion Times*, vol 3, no 1, p2.

SELECTED QUOTES

"The demand for long-term control cells reflects results from the early cold fusion experiments, which produced heat or nuclear products in occasional bursts. More recent work has achieved steady output. Once a cell turns on, it typically stays on for many days. Skeptics who accept the data on excess heat nevertheless assert that it originates not from any nuclear process but from some hitherto unknown chemical reaction. But no evidence from any study has been reported to support various speculated chemical sources.

"An important requirement for producing heat, for example, now appears to be palladium largely free of microscopic cracks. Deuterium apparently escapes from any cracks too fast for a critical concentration to build up. Michael McKubre and co-workers at SRI International, as well as researchers at several other laboratories, have shown that the larger the ratio of deuterium to palladium in the electrode, the greater the heat.

"Many experimenters have failed to produce anomalous effects because they have not applied enough current to their cells. Several experiments have shown that the nature and timing of the electrical input to a cell significantly affects the chances of its success. Heat is more likely to be produced when the electrical current is repeatedly "ramped" from a high to lower level or briefly pulsed to high values."

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 agenices who should be funding alternate, non-polluting, energy production methods.

OREGON - QUANTUM LEAP FOR ELECTRIC VEHICLES

Bruce Meland, "Over-unity: the Quantum Leap for EVs," *Electrifying Times*, vol 2, no 3, Winter '94-'95, p 1, 13-17.

SUMMARY

Classical physics, though most technologies we use today are based on it, is incomplete, flawed, or just not broad enough. Researchers have long been discovering anomalies that "classical" physics does not explain, or even recognize in some cases. Now is the time when new laws will be discovered, and old laws will be revised as we learn more about the inner workings of the universe.

The beginning of the emergence of this new age of physics was in the 1920s with quantum mechanics. Such scientists as Bohr, Schrodinger, Sommerfeld, Heisenberg, and Pauli looked beyond the establishment-dictated sciences and opened a new door to reality in the physical world. So have open-minded scientists ever since, addressing the anomalies and tracking them down to become the new breakthroughs. Some of the over-unity researchers are listed in this article, to acquaint people with "new science."

The researchers discussed are: John Searl of England, with the Searl Effect Generator which deals with both over-unity energy and levitation; Robert Cook, Sr., of Los Alamos, with the C.I.P. drive, a reactionless drive unit which converts angular momentum into translational force; Troy Reed of Reed Technology in Tulsa, Oklahoma, researching a magnetic motor resonant system; Ron Brandt of Oregon working with a permanent magnet motor and complimentary resonant circuit; John Bedini working on a resonant energy motor; Scot McKie of Seattle, researching the PodMod system, a resonant circuit generator with two storage "tanks"; Jerry Labine, experimenting with a Tesla turbine and Tesla Coil innovator; Sonne Ward of Idaho, who has invented a motor generator device used to power a hybrid car, coupled with a one-cylinder engine using Ward's "Accurate Injection" system; Robert Adams of New Zealand, inventor of the Pulsed Electric Motor Generator (PEMG); and Joel McClain and Norm Wooten, of Texas, who have developed a Magnetic Resonance Amplifier now under research.

TEXAS - ELECTROLYTE CALORIMETRY

Dr. Dennis Cravens (Vernon Comm. Col., Mem. ENECO Sci. Advisory Bd.), "Flowing Electrolyte Calorimetry," a demonstration, to be presented at ICCF-5, Monaco, April 9-13, 1995.

Circulation of the electrolyte through a cold fusion cell allows high current densities and high energy fluxes within a cell with few complications. When the specific heat and flow rate of the electrolyte are known, the thermal output of such cells can be calculated similar to flow calorimetry techniques. Benefits of such systems include:

1) operating at high power densities,

2) using high current densities at the cathode,

3) operating at high power densities,

4) sampling of electrolyte after loading,

5) adjustments to electrolyte composition during a run,

6) increasing conductivities of electrolyte alter loading,

7) operating the cell in a vacuum environment for increased calorimetric accuracy, and

8) calibrating advantages of flow calorimetry.

The cell is based on the "Patterson cell design" and uses palladium and/or nickel coated beads to create a large surface area cathode.

TEXAS - GAS DISCHARGE CALORIMETRY

Dr. Dennis Cravens (Vernon Comm. Col., mem. ENECO Sci. Advisory Bd.), "Flow Calorimetry Demonstration of a Gas Discharge System," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHOR'S ABSTRACT

A high current density and high temperature cell will be demonstrated. The design consists of spark discharges upon a nickel doped-palladium/rhodium alloy which has been pre-loaded to at least 0.67 D/metal ratio and operating in a deuterium atmosphere. Test ports (BNC) will be available for those individuals wishing to take real time measurements on the system or to verify those measurements indicated on the meters located within the demonstration housing. The heat output will be indicated by flow calorimetry. Due to the experimental nature of the field and the drastic simplifications required for international transport of the system, no promises will be made as to its production of excess heat during the demonstration. However, similar systems often produce 30 % excess of heat flow over the raw electrical power into the system (even including transmission and conversion losses).

TEXAS - MRA PROGRESS REPORT

Joel McClain and Norman Wootan believe, to the best of their ability to test and measure, that the Magnetic Resonance Amplifier is a true over-unity space-energy device. Rather than patent such a device they made it public over the Keeley Net. When you consider that they believed they had solved the world's energy problems, their unselfish act must be given great plaudits. In addition, they even provided other trusted experimenters with the components parts, the same as they had used. The results have been interesting. A few groups have replicated the MRA circuit and have claimed various levels of over unity. Dr. Hal Puthoff replicated the circuit and made careful measurements, taking into account the interconnection of two units, one having high capacitive reactance and the other high inductive reactance. Puthoff suggests that if the impedances are properly treated, the device is not an over-unity device.

The jury is still out. Others are working on high efficiency signal generating circuits so that a complete input (to the signal generator) can be compared to the output (hopefully an amplified d.c. power from a bridge circuit). The circuit is highly non-linear when operated at the frequencies specified by the inventors. There is still some controversy as to whether the tests made by Puthoff's staff were of a unit that was fully operational. Stay tuned for further reports or dial up the KeelyNMet BBS on (214) 324-3501 and view the latest.

UTAH - UTILIZING PATENTS

Frederick G. Jaeger (President of ENECO, Salt Lake City, Utah USA), "A Model for Commercialization Utilizing Patents." to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHOR'S ABSTRACT

The biggest impediment to commercialization is lack of demonstration devices and firm scientific understanding of the mechanism(s) responsible for various 'cold fusion' and enhanced energy effects. With scientific understanding, the requisite amplification and reproducibility will be achieved to rapidly propagate a variety of commercial products.

Early patent filings, even under conditions of scientific uncertainty, protect commercial rights of inventors and provide a fair and orderly international infrastructure for commercial development.

Consolidation of related patents into a well-balanced portfolio minimizes scientific and commercial risks while providing maximum commercial opportunities. The portfolio concept removes certain intra-mural rivalries among contributors and allows a rich cross-fertilization of ideas to flow between multi-disciplined inventors to further scientific understanding.

From an economic viewpoint, a portfolio provides a collective value-added 'futures market' of assets of sufficient size to attract investment capital required for patent prosecution, R&D support, license/prototype marketing, infringement enforcement, and royalty collection.

From a commercial user point-of-view, a well-balanced portfolio provides a convenient, unified worldwide structure for acquisition of key technology licenses and prototypes. Commercial users of the technology will be able to rapidly incorporate the unique competitive advantages provided by 'cold fusion' and enhanced energy technologies into their respective product lines with minimal inconvenience.

The delay of scientific understanding in the field over the last six years has created an unusual opportunity to assemble a precedent-setting patent portfolio that will significantly influence the creation and commercial direction of an entirely new industry. To facilitate rapid global commercialization on a non-discriminatory basis, the portfolio concept helps shift resources towards research and understanding rather than towards unproductive litigation involving fragmented patent claims.

UTAH - ELECTROLYTIC HEAT PUMP

Yan R. Kucherov (ENECO, Salt Lake City, Utah, USA), "Electrolytic Heat Pump and Open/Closed Thermodynamic Systems," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHOR'S ABSTRACT

It can be shown that some of the excess heat results for electrochemical cells may be explained on the basis of thermodynamic principles applied for open systems.

Illustrations are given showing that violation of thermodynamics laws can be avoided by redefining a closed thermodynamic system. In practice, it means channeling the heat flows by placing thermal insulation in one point or another.

If a refrigeration cycle with a non - thermal energy storage in the form of ions is achieved, it can be used as an environmental heat pump to concentrate thermal energy.

The requirements for an electrolytic device providing refrigeration effects include thermal insulation between the anode and cathode, low ohmic heating, high catalytic activity of the anode material, etc.

A specific electrolytic device realizing refrigeration effect was designed and built on the basis of this approach. The device was in good thermal contact with ambient air, used high molarity CsOH electrolyte and platinum / crystallographically oriented platinum-nickel or crystallographically oriented nickel-nickel electrodes. DC or pulsed electric power sources were used in the device. Up to six thermistors with computerized data acquisition system were used for temperature measurements.

Relative anode cooling was achieved in all experiments. Temperature gradients in the case of anode cooling were small - approximately one degree Celsius. Heat flow estimations gave results well in excess of the electric input with reasonable accuracy.

The results demonstrate an electrolytic heat pump principle which must be taken into account when interpreting some of the previously reported excess heat publications. Of course, this result cannot be applied to closed calorimeters.

Because of relatively small temperature gradients, the commercial application side of this effect is presently unclear.

Reference:

P.H. Handel, "Subtraction of a New Thermo-ElectroMechanical Effect from the Excess Heat, and the Emerging Avenues to Cold Fusion". ICCF-4, V. 2, 7-1. EPRI 1994.

WASHINGTON D.C. - NEW SHOT AT COLD FUSION

Courtesy of Jed Rothwell

Malcolm W. Browne, "New Shot at Cold Fusion by Pumping Sound Waves into Tiny Bubbles," *Science Times* section of *New York Times*, Dec. 20, 1994, page D1 & D8, illus.

EDITOR'S COMMENTS

Browne's article discusses some of the most recent work of Dr. Seth Putterman at UCLA. As reported, the more recent work on sonoluminescence has achieved higher temperature levels than previously obtained. While Putterman works with single bubbles, Dr. Kenneth Suslick, a chemist at the University of Illinois (Champaign-Urbana) has produced clouds of bubbles. The bubble temperature produced is inferred by the light emitted from the sonoluminescence. The article suggests that it may be possible to create high enough temperatures so that the fusion of deuterium can be achieved. It is noted that "this process must join together atoms of isotopes of hydrogen (either deuterium or a mixture of deuterium and tritium -- the same mixture that fuels hydrogen bombs). This yields helium nuclei and tremendous amounts of energy." The author later states that no neutrons have been detected. Also, the article addresses the problem of getting bubbles of hydrogen or hydrogen isotopes to produce sonoluminescence. The process, which might be able to produce excess energy, is compared with the process where glass spheres are used in inertial confinement hot fusion.

It is interesting that Malcolm Browne fails to mention that E-Quest Sciences has been producing nuclear by-products (as measured by scientists at the Los Alamos energy research laboratories) using the sonoluminescence phenomena at or near the surface of a metal (such as palladium). In addition, Browne makes no mentions of the paper by Julian Schwinger in which he suggests that the Casimir effect may be responsible for the forces which collapse the bubble so violently. Of course, the Casimir effect is a by-product of an energetic space and the E-Quest experiments suggest the reality of **cold nuclear fusion**. Neither of these two concepts are acceptable to the classical hot fusion community. **This article is an impressive demonstration of how one can select facts so as to avoid any acceptance of either the concept of cold fusion or an energetic space.** Rather, the projected use of sonoluminescence is associated with high temperatures (of the collapsing bubble) and therefore, the possible similarity to inertial confinement. The concept of the 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 experimental data for cold fusion. However, we are pleased that the prestigious *New York Times* would use the term "cold fusion" and publish an article without the usual attack on Pons and Fleischmann. Maybe, just maybe, this act of journalism heralds a gentle recognition of the continuing advances that have been and are being made in cold fusion technology.

D. NEWS FROM ABROAD

AUSTRIA - VIOLATING NEWTON'S THIRD LAW

Courtesy of the Author

Stefan Marinov, "Experimental Violation of Newton's Third Law," *Deutsche Physic*, Vol 4, No. 14, April-June 1995, pp 5-28, 15 references.

AUTHOR'S ABSTRACT

Numerous experiments have shown that Grassmann's formula for the force of the interaction of two current elements (which allegedly is accepted as the right one by official physics) is wrong. Wrong are also the formulas of Ampere, Whittaker and Neumann. Only Marinov's formula, introducted recently by me, resists against all known experiments. Marinov's formula preserves Newton's third law, but not entirely, as the forces with which two current elements interact are equal and oppositely directed but may not lie on the line connecting the elements. I report on an experiment carried out by me, the "rotating Ampere bridge with interrupted current," which violates the angular momentum conservation law. Although giving right predictions to all known experiments, I know by the help of an original experiment that even Marinov's formula is not pefect. I am, however, firmly convinced that a better formula can never be found.

EDITOR'S COMMENTS

Marinov delights in finding experiments that prove various laws of science to be wrong. In this paper he discusses several such experiments relating to formulas for the interaction of electrical current elements. He quotes from Hering in 1923 saying the following when his article was twice denied publication:

In one case publication was at first refused on the grounds that if the experimental evidence was correct, which was easily demonstrated, it was so serious a matter to change one of the older laws, that it ought to be kept secret? In another case the refusal [to publish] was because it was "so subversive of long established principles," the age of the law being considered more important than its correctness.

Marinov concludes his paper with: "Nevertheless, one can only wonder that Marinov's formula was discovered after almost two centuries of electromagnetism. And this formula showed that besides the already known Lorentz vector magnetic intensity, there are three other intensities: the Marinov vector magnetic intensity, the Whittaker scalar magnetic intensity and the Marinov scalar magnetic intensity, all of which remained for two centuries unnoticed. And there is the miracle that the scalar magnetic intensities give possibilities for constructing perpetually working machines. If mankind had discovered Marinov's formula in the XIX-th century, the history of the XX-th century could be completely different and the world had not to come to the border of an energetic and ecologic precipice on which it stands now."

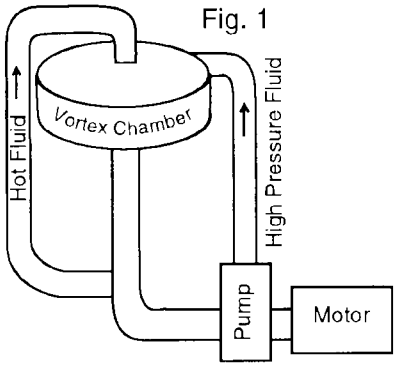
BELARUS - 150% EFFICIENT CAVITATION

Courtesy of Alexander Kuchinski, Minsk

VORTEX CAVITATING DEVICE
CLAIMS 150% EFFICIENCY

A water-circulating device reportedly develops excess thermal heat when the water cavitates. The water circulation flows from a water pump through a nozzle into the periphery of a vortex chamber. The output of the vortex chamber is from the bottom center where the flow returns to the water pump. It is well known that in fluid flow the $P_1V_1 = P_2V_2$ equations represent the pressure and velocity relationship of fluid flow. Both the nozzle and the vortex chamber increase the velocity of the flow with an accompanying decrease in pressure. Under proper flow and water temperature conditions, the pressure become low enough to allow the warm water to burst into bubbles of water vapor (cavitation).

Fig. 1



As shown in the figure, there is a secondary circulation. Because the wall pressure is higher than the pressure at the center of the vortex chamber, there is a secondary flow from the down pipe back to the center of the vortex chamber. This secondary flow can provide for the circulation of hot water to heat exchangers external to the vortex system.

Theory of operation: This device provides excess heat in the same manner as provided by the Griggs' Hydrosonic Pump (which was described at the ICCF-4 conference in Hawaii ("A

Brief Introduction to the Hydrosonic Pump and the Associated 'Excess Energy' phenomenon," Proceedngs - ICCF-4, vol 4, p 43-1 to 43-23) There are at least three theories as to the source of the excess heat. The first theory, attributed to the late Julian Schwinger is that the decreasing cavitation bubble reaches a point where the Casimir forces cause the bubble to rapidly implode during which process, zero point energy is captured and turned into heat. The second theory by Lev Sapogin (the scientific advisor to the Moldavian inventor of the vortex flow heater) suggests that a hydrogen wave packet, under certain environmental conditions, becomes distorted and can undergo a transition from a wave packet to energy. A third explanation by N.E. Zaev of Moscow states that thermal separation can occur in various materials under some environmental conditions. This allows some parts of the material to gain energy from the environment which may show up as excess thermal energy.

Commercialization: We understand that this device is in production in both Moldavia and in Belarus. We further understand that a unit will be shown to the attendees at the ICCF-5 conference in Monaco. We welcome the commercialization of any type of enhanced energy systems. Scientists will still have to grapple with the theory of operation of these cavitation devices.

BRITAIN - VACUUM DISCOVERIES

Robert Matthews (science correspondent for *Sunday Telegraph*), "Nothing Like Vacuum," *New Scientist*, 25 Feb. 1995, pp 30-33.

SUMMARY

One of the hottest topics in physics today, the vacuum is discussed from many angles in this article. Using Einstein's special relativity as a base, Matthews speaks of the "Empty space that is not really empty at all, but a seething sea of activity that pervades the entire Universe."

Rejecting the "aether" idea of last century, the author does tell of the "fluid" vacuum "that must conform to the dictates of special relativity. The vacuum is not forced to be mere quantum fluctuations around an average state of true nothingness. It can be a permanent, nonzero source of energy in the Universe." As a possible source of nearly limitless energy, the "vacuum" is under research assault from all directions.

The current thinking that general relativity may not be quite all we had thought it was is discussed. The active, energetic "vacuum" may answer many long standing questions, from explaining the discrepancies in the calculated age of the Universe, to the problem of where is 80% of its theorized mass, to the mystery of the cause of inertia.

Matthews mentions the theory of Haisch, Puthoff and Rueda, published last year, that addresses both the energetic vacuum and the inertia that they believe is a result of space energy interaction. Their work has been built partially on the theories of Russian physicist Andrei Sakharov. The possiblity of this theoretical work leading to the discovery of ways to alter the vacuum state and therefore theoretically alter inertia is a monumentous extrapolation. Haisch has pointed out, "History is full of impossibilities turned into technologies, from flying aricraft to splitting atoms."

Meanwhile, the research goes on. Later this year, Haisch, Rueda and Daniel Cole will publish research in *The Astrophysical Journal* that suggests that the vacuum plays a key role in creating structure in the Universe, by forming concentrations of matter which leads to mass formation. This is the eternal question of where it all came from that has mystified cosmologists for ages. If the vacuum is the missing ingredient, this discovery would be quite an achievement for the physicists.

Matthews concludes with, "The solution to the cosmologist's nightmare, the explanation of inertia and the cure for the world's energy crisis? The vacuum is in danger of becoming everyone's answer to everything. But it seems a safe bet that the vacuum theorists are likely to come up with some big surprises over the coming years."

Summary by D. Torres

BELARUS - NIOBIUM CATHODES

V.A. Filimonov et al. (Inst. of Physicochemical Problems, Minsk, Belarus), "Nuclear Emission, Excess Heat and Structure Changes under Electrolysis of Heavy Water on Niobium Cathodes," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHORS' ABSTRACT

A dramatic difference in the behavior of recrystallized Nb cathodes having different contents of extended defects, using lithium deuteroxide heavy water electrolysis (El), was observed.

Microphotographs of metallographic specimens (lappings) of noted Nb samples were studied previously. A quantity of dislocations' (Ds) etching holes varied from 5×10^4 to $10^9/cm^2$.

Electrolysis was carried out at temperatures above 85°C. Direct current density was more than 11 amp/cm^2, voltage was from 10 to 25 volts. Nb cathodes were coated with a palladium layer

1 mm thick. After passing current for 2 to 3 hours, a current density constant value was established, and nuclear emission evidence was obtained using "working" Nb samples having a Ds content of from 5 x 10^4 to 5 x 10^5/cm^2 by a neutron detector with gas-filled proportional counters and a gamma-ray detector with NaI crystal scintillator supplied with ^{10}B and ^{1}H containing an n-gamma converter. No emission using "dummy" Nb samples having about 10^9/cm^2 Ds content was observed.

The cells were thermostated at 85° to 100°C by Joule heat accompanying EI plus hot water flowing through a water jacket. After stopping, the latter cells with "dummy" Nb samples cooled rapidly. Those with "working" cathodes retained almost the same temperature after switching off the hot water flow. Hence, heat release was enhanced significantly when outer heating was canceled. Estimated excess heat was about 100% as related to Joule heat.

A deuteride phase was formed at the flat surfaces of cathodes situated in front of a flat Pt anode during EI. However, a smooth transfer from a deuteride phase to a metal one occurred on cross-sections of "working" samples operated above 85°C.

Described features of Nb cathode behavior are consistent with synergetic activation models of cold fusion (reported at ICCF-4) according to which (i) high deuterium concentration gradient, (ii) low extended defect content, and (iii) Operating near the top of the phase separation region in the metal-deuterium system, are essential for CF implementation.

BRITAIN - MODERN AETHER SCIENCE

Harold Aspden, Modern Aether Science, Sabberton Publications, P.O. Box 35, Southampton, SO16 7RB, England, c1972, 165 pages, indexed, ISBN 0 85056 0039.

A book review by Hal Fox.

Although this book is over twenty years old, it makes good reading for the non-mathematical student of the aether. The following topics are chapters in the book: Nature's Unseen World, Thunderbolts, Discovering Gravitations, Lodestone, Origin of Solar System, Perturbation of Venus, Microcosmic Foundations, Law of Force, Boundaries of Relativity, Dirac's Electron, Nature of Mass, Aether Evidence, Action at a Distance, Nuclear Aether, Earth's Electricity, and the Cosmic Aether.

To show what a difference a decade or two makes, Aspden reviews the difficulties in explaining how the solar system formed planets. The only known way was by the close approach of a stellar body and pulled filaments off the solar plasma to form the planets. As was shown in the recently reviewd, The Big Bang Never Happened, a very sensible electromagnetic explanation is possible and there must be many solar systems. Aspden suggests that the aether can be used to explain the formation of planets. Aspden goes on to make a good case for the concept that the aether rotates with a solar body.

Aspden cites Newton (in Principia, 1687) as saying, "That one body may act upon another at a distance through a vacuum, without the mediation of anything else, . . . is to me so great an absurdity, that I believe no man, who has in philosophical matters a competent faculty for thinking, can ever fall into." He also cites de Broglie who in 1971 stated in the Physics Bulletin the following: "Everything becomes clear if the idea that particles always have a position in space through time is brought back. ... The movement of the particle is assumed to be the superposition of a regular movement . . . and of a Brownian movement **due to random energy exchanges which take place between the wave and a hidden medium**, which acts as a subquantum thermostat." If de Broglie needed an ether (hidden medium) in 1971, who are we not to vigorously pursue such a concept?

That is a bit of the flavor of Aspden's book. It is easy reading, challenging, and supportive of the concept of an aether. If you can get a copy, it is highly recommended reading, especially for those who do not like to be slowed down by numerous equations. So goodbye Einstein, hello space energy!

CHINA - NEW COLD FUSION MECHANISM

Chuan-Zan Yu, Yi-Fang Chang (Internat. Ctr. Theor. Phys., Trieste, Italy and Dep. Phys., Yunnan Univ., Kunming, China), "A New Mechanism of Cold Fusion," paper to be presented in ICCF-5, April 1995, 3 mss. pages, 7 refs.

AUTHORS' ABSTRACT

In this paper, we propose the cold nuclear fusion theory, which is analogous to the β^+-decay or the K-electron capture as follows: $D^+ + D^+ \rightarrow H^{4*} + e^+ + \nu$ or $D^+ e^- + D^+ \rightarrow D^+ + n^- + \nu \rightarrow H^{4*} + \nu$. The highly excited nucleus H^{4*} enhances the internal conversion pair e^+e^- (a few to emission of γ radiation because the transitions $0^+ \rightarrow 0^+$ and $2^+ \rightarrow 0^+$ are forbidden, i.e., $H^{4*} \rightarrow H^4 + me^+e^- + \gamma.m$ = 0,1,2 . . .). The neutron-rich isotope H^4 is unstable for β^--decay and evaporation neutron. The β^--decay is mainly: $H^4 \rightarrow H^4 + e^- + \bar{\nu}$. The evaporation neutron is a few: $H^4 \rightarrow T^3 + n$. So, the β^+-decay and the electron capture theory, i.e., the weak interaction theory is proposed as a new mechanism, in which not only the electron helps the deuteron to overcome the Coulomb barrier, but also

a lot of fusion energies transfer to electromagnetic radiation, and produce He^4 as well as a few T, which agrees with experimental results. The key issue is to search the β radiation and the positron annihilation.

CHINA - THEORIES OF COLD FUSION

Chuan-Zan Yu, Yi-Fang Chang (Internat. Ctr. Theor. Phys., Trieste, Italy and Dep. Phys., Yunnan Univ., Kunming, China), "Internal Conversion Mechanism and Multistage Chain Reaction Theory on Cold Fusion," paper to be presented in ICCF-5, April 1995, 4 mss. pages, 10 refs.

AUTHORS' ABSTRACT

First, the various internal conversion mechanisms of cold fusion are proposed. From this we derive the multistage chain reaction theory, in which the first chain reactions are: e^- + D $\rightarrow$ 2n + ν_e, 2n + D $\rightarrow$ ^{4}H $\rightarrow$ ^{4}He + e$^-$, e$^-$ + D $\rightarrow$ 2n + ν_e, etc. Further, the reaction rate and power of cold fusion may be calculated quantitatively, which agrees with the experimental results. Finally, the three basic characters on cold fusion are discussed.

CHINA - ELECTROWEAK INTERACTION

Chuan-Zan Yu, Yi-Fang Chang (Internat. Ctr. Theor. Phys., Trieste, Italy and Dep. Phys., Yunnan Univ., Kunming, China), "Electroweak Interaction in Cold Fusion and Comparison of Conditions Between Cold Fusion and Solar Fusions," paper to be presented in ICCF-5, April 1995, 3 mss. pages, 8 refs.

AUTHORS' ABSTRACT

The experimental results of cold fusion compare with the Standard Solar Model, which shows that both basic conditions are similar. From this cold fusion may be produced through the weak interaction, i.e., $D^+ + D^+ \rightarrow H^{4*} + e^+ + \nu$ and $D^+ + e^- + D^+ \rightarrow H^{4*} + \nu$. Therefore, the electroweak theory may be applied, in which the long distance electromagnetic interaction appears in cold fusion by the mixture of the Z^0-boson and the γ-photon.

CHINA - C.F. & QUANTUM FIELD THEORY

Chuan-Zan Yu, Yi-Fang Chang (Internat. Ctr. Theor. Phys., Trieste, Italy and Dep. Phys., Yunnan Univ., Kunming, China), "Quantum Field Theory and Triton-Neutron Ration on Cold Fusion," paper to be presented in ICCF-5, April 1995, 1 mss. page, 1 refs.

AUTHORS' ABSTRACT

Based on the quantum field theory and the distance of two body interaction, we obtain the triton-neutron ratio $R \sim 5.32 \times 10^{-7}$, which may explain some experimental results on cold fusion.

According to the quantum field theory, the transition probability from the initial state to the final state is

$$W_{fi} = [S_{fi}]^2 \quad (1)$$

While the scattering matrix is

$$S_{fi} = i(2\pi)^4 \delta^{(4)}(P_f - P_i) T_{fi} \quad (2)$$

where the scattering amplitudes T_{fi} are directly proportional to the interaction strength α, so

$$W_{fi} \propto \alpha^2 \quad (3)$$

Assume that the compound nucleus of the same initial state $D + D$ may form two types of different metastable states $T - p$ and $^3He - n$ by an equal probability.

When the interaction distance between T and p or ^{3}He and n can reach the region of strong force, the strength of strong interaction and the two body bound force are equal for $^3He - n$ and $T - p$, so the ration of the two reaction channels is

$$R = \frac{N(D + D \rightarrow {}^3He + n)}{N(D + D \rightarrow T + p)} \sim 1, \quad (4)$$

which is considered usually, for example, in the thermonuclear fusion. But, if the distance does not reach the region, R will be different. The known radii of the metastable states of two particles are

$$r_n = \frac{n^2 \hbar^2}{MZe^2} = \frac{n^2 m_e a_0}{MZ} \quad (5)$$

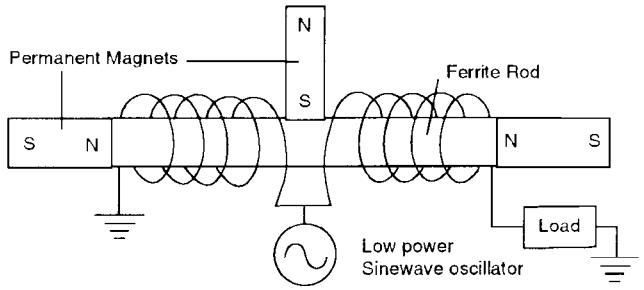
in which $M = \frac{m_1 m_2}{m_1 = m_2}$ is the reduced mass of two particles, Z may simply be nuclear charge, $a_0 = \frac{\hbar^2}{m_e e_2} = 5.2918 \times 10^{-9}$cm is the Bohr radius. For T + p, $r_n = 3.8430 \times 10^{-12}$ n^{2}cm. The smallest r_1 does not also reach the distance of strong interaction, it is mainly the electromagnetic repulsion between T and p. While it has not the electromagnetic repulsion between ^{3}He and n, the strong interaction appears more easily when both distance draws near. Therefore, the difference of two body bound force is very large, the ration of the transition probabilities, whose final states are T + p and ^{3}He + n $\rightarrow$ ^{4}He respectively, is $\frac{a^2}{a_s^2} \sim 5.32 \times 10^{-7}$, where the strength of the strong interaction is $\alpha_s \sim 10$. The result is that D + D $\rightarrow$ T + p, whose transition probability is smaller, is escaped and the ^{3}He - n state is bound, so the ratio of two channels is just reverse, $R \sim 5.32 \times 10^{-7}$. It may explain the experimental results in which the anomalous ratio $R \sim 10^{-4} - 10^{-7}$ (see ref. In

(1)). Moreover, the neutrons react easily with other nuclei, so the observed neutrons are less.

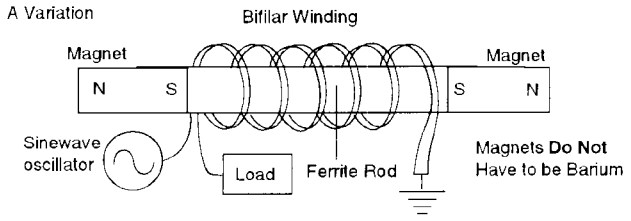
Reference:
(1) M. Fleischmann, S. Pons, G. Preparata: *Nuovo Cimento A*, vol 107, pp 143, 1994.

NEW ZEALAND - VTA EXPERIMENTS

As a piece of intriguing information, a fellow called up KeelyNet from New Zealand and had been experimenting with the Sweet VTA over-unity device. He worked with Sweet in the early days and very kindly volunteered to share some of his information with KeelyNet and other researchers through our various contacts. I am placing these two most intriguing circuits in this newsletter should you wish to try to duplicate the results claimed. His note says, "(This is) one of the configurations we used and got about 120-150% effeciency." The winding is bifilar.



"In this system input power is almost completely REACTIVE at RESONANCE with output in the load being real and inphase, of course. Variation of the magnet positions will often result in an increase in the output without any change in the input. You will need two scopes or 4 channels to tune them. We had problems with repeatibility and stability at operating frequencies. Being able to change the magnet positions resulted in some interesting effects. We would often move the magnets along the outside of the coils."



Either of these circuits might be worth trying with the piezo and isolated input/output as Joel and Norm used in the MRA. Since the problem was stability due to frequency shifts, the piezo might act as a reference for stabilization and consistancy of energy production. Over the past few years, KeelyNet has picked up bits and pieces of information that hints of the negative energies emitted by certain over-unity devices such as the Sweet unit. A couple of contacts mentioned that all negative effects could be avoided by using a 'balanced coil', much like the top circuit.

POLAND - MICRO HOT FUSION MODEL

Rainer W. Kühne (Braunschweig, Germany) and Roman E. Sioda (Inst. of Indust. Org. Chem., Annopol, Poland), "An Extended Micro Hot Fusion Model for Burst Activity in Deuterated Solids," *Fusion Technology*, vol 27, no 2, pp 187-189, 40 refs.

AUTHORS' ABSTRACT

An extended micro hot fusion scenario attempts to explain the burst processes of cold fusion reports and unsuccessful experiments. A heuristic model requires only 10 m^3 of palladium deuteride to release a power of 1 GW for a long time. This might facilitate future commercial use of cold fusion.

RUSSIA - HIGH ENERGY GLOW DISCHARGE

A.B. Karabut, S.A. Kolomeychenko, I.B. Savvatimova (Scientific Industrial Association "Luch," Russia), "High Energy Phenomena in Glow Discharge Experiments," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHORS' ABSTRACT

The results of gamma and fast electron registration in glow discharge experiments are reported. Cathodes were made of Pd, Nb and other materials. Hydrogen, deuterium and argon were used. The typical gas pressure was 3-7 Torr, the discharge current 5-100 mA.

The gamma spectra standing out above background were registered using Ge-Li detector. In the range from 60 to 1000 keV gamma signal exceeds background by 10^3 - 10^4 s^{-1}.

The monoenergetic bunches of penetrating radiation (presumable fast electrons) were registered using x-ray films with step attenuators and multiplying screens. The bunches are characterized by low angular spread (2-3 x 10^{-3} radian) and by short duration [1]. The energy of the bunches and their other characteristics depend on the properties of the cathode material and the discharge gas.

Generation of high voltage pulses (up to 10^5V) of short duration (40-60 ns) was registered by electric probe measurements. The pulse spectra represent patterns with the pronounced lines specific to the cathode material and discharge gas.

Based on these results and the data on the isotopic and elemental change in the cathode material [2], possible mechanisms for the initiation of nuclear reactions [3] are discussed.

References

[1] A.B. Karabut, Ya.R. Kucherov, I.B. Savvatimova, "Nuclear Product Ratio for Glow Discharge in Deuterium," *Physics Letters A*, 170, p 265, 1992.

[2] I.B. Savvatimova, A.B. Karabut, Ya.R. Kucherov, "Cathode Material Change after Deuterium Glow Discharge Experiments," Pro. of the Fourth International Conf. on Cold Fusion, 1993, Hawaii, USA, Vol 3, pp 16-(1-11).

[3] A.B. Karabut, Ya.R. Kucherov, I.B. Savvatimova, "Possible Nuclear Reactions Mechanism at Glow Discharge in Deuterium," Frontiers of Cold Fusion, Proc. of the Third International Conf. on Cold Fusion," October 21-25, 1992, Nagoya, Japan, p 165.

RUSSIA - ANOMALOUS THERMAL EFFECTS

V.A. Khokhlov, E.S. Filatov, A.L. Samgin, O.V. Finodeyev*, V.S. Andreyev, S.A. Tsvetkov (Inst. High Temp. Electrochem., Ural Branch of Russ. Acad. of Sci., Ekaterinburg, * ENECO, Inc., Salt Lake City, Utah, USA), "'Anomalous' Thermal Effects In the D_2(Pd) Loaded Electrode In Molten Alkali Chloride-Alkali Deuteride Electrodes," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHORS' ABSTRACT

The thermo-electrochemical study of

$Li(Al)/(LiCl\text{-}KCl)_{eut} + LiD/D_2(Pd)$ (1)

$Li(Al)/(Li\text{-}KCl)_{eut} + LiH/H_2(Pd)$ (2)

cells was carried out by means of reliable experimental apparatus for calorimetric measurements.

In electrochemical cells (1) with a sharp change of current density on the Pd-anode from 4 to 290 or 420 mA/cm2, stable "excess" heat effects were observed and that could not be explained by isotopic differences in electrochemical reactions while these effects were not found in the a similar cell (2) containing lithium hydride.

In under-saturated solutions of lithium deuteride in melted eutectic of LiCl-KCl, the thermal effects mentioned are apparently diminished because of a decreasing concentration of deuterium in the Pd.

RUSSIA - PREVIOUS COLD FUSION INVENTION

Courtesy of Alexander Frolov and Igor Goryachev

N.E. Zaev (Moscow), "The Fusion is Coming but Where is Kurtchatov?", *Izobretatel I Razionalizator"* (a Russian magazine for inventors), no 1, 1995, pp 8-9, translation by Frolov & Goryachev.

"Dear Editor, Please look at this information. Perhaps it is the forgery, but the magazine is well known and serious." -- A.R. Frolov

TRANSLATION OF ARTICLE

The inventor Ivan Stepanovitch Filimonenko is now 71 years old. In 1960, influential people (Igor Kurtchatov, Sergey Koroliov and Georgiy Jukov) strived to have Filimonenko's work included in the Soviet Union's state program for scientific-technical progress. The Decision of the Council of Ministers and Communist Party Central Committee number 715/296 of July 23, 1960 ordered the development of several important principles of Filimonenko's technology:
(a) Production of energy, (b) Production of motive force without expelling mass, and (c) Human protection from nuclear radiation.

In 1962 Filimonenko registered Russian patent number 717239/38, dated July 27, 1962 and titled, "The Process and System for Thermo-emission."

The main idea of Filimonenko's process was the electrolysis of heavy water. The absorption of deuterium takes place in a hard cathode (palladium) and it is the place for fusion reactions. This fusion is not "cold" but is "warm" fusion because it takes place at about 1000 degrees C. There are no neutron emissions for this device. Filimonenko discovered a new effect: When the system is in operation a strange emission from the system changes the time period of half-life decay and suppresses induced radioactivity.

Frolov's Note: A small amount of electric power produces a high thermal power for this device to provide an over-unity system. Instead of an energy dispersion process, it is an energy concentration process. This is possible only when the curvature of space-time is changed. The local space-time

changes produce a gravity effect and influence radioactivity. It is clear that any deviation of space-time curvature from normal may influence any nearby biosystems. Therefore, the medical aspects of [this type of over-unity] energy is a most serious problem. All of Filimonenko's work was stopped in 1968. The inventor was sent to prison for six years for actions against the standard nuclear program. In 1989 and 1990 in the Moscow "Lutch" plant, there were two Filimonenko reactors made. They used tubes of 0.7 meters in length and 0.041 meters in diameter. The palladium part had a mass of 9 grams. The power output was 12.5 kilowatts for one reactor. Igor Kurtchatov died in 1960 at the age of 58.

Editor's Note: I have personally been at the Lutch plant in Podolsk near Moscow and talked to the laboratory director. No mention has been made of any other type of cold nuclear fusion except for the work of Kucherov, Karabut, and Savvatimova which was funded by the company now called ENECO. No reports of this cold fusion work have surfaced in the several cold fusion conferences held in Russia or elsewhere. This publication in "Inventor and Innovators" is the first we have heard of Filimonenko's work.

As we went to press I contacted my Russian "Lutch" sources. Here is the story. The reactors were tried and did not work as predicted. Also, Filimonenko believes that somehow Fleischmann got his cold fusion idea from Filimonenko's work. Pons & Fleischmann's work began about the mid 1980's. If Fleischmann was that clever at penetrating Russian science, we nominate him to head up the CIA. --Hal Fox, Ed.

RUSSIA - EFFECTS IN D_2 CONDUCTORS

A.L. Samgin, O.V. Finodeyev*, S.A. Tsvetkov, V.S. Andreyev, V.A. Khokhlov, E.S. Filatov, I.V. Muffgin, V.P. Gorelov, S.V. Vakarin (Inst. High Temp. Electrochem., Ural Branch of Russ. Acad. Sci.; *ENECO, Salt Lake City, Utah, USA), "Cold Fusion and Anomalous Effects in Deuterium Conductors During Non-Stationary High-Temperature Electrolysis," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHORS' ABSTRACT

This work was performed in conjunction with researches begun in 1989 and presented in ICCF-3 and ICCF-4 [1]. The objective of these investigations is the possibility of "cold fusion" reactions in solid-state perovskite-type proton conductors based on $SrCeO_3$-type ceramics.

The following investigations were performed within this research program:

- search for synthesized ceramics of an optimum composition;
- development of the porous metal-ceramic-porous metal sandwiches with Pt as well Pd- electrodes;
- search for reliable evidences of nuclear reactions and nuclear products;
- calorimetry;
- investigation of possible channels of deuterons transactions within ceramic matter;
- phasic and structure transformation of the ceramic samples imposed in static as well variable electrical fields, thermo-cycling and variations of the ambient pressure of deuterium or hydrogen..

Interim results of the investigations are defined as follows:

- certain conditions for electrolysis of a proton conductive ceramic are required for repeatable anomalous effects;
- neutron bursts in excess of background were observed in a few instances;
- preliminary calorimetric results evidenced anomalous thermal effects. These effects cannot be explained by neutron radiation and satisfactory correlate with specific temperatures of the samples in the regions of 350°C, 500°C and 650°C.

X-ray structural analysis of the samples shows phase and crystal lattice transformation of the solid electrolytes in a deuterium atmosphere. It was discovered that the samples which demonstrated significant thermal effects contained two phases - strontium cerate and cerium dioxide. Generally, the ceramic tablets were covered with cracks after thermal cycling.

Replication of the experiments in a hydrogen atmosphere indicated that thermal effects are lower as compared to a deuterium atmosphere. Also, the behavior of the ceramic samples depends on the composition, technology of processing and ambient conditions.

RUSSIA - TUNGSTEN BRONZE CRYSTALS

S.V. Vakarin, A.L. Samgin, V.S. Andreyev, S.A. Tsvetkov (Inst. High Temp. Electrochem., Ural Branch of Russ. Acad. Sci.), "Influence of the Mono-Crystalline Perfection of the Oxide Potassium Bronze Tungsten on the Neutron Emission," to be presented at ICCF-5, Monaco, April 9-13, 1995.

AUTHORS' ABSTRACT

There are known works where oxide tungsten bronzes are sources of neutron emission in experiments of cold fusion. Recently, a number of research groups have tried to replicate these experiments. However, there have been no satisfactory repeatability.

Our experiments allows us to determine the relation between crystalline lattice perfection and neutron emission which make it possible to establish a criteria for the crystal selection on the basis of X-Ray structural analysis.

At the present time, it is has been verified that positive results were achieved with the crystal specimens having "character" radiogram of the "working" edge. These crystals have the perfect structure as confirmed by X-Ray topograms. However, during experimental runs the perfection of the crystal diminishes, followed by sharp decline of neutron emissions. This assumption is well supported by X-Ray analysis and topography. It is notable that same structural defects have crystals which didn't show neutron emission at all.

These results led to the conclusion that a necessary requirement for positive cold fusion effects with tungsten bronzes is a high level of perfection on the surface layer of the mono-crystal's working edge. Also, there is a possibility that neutron emission occurred during transformation of the crystalline lattice, which is a modification of the cold fusion "accelerating" model.

UKRAINE - NEW BATTERY TECHNOLOGY

Courtesy of Samuel P. Faile

"Ukrainian Battery," *Electrifying Times*, Spring/Mid-summer, 1995, p 17.

SUMMARY

From the I.N. Frantsevich Institute for Problems of Materials Science, Kiev, Ukraine, comes an entirely new battery technology. Commercializing the battery for them is Emtech Ltd., of Mississauga, Ontario. 11 patents have been applied for.

The new battery, when used to power an electrical vehicle (EV) will provide more power in less space and weight, and recharge faster than conventional batteries. A battery set weighing approximately 200 lbs. will provide up to possibly 400 miles range, recharge in 15 to 30 minutes, and maintain full voltage up to 94% discharge. The Ukrainian battery claims to operate well in the -40 to +60°C temperature range. In contrast, a conventional lead-acid battery can propel a small electric car about 100 miles, weigh about 1000 lbs. and take several hours to recharge. In addition to these advantages, the Ukrainian battery is made of nothing but environmentally friendly, plentiful and inexpensive materials.

The charge is stored in crystalline layers of a sheet-like material similar in appearance to mica. Because of quantum mechanic effects, the electrical characteristics of each crystalline layer is that of a capacitor, and thin as one molecule. Capacitance is inversely proportional to thickness of the separation between layers, so the Ukrainian battery functions like a giant capacitor. The batteries can last many hundreds of rapid charge/discharge cycles, with no heat or waste products. They seem ideal for the EV utilizing a magnetic motor.

E. EDITORIAL

CHANGE OF DIRECTION BY DOE?

By Hal Fox

There may be a change of direction at the U.S. Department of Energy (DOE). This change was not made apparent at the time the latest budget request was compiled. For fiscal year 1995, DOE received $328,638,000 for Fusion Energy research. For fiscal year 1996, the request is $366,045,000. The total U.S. expenditures on cold nuclear fusion and efforts to utilize space energy is less than two percent of that amount.

However, a recent communication with an executive of A.T.Kearny, Inc. (a large management consultant firm) stated that the DOE is soliciting proposals for **ultimate energy sources.** If that report is true, then that is evidence of a change of direction at DOE.

Assume that the advisors and workers at DOE have carefully investigated the growth and development of cold nuclear fusion and have begun to track some of the true over-unity devices and have now discovered viable new energy sources. If that assumption is correct and the DOE is now changing policy based on strong engineering and scientific discoveries, **then the DOE is to be highly congratulated.**

On the other hand, if the DOE is playing the old bureaucratic game of CYA (cover your ___(extremity), **then the Congress of the United States should accelerate the downsizing and dismantling of the DOE.**

According to our sources, the new request for proposals is directed toward the identification and evaluation of existing or predicted new (ultimate) methods for producing energy. This type of request from DOE is long past due. Shortly after the discovery of cold fusion, a DOE project manager had the temerity to announce that he had $2 million in unspent project

funds and would entertain proposals on cold fusion projects. His funds were removed, he was given a sideways promotion and no funds to manage.

Our editorial policy has been the recognition that the Secretary of Energy (both Watkins and O'Leary) are guided by internal advisors. We have found it very difficult to get the cold fusion message through to the Secretary of Energy -- **you can't get past the barrier of advisors.** However, thanks to the efforts of many, **especially Jed Rothwell and Eugene Mallove of the Cold Fusion Research Advocates**, and including a similar group in Minnesota, the politicians have been given significant amounts of information on new energy. Up to a certain point, you can't blame the Secretary. However, when the information achieves critical mass, then the Secretary must either act or take full responsibility for inaction.

Now that many members of the U.S. Congress and many U.S. Senators are aware of the failure of the Department of Energy to fulfill its mission of developing new energy sources, **the are many supporters of the idea that it would be best to dismantle DOE along with HUD and the Department of Education.** If that action does not get the attention of the Secretary of Energy, then DOE deserves to be disbanded.

F. ARTICLES BY OUR READERS

RUSSIA - ZAEV & FUTURE ENERGETICS

The Close Prospective of Future Energetics
By Dr. Igor Goryachev

It is acceptable to doubt the Second Law of Thermodynamics. According to this Law, thermal energy can flow only from a hotter material to a colder material. The questions are: is this concept unassailable? Is our interpretation of the Second Law correct? Is the nature so simple as to be restricted just to one method of operation?

We hear, from time to time, that the Second Law is not a strong law of nature. It is know that even Maxwell long ago considered the possibility of a limitation of the Second Law. He searched for examples of phenomena that were contrary to the Second Law. Maxwell described a method of separation of gas by the use of "Maxwell's demon" which would allow fast or hot molecules to exit into another chamber through a demon-controlled port and not allow the slow or cold molecules entrance. Thereby the second chamber would become hotter and violate the Second Law.

This Maxwell's Demon keeps exciting the imagination of physicists and has done so for almost a hundred years. Some scientists deny the possibility of the phenomena, while others consider the concept to be possible. Even the father of Information Theory, Norbert Weiner, considered the concept allowable. It was Maxwell himself who proved that because of gravitation there should be a temperature gradient in a column of gas (the "paradox of Maxwell.") In a physics text by V.F. Yakovlev (1976) the existence of this gradient was stated to be real.

One can recall the experiment of Pound and Rebke who disclosed that light (photons) going upward against gravity would get redder (decrease in frequency and energy of the photon). Alternatively, a photon going downward would get bluer. Actually, these experiments demonstrate active influence of the gravitational field on both atomic and subatomic levels.

Independently of Maxwell, the Russian scientist Tsiolkovski predicted a temperature gradient in his brochure, "Longitude of the Sun Irradiation," published in 1877. Then Tsiolkovski developed this idea in his work, "The Second Law of Thermodynamics," in 1914. It was he who made the most important conclusion - the temperature gradient is proportional to the molecule weight of the gas. The evaluation of the temperature gradient for the atmosphere of Venus matched very well with the results of actual measurements made by the spacecraft "Venus". Moreover, based on the fact that the method of gradient evaluation included thermal capacity American scientists Collins and Van-Wails took advantage of that act to measure thermal capacity of various gases, and in doing so solved a severe problem.

Engineer V.F. Parfenov, from Kuibyshev, Russia, went even further. In 1971 he made this statement: "Matter in force fields develops a temperature gradient." These fields include the field of centrifugal force. From this point of view, the old-time effect of Rank (separation of rotating gas for cold and hot components) does not appear so unexpected. [We know this device as the Hilsch Tube.] Further Parfenov considered that the difference in temperatures along the surface of the earth is caused by its rotation and the difference in temperatures depending upon the elevation [degree of gravitational force.]

Now it is evident that the dual relation towards the Second Law of Thermodynamics is mostly the consequence of its careless interpretation. With the invention of lasers it became necessary to introduce negative Kelvin temperatures. This concept made it necessary to reevaluate the Second Law.

In the famous declaration of Clausius (in 1865, he declared a postulate that heat cannot pass from a cold body to a hot body by itself.) If the effect is found, then that result must be paid for elsewhere. But the Second Law does not specify who is the payer. Why should he pay for this transmission of heat energy? Let someone else pay for it.

Several generations of scientists, with L. Boltzman in the lead, determined that the Second Law is based on statistics. The implementation of the statistical approach is based (according to American physicist Kiffel) on the assumption that "a closed system can exist with equal probability in any allowed quantum state." This assumption is really a fundamental concept.

In this connection some questions arose: What can be defined as a system? What conditions should be met in order for the system to be rightfully considered as closed? Actually, all surrounding multiples of particles (gases and liquids) or bodies, even if they can be considered systems, cannot be considered to be closed. For example, gravitational forces cannot be excluded even in a freely-falling system.

It is not out of place to remember that Maxwell, though he was the first to implement statistics for gases, did not consider his approach to be anything but a temporary view of the situation. He distinctly observed that the statistical approach gave averaged results which were caused by individual motions. This is why it is appropriate to using individual characteristics of the assembly, for example their speed, to control the system by controlling each member of it. This process must be done in such a way that the particles **themselves** move in the required direction as induced by their **private interests**, that they **desire** to move in such a way (in electrical, magnetic, gravitational fields.) Lack of symmetry in space or time (gradient) fields results in the phenomenon that particle motion back and forth is not symmetrical. An example of this asymmetry exists in thermal or electrical diodes.

It is appropriate to note that the features of particles which are **interactive** with fields are mass, charge, dipole (electrical or magnetic) moments, and speed. These features make it possible to self-sort particles in a self-organized system. The fields would make Nature pay the bill for the Second Law. In the last century a strange behavior of some luminifers was noted - they irradiated light with a lower wavelength as compared with the wave length of the initial excitation light. What was disclosed is the capability for the transformation or conversion of the excitation light into heat and also of internal energy of the matter into light energy. This shows the capability of a substance to concentrate thermal energy. The long-lasting discussion of whether the secondary irradiation could take energy out of the luminifer resulted in the recognition that efficiencies could exceed 100% if certain conditions were met. The thermodynamic proof of this fact was difficult. It became necessary to introduce time into the equation which, in principle, was excluded by the canons of thermodynamics.

This phenomenon found a practical application in 1961 when the Japanese scientist S. Yatsava proposed to use luminescent compounds of gadolinium for optical cooling. Multiple measurements demonstrated that the luminifer actually was cooled by irradiating more light energy than the energy received. In 1966 there were reports by A.T. Aronov, B.M. Voll and others about the efficiency of luminifer being up to 110%. It was disclosed that the cooling of the sample was compensated by heat coming from the environment. Then it was determined that the efficiency of such a process can reach a maximum of 160% and the temperature of the crystal can fall by 26.6 degrees C, assuming the power of irradiation equals 1 watt per sq. cm.

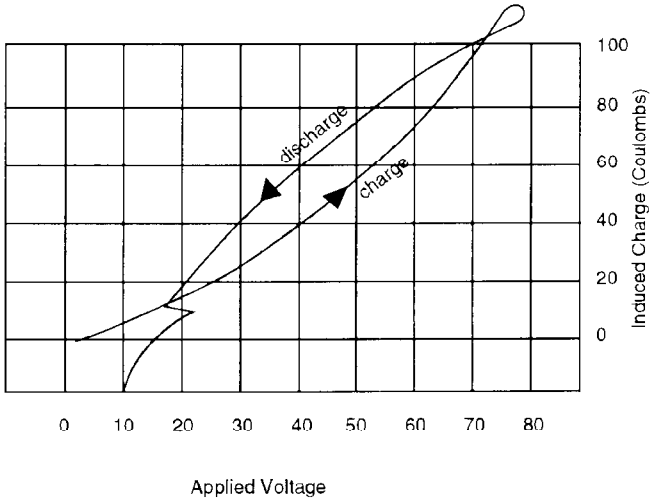
It appears that a violation of the Second Law took place. However, because the system that was absorbing and irradiating, it cannot be considered a closed system, therefore the Second Law cannot be applied. The incoming light (energy flow) entering the crystal of luminifer (with unknown processes like within a boiling kettle) which is definitely non-linear (with gradient fields), therefore, receives vigorous changes in the oscillations of the electron shells and within the crystal lattice. This light is then irradiated again by the same crystal with individual processes which are independent acts as compared to the incoming radiation. This radiation is independent of its new source. These facts in addition to other arguments (e.g., paradox of Gibbs) provide the basis for the statistical thermodynamics.

There are other ways in which a field may participate in energy exchange. The clever Chinese Yu Sin Chan was not aware of Clausius and his Second Law. That is why Chan designed the bowing-bird toy which can continuously transform thermal energy of the environment into work. The secret is simple: the system is open and gravitation, environmental heat, and humidity of the air are actively participating in the action of the bowing bird.

Moscow engineer E.G. Sparin, following Maxwell and Tsiolovski, proposed a new device. He used two thermally-insulated tubes 100 meter high and installed vertically. One tube is filled with hydrogen, the other with radon. The temperature of the upper ends of the tubes will differ by 11 degrees C. Taking advantage of this difference in temperature, one can generate energy. In this case the energy will be absorbed from the lower layers of gas which is in thermal contact with the ground. Again, this is not a closed system.

Another method of use ("concentration" according to F. Engels) of dissipated energy can be based on the feature of some non-linear capacitors to change their capacity depending upon the value of the electric field. In particular, capacitors can increase capacity with increase in the electric field while being charged. When being discharged (field decreasing) the capacitor gives up all the energy previously stored and adds additional energy. The source of the additional energy is from

the environment and is related to the hysteresis of the charge-discharge cycle as shown in Fig. 1. Although this energy addition is small, it has been shown that with some dielectrics this energy addition can reach 20%. If one assembles an oscillating chain of such capacitors, and uses 1,000 watts to power the device, it is claimed that a self-sustaining system can be made which will provide 200 watts to an external load! The explanation is that the capacitor will cool and will pump thermal energy from the environment. Again, it is evident that there is no violation of the Second Law because such a system is not a closed system. The fuel cell which provided power in spacecraft such as Apollo and Gemini can also work with efficiencies higher than 100% at the expense of the environmental heat.



Another example: Place a plate of actively conducting semiconductor into a gap of a magnet with beveled poles. If the plate is perpendicular to the magnetic field, the electrons moving in the plane of the semiconductor plate will deflect due to the magnetic field gradient. The concentration of the electrons will become different at the edges of the plate as shown by the electric potential. When this potential is connected to a load, power will be delivered to the load at the expense of energy from the environment and the plate will cool.

In all these devices there is a common feature: they get colder by themselves, which means that they are capable of using energy from the environment. The result is the process of absorption of low-potential environmental heat. We may conclude that the Second Law of Thermodynamics can be considered a valid universal Law of Nature as long as we deal with closed systems. From a practical sense, the earth's utilization of the Second Law of Thermodynamics, without detailed analysis of the conditions envolved should be excluded. [For example, any large hydroelectric dam with generators violates the Second Law depending on how you define the boundaries of the system.]

It is now evident that nothing actually prohibits extraction of energy from the environment, concentrated by means of known (or still to be invented) systems which will use gradient force fields or nonlinear features of matter. It is already recognized that nonlinear physics is a new physics but still "terra incognita" for the time being. Nature has long been observing our attempts to solve the energy problem. Nature knows that sooner or later mankind will find a method to take advantage of the available oceans of energy.

Reference:

N.E. Zaev (Moscow), Selected writings from *Journal of Russian Physical Ideas.* This article is, to some extent, a summary of Zaev's articles and inventions.

[I have been trying for several months to track down the writing of Zaev and have finally succeeded with the help of Frolov and Gorychev. Note that Zaev's explanations do not rule out tapping space energy. This paper is an important contribution to free energy. --Editor]

G. LETTERS FROM OUR READERS

LETTER FROM EDWARD LEWIS

When I first learned about the phenomena called "cold fusion" in March or April of 1989, I was looking for evidence of the recent production of significant anomalies of the quantum mechanics and relativity theories, contradictions of the basic ideas of Quantum Mechanics and Relativity theory which Einstein had formulated about 1905. This is because I was then developing a theory about the 80 year periodicity of revolutions in the development of science which would explain the "Kondratiev cycle," an approximately 40 to 60 year periodicity of economic depressionary periods in the economies of the capitalist countries that Kondratiev, a Russian economist who lived decades ago, thought had occurred. I suspected that changes of science theory happened at 80 year intervals, 1905 Einstein, 1820 Faraday; and I was looking for the recent production of anomalies that occurs before such changes of theory during the times that Kuhn called "crisis periods." At that time, I figured that superconductivity which was discovered 3 years earlier was such an anomaly, but I was looking for others, and I thought that cold fusion was also such an anomaly.

Most of you who have been producing anomalous phenomena were born about 1935 or 1945, give or take some years, and learned and apprehended quantum mechanics and relativity

theories as you were growing up. You were born about the time that those in your parents' generation, such as Schwinger, Tomonaga, and Schroedinger, were substantially developing quantum mechanics theory. Your parents' generation was in turn born about 1905, give or take some years, which was when Einstein was formulating the fundamental ideas of quantum mechanics and relativity theories. There were three generations involved in the development and contradiction of the quantum mechanics and relativity theories. This 3 stage, generational development -- formulation of fundamental ideas of a new physics theory, development of theory, and experiencing of fundamental anomalies has recurred 6 times since 1506, when Copernicus formulated a fundamental physics theory. The three stages have taken about 80 years on average, between about 72 to 90 years in each case. The approximate timing of the pattern of the initial formulation of theory was, in my opinion, 1506 - Copernicus, 1582 - Gilbert, 1593 - Galileo, and 1595 - Kepler, 1664 - Newton, sometime about the years 1740 or 1747 Franklin, 1820 ~ Faraday, and 1905 - Einstein. Gilbert, Galileo, and Kepler more or less independently formulated similar theories because they resolved the same set of phenomena, the phenomena that contradicted or accorded with Copernican theory.

I have copies of an approximately 35 page, single space, paper in which I describe the patterns of the 80 year periodicity of the development of physics with much detail, the 80 year periodicity of technological change since 1790, and the approximately 40 year periodicity of economic depressionary periods in the lead technological economies since 1790 that is an economic effect of the scientific and technological development periodicity. There are two different kinds of depressionary periods that alternate -- during each change of technology and during the middle of each technological phase. I describe a theory to resolve these patterns, and include a graph and a plot.

[If interested contact Edmund Lewis at 4236 N. Kenmore, Apt. 312, Chicago, Illinois 60613.]

LETTER FROM DR. EUGENE MALLOVE

The recent "Cold Fusion Day" at MIT was a highly stimulating and rewarding experience for the 150 or more attendees, who spent all day January 21st listening to extraordinary presentations by a host of speakers. There were reports of experiments in "mainline" cold fusion --electrochemical experiments--as well as discussions of new directions, such as the Hydrosonic Pump, and anomalous effects from arc discharges underwater.

A most intriguing development was introduced by mechanical engineer Bertil Werjefelt from Hawaii, who discussed his multi-year experimental effort and his attempt to provide a theoretical explanation for what he claims to be "the extraction of energy from magnets and magnetic fields." His presentation revealed that Japanese scientists, at several major universities and corporations, have announced verification of his work.

Since Mr. Werjefelt believes that there may be a connection between cold fusion and these claimed electrical phenomena at the subatomic level, these materials are submitted to enhance understanding of the entire excess energy question. I suggest that you examine them with a completely open mind, because it is quite challenging and builds on the established thermodynamic work of others.

Sincerely, /s/ Eugene F. Mallove, Sc.D.

G. MEETINGS & MISCELLANEOUS

FIRST CALL

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June 19, 20, 21, 1996
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"The World Energy System: The Transition from Local, National, Regional, to Global Energy Philosophy"

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SPONSORS: Faculty of Engineering and Applied Science, Ryerson Polytechnical University and the Canadian Institute World Energy System, both of Toronto, Ontario, Canada.

DATES: Participation notice: June 30, 1995; Date to submit papers: December 31, 1995; Registration of participants: June 18, 1996; Conference: June 19-21, 1996.

For information contact the Canadian Institute World Energy System, 5 Strathgowan Crescent, Toronto, Ontario, M4N 2Z6 Canada, Tel: (416) 487-0479, Fax: (416) 489-4413, E-mail: WES@acs.ryerson.ca

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VIDEO TAPES OF MIT IAP COLD FUSION DAY

January 21, 2995
at Massachusetts Institute of Technology

ARE NOW AVAILABLE

Four (4) two-hour VHS video tapes are available as a set, or individually, which were only slightly edited from professionally taken video footage of the day-long IAP Cold Fusion session at MIT on January 21, 1995. The tapes include the following material;

TAPE #1

Dr. Eugene F. Mallove (Cold Fusion Technology, Concord, NH)
"Cold Fusion and New Energy Technology - An Overview"

Dr. Peter Graneau (Northeastern University Center for Electromagnetic Research)
"Anomalous Forces in Water Plasma Explosions"

TAPE #2

Buford ("Ray") Conley (MIT, graduate student, Dept. of Aero/Astro Eng.)
"Light Water Excess Heat Experiments"

Fred Jaeger (ENECO, Salt Lake City)
"Patents and Commercialization"

Professor Peter L. Hagelstein (MIT Dept. of EE&CS)
"Cold Fusion: What We Know and What We Don't Know"

TAPE #3

Professor Peter Hagelstein - (CONTINUED from TAPE #2)
"Cold Fusion: What We Know and What We Don't Know"

Professor Keith Johnson (MIT Dept. of Materials Science and Eng.)
"Progress in the Theory of Excess Heat" ***and***
"Excess Heat" - The Movie, now being made by Hollywood!

James L. Griggs (Hydro Dynamics, Inc.; Rome, Georgia, USA
"The Hydrosonic Pump: Excess Power and Other Effects"

TAPE #4

Bertil Werjefelt (PolyTech (USA), Hawaii)
"Energy from Magnetic Materials and Magnetic Fields"

Dr. Eugene F. Mallove
Concluding Remarks

The tapes include the speakers' presentations as well as question and answer sessions. There is footage of the Hydrosonic Pump under test as well as closeup footage of rotor surface melting effects. Bertil Werjefelt shows footage of experiments in his own laboratory. There are scenes of Japanese researchers from Sumitomo, Hitachi, and other companies and universities now involved in their claimed extraction of energy from magnetic materials. These efforts are now said by these researchers to be proceeding toward commercialization. Actual experiments are seen in progress.

The tapes are VHS cassettes in NTSC format and range from 120 to 127 minutes each.

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NOTE: It is expected that a video tape of the Clean Energy Technologies, Inc. (Dallas, Texas) working Pons-Fleischmann-type cell based on James Patterson's U.S. patents and experiments will be available in the next several weeks. Please note your interest in receiving information about this tape.

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FUSION INFORMATION CENTER EXPANDS INTO THE FUTURE

In its continuing efforts to discover and report on cold nuclear fusion and enhanced energy devices, the Fusion Information Center (FIC) has made arrangements for the coming commercialization of new energy systems. FIC believes that commercialization is near, therefore, FIC has made arrangements to be involved in the privatization of an electric motor repair plant in Minsk, Republic of Belarus through a joint-venture business arrangement. At the present time this plant is state-owned but due to excellent management has not laid off any employees and has made modest profits each month.

Expansion for this plant include the manufacturing of brushless d.c. electric motors. These high-reliability motors will use the latest design for permanent magnet rotors and will be delivered with special controllers. In addition, the joint-venture plans to manufacture a new lanthanum-nickel rechargeable battery that has been developed by scientists in Minsk. This new battery technology will provide batteries having about 200 ampere hours of power per kilogram of battery weight. These are two products planned for manufacture beginning in 1995.

The third product is an on-board battery charger. This battery charger will be used to charge batteries in a variety of applications for the motors, controllers, and batteries of electric vehicles ranging from powered wheelchairs to electric automobiles. The power source for the battery charger is, as yet, unidentified. A cold fusion device or a new enhanced energy system that can obtain its power from the environment (including zero-point energy or space energy) may be the prime source of energy for the on-board battery charger. FIC believes that suitable technology is now in the laboratory stage. FIC wants to be ready with its manufacturing and marketing facilities to take advantage of the earliest available development that will provide the required power for its battery charger. "Meanwhile," says Hal Fox, the president of FIC, "we'll just have to plug in the battery charger for overnight charges."

FIC also announces that it has signed contracts for the further development of both brushless motor and new battery technology with two groups of scientists in Minsk. "The Republic of Belarus is an excellent place to do business," says Fox. "The people are highly educated, friendly, and willing to work hard to develop new industry. Past resistance from some government officials to privatization by capitalists has diminished. Most of the government officials now understand the benefits of privatization and the accompanying inflow of capital," he concludes. Fox has traveled twelve times to Belarus in the process of developing business and scientific contacts.