

FUSIONfacts

A Monthly Newsletter Providing Factual Reports On Cold Fusion Developments

ISSN 1051-8738

• University of Utah Research Park •

Copyright 1993

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

VOLUME 4 NUMBER 12

FUSION FACTS

JUNE 1993

CONTENTS FOR MAY 1993

A. THE SAME SUN FOR EVERYONE.....	1
B. THE ACCEPTANCE OF COLD FUSION.....	4
C. NEWS FROM THE U.S.....	5
D. NEWS FROM ABROAD.....	7
E. SHORT ARTICLES FROM READERS.....	11
An Elementary Model of Deuteron Behavior...	
By David Moon.....	11
Cold Fusion Makes French Headlines	
By Carol White.....	14
Gary Taubes Publishes!	
By Eugene Mallove.....	15
G. LETTERS TO THE EDITOR.....	19
Letter From Peter Graneau.....	19
Letter From Dana Rotegard.....	20
H. MEETINGS AND MISCELLANEOUS.....	20
IECEC Meeting.....	20
New York Conference.....	21
4th International Cold Fusion Conference.....	21

It is rumored that when Pythagoras discovered his famous theorem, in gratitude he sacrificed a hecatomb (100) of jackasses as thanksgiving to the gods. Ever since, when a new truth is discovered, all the jackasses run scared, braying loudly.

(slightly revised fable)

**** SPECIAL SUBSCRIBERS NOTICE PAGE 22 ****

A. THE SAME SUN FOR EVERYONE

By Vasily Yakovenko

EDITOR'S INTRODUCTION -- The following address was given by a Belarussian patriot who, at the time of his first actions to the Chernobyl blowup, was in risk of his life for implied criticism of the ruling elite under the Soviet Communist regime. The Chernobyl disaster occurred on April 26, 1986. This address discusses some of the effects of that greatest of all human-engineering disasters.

No greater reasons can be found for the strong support of the development of benign alternative energy systems than to prevent humanity from ever again being at risk for such massive human suffering. The personal impact these facts made on me has engendered a rededication of my efforts to help in promoting the research, development, commercialization, and installation of new, clean, energy systems. As the citizens of Belarus have found, and in a minor fashion, as cold-fusion researchers have found, **you can not depend on national governments to make the proper decisions on behalf of the citizens of their nations!**

[Address delivered as part of the opening session of the International Conference on "Possibilities of Ecologically Clean Energy Production and Energy Conservation", Minsk, Republic of Belarus, May 25, 1993.]

Ladies and Gentlemen,

Hosts and hostesses, who invite guests to their house, usually acquaint them with their families, relations, and home. So let me share with you facts about Belarus (White Russia). Ten million, three-hundred thousand people live in our damaged Ecological House in White Russia. This population is about equally distributed in towns and villages, occupying an area of about 207,600 square kilometers. The exception is the city of Minsk, which is turning into a megalopolis where about one-fourth of the total population lives.

As is known, the Gomel region (near the south-eastern part of Belarus) has become much less populated, and as for the Chernobyl 30-kilometer zone, it has become entirely depopulated [due to the Chernobyl disaster.]

Our people have good, easy-tempered dispositions, and they are noted for their diligence and warmheartedness. [The White Russians are renown for their "Southern hospitality".] The Belarussians are one of the branches of the Slavs occupying the central part of eastern Europe. We appear to find ourselves in a kind of a buffer zone, on the border between the West and the East, where storm clouds have gathered, thundered, and blazed.

I am not sure if one can get used to misfortunes. However, the Belarussians, my forefathers, endured a lot. These people, who have never first assaulted anyone, nevertheless could prove their right to this land. But this buffer zone was densely dug with trenches during the First World War, and during the Second World War, it was ploughed over with tank treads, bombs, and artillery shells.

During the Second World War, Belarus lost every fourth person. If judged by the damage caused to our people, Chernobyl can be regarded as belonging to the category of the war-like hard times. With all the damage caused by the Chernobyl disaster, it will require 16 total annual national budgets of our country to cope with this disaster. These calculations of costs are conservative, not all remedial action that may be required is taken into account.

Today, on the pages of the Belarussian press, and on other media, one constantly sees the figures for the number of victims, the number of those unprotected citizens who were in the fallout zone and who were exposed to life-threatening radiation. These victims also make up about one fourth of the population of Belarus. Are these figures honest or exaggerated? These figures were defined at the time when the truth about Chernobyl was still concealed. People became used to these numbers much as one often gets used to a repeated lie.

In fact, the majority of the population in Belarus were exposed to iodine and suffered from other kinds of ionic radiation during the first days of the explosion at the Chernobyl Atomic Power Station. In the months and years following the disaster, actually all of the population were constantly and inevitably irradiated from the inside through the contaminated foodstuffs stored in the Chernobyl zone. These products -- meat, butter,

cheeses, milk, as well as fodder, timber, and peat were distributed all over the republic. Some radiation continues to spread.

In this situation, the eviction of the population from the contaminated areas to new lands (by now about 100,000 people have already been evacuated) looks rather like a masquerade than real health care of the citizens by the Government.

The delays in formally notifying the people [about the radiation hazards], to the delays in rescuing them, resulted in a larger number of victims and to constant and lasting irradiation of many millions of our countrymen, both adults and children.

Nobody, at present, argues the fact that the human immune system is suppressed under this long-term exposure, even where the continuous radiation is relatively small. Specialists have proved that even small radiation doses have a damaging effect on the human genetic system. It is now time to ask: "What shall we have in the near future caused by such a mass national impact of small radiation doses?" "What will it result in -- in terms of life expectancy, human ailments, and long-term health?"

Before Chernobyl, very few cases of thyroid cancer were recorded among children -- only about 4 cases over a 17-year period. After the Chernobyl disaster -- 200 cases have been observed in just 7 years. Similarly, endocrine gland illnesses, as well as stomach diseases, have become frequent.

I have no desire to scare anyone, but the facts are that health is still being damaged in our ecological house. **In our large family population only 8% of the children are now healthy. To have any reasonable development of our society, we must ensure that at least 52% of our children are healthy.** We have also observed a reduction in live births. Our economic crisis is worsening (due to having to deal with such a disaster), and our energy crisis worsens. In summary, our prospects are getting worse.

It has taken the Belarussian Parliament and Government four years to admit the global nature of the Chernobyl catastrophe. Now they see a way out of our present crisis in the power industry by constructing a new Nuclear Power Station. The government officials have been convinced that nuclear power is very effective and they are ready to approve such a source of power, even today.

Specialists who helped to prepare this conference are more restrained in their statements, and it is clear why. Our society is shocked [that nuclear power would be considered]. However, not all people realize the severity of the aftermath of the Chernobyl disaster.

Having studied the situation in these troubled times, the Board of the Socio-ecological Union "Chernobyl" made a decision to prepare and hold this international conference in Minsk to investigate more fully the essence of our problems, and look into the possibilities of other technical solutions for our problems -- solutions that will have the least risk for our long-suffering soil and people.

We were supported by scientists. The Belarussian socio-ecological movement could always be proud of being supported by honest scientists of principle.

It is probably worth while mentioning here that our movement was born within the walls of the Union of the Writers of Belarus in 1987 and it has to its credit such long-awaited and major victories as the reappraisal of the land-reclamation conception in the Palesje area and stopping of the already started (by bureaucratic considerations) damming of the river Pripyat. We literally saved from the dashing knife of land-reclamation specialists 30 new areas, being prepared for drainage in the flood-lands of the river. By this we averted the trouble of turning the Polesje area into a sandy desert.

An obvious success of the socio-ecological movement is preventing the Zapadnaya Dvina areas from being flooded for the purpose of making an artificial storage lake there (just like the foul Kiev storage lake) and stopping the construction of the second line of the Ignalinsk Nuclear Power Station on the border of Belarus and Lithuania. And these are only the major achievements of our efforts.

At the sources of the socio-ecological movement there were such writers as L. Karaichev, A. Kozlovich, I. Novikov, Ya. Parkhuta, A. Petrashkevich, and T. Chaban. They were also supported by A. Adamovich, V. Bykov, V. Kazko, B. Sachenko and others.

Since the end of 1988, our movement has literally dismantled the blank wall of secrecy of the totalitarian regime in the Chernobyl affairs. And at last it made public the facts of mass ailments of the children as well as the whole population of the zone. **The authorities and the then ruling communist party were in fact silently destroying their own countrymen.**

The movement influenced the oligarchic ruling clique in different ways: by sharp public debates, scientific and practical conferences and meetings, and naturally, with the help of writers' articles in the mass press (they succeeded sometimes in publishing articles, overcoming a large amount of obstacles). We applied to the highest legal authority in the USSR as well as of Belarus with documents manifesting the crimes of some top official before the people. As a result of our efforts since February--March 1989, there has now started a period of disclosing secret diagrams of the radioactive contamination of the territory and other Chernobyl-related materials. Thus a spring of glasnost in the Chernobyl area has begun, the area that has grown black with people's grief.

At the cost of incredible efforts with the totalitarian regime putting obstacles in our way, we managed to set up first the Belarussian Ecological Union and then the Socio-ecological Union "Chernobyl," which has been open and publishing the interrepublic newspaper "Nabat" for about three years.

Of late we have worked together with the Socio-ecological Union (Moscow), the Ukrainian ecological association "Zeleny svit," the Center for Citizen Initiatives (California), the Movement for Help to Chernobyl (Japan). We are also supported in our work by our fellow countrymen from abroad.

The strategy and tactics of our movement are uniting the efforts of creative intelligentsia, independent and sober-minded scientists and specialists, forming our independent views, conceptions, programs and appealing to public opinion.

That is why we are proud of the active participation in the present International May conference of the well-known specialists from the USA, France and other countries as well as leading scientists and specialists from our Republic and from the CIS.

The prospects for ecologically clean energy and energy conservation will be under discussion at the conference.

I wish every success to this representative forum. All the world is interested in our success.

Vasil Yakovenko
President of the Socio-ecological Union "Chernobyl"
Editor-in-Chief of the newspaper "Nabat"

B. THE ACCEPTANCE OF COLD FUSION

By Hal Fox

The following recent events demonstrate the increasing worldwide acceptance of cold fusion and other enhanced energy systems:

The Japanese Diet approves the funding requested for "New Hydrogen Energy" research. The funds approved, together with funds that are expected to be provided by Japanese industry, comes to an estimated \$50 million for cold fusion R&D over the next four years in Japan.

At the other end of the economic spectrum, the Republic of Belarus, through the Belarussian Academy of Science, has shown the foresight to provide modest funding for cold fusion.

The recent "International Symposium on New Energy" (Denver, April 16-18, 1993) and the international conference "Possibilities of Ecologically Clean Energy Production and Energy Conservation" (Minsk, Belarus, May 25-27, 1993) both had excellent sessions devoted to advances in cold fusion. [The Minsk conference papers are reviewed in this issue.]

The U.S. magazine, *Popular Science* will have an article in its August, 1993 issue on cold fusion.

In France, the peer-reviewed journal, *Physics Letters A*, the French newspaper *Le Figaro*, the French newspaper *L'Express*, and the French television have all had recent favorable articles on cold fusion. In addition, the English-language newspaper, *International Herald Tribune* has also had favorable cold-fusion articles.

In the U.S. the Congressional Energy Subcommittee provided a favorable audience for the presentation of factual information on the advances made in cold fusion. The hot fusioners who were making presentations at the same Hearing (May 5, 1993) were not pleased.

In contrast, Dr. Richard L. Park, Executive Director of the American Physical Society writes a highly negative, unprofessional, scurrilous message for a computer bulletin board about Pons and Fleischmann. In the later half of 1989, many scientists were willing to accept the word of experts (such as Dr. Park) who proclaimed that cold fusion could not be true science and therefore must be bad science or fraud. **There is no longer any reputable scientist who has been studying the cold fusion literature who would be willing to proclaim**

that cold fusion is a fraud. By contrast many scientists, far more experienced in electrochemistry and calorimetry than Richard Park, have replicated and advanced the original work of Pons and Fleischmann. Many of these scientists have allied themselves (or are seeking to do so) with foresighted business professionals who are laying the business groundwork to commercialize this new science of cold fusion. [See the letter from Minnesota from Dana Rotegard on page 20.]

New cold fusion devices are not the only enhanced energy devices that are approaching commercialization. The recent "International Symposium on New Energy" and the associated retreat has provided a new impetus for the development of devices that appear to be tapping the energy of space. If you have believed that cold fusion seems to be contrary to current scientific understanding, you may find that obtaining energy from space strains credibility.

Several recent articles have suggested that the Michelson-Morley experiment (wherein it was determined that light travels at the same velocity in the direction of the earth's motion and perpendicular to the earth's motion) was flawed, and that the experiment as performed could not have determined the presence of an ether. If these assertions are true then it means that for almost a century science has been denied (by unbelief) access to a potential very large reservoir of energy -- the energy of space.

Some of the many anomalous phenomena observed in the many differing types of cold fusion devices may be found to be related to space energy. Here is the rationale: The enormous energy in space is characterized by being detectable (sensed or measured) only from an accelerated frame of reference and not from a fixed frame of reference. Accelerated frames of reference include rotational motion (even the electron shells orbiting around a nucleus), toroidal motion, and motion of a charged particle in an electromagnetic field. Such motions, to the extent that such a particle in accelerated motion can couple with space energy, may be the source of some excess energy that has been observed in some of the cold fusion experiments.

From the point of view of the engineer, it is not necessary to understand the theory of cold fusion, or of zero-point energy. The engineer need only be shown a replicable and reliable source of energy and his/her skills can be used to design and create commercial devices. Cold fusion now enjoys that state of advancement

wherein usable heat is being produced on demand and on a daily basis. For example, parameter studies are now underway to determine more optimal designs of cold fusion electrochemical cells so that the amount of output power (as a ratio of input power) is increased.

In previous papers, we have defined that a device producing an output of 300% excess power is a candidate for commercialization. Several different cold fusion devices, in addition to the classical Pons-Fleischmann cells are now producing over four times the input power. With some optimization, commercial design efforts, and longevity studies, these newly designed devices are expected to become production prototypes for early commercial applications.

Regardless of the Richard L. Park types in the world, the four-year-old new science of cold fusion has not been, and will not be dismissed by offhanded comments by those ignorant of the extensive peer-reviewed literature. Similarly, there will be a continued development of addition sources of energy, that will likely also be assailed by those who treasure an unchanging science. For the rest of us, to whom science is characterized by discovery and change, we will be applauding the restoration of our home planet by the gradual replacement of fossil-fuel-derived energy systems by cold-fusion and other enhanced-energy systems.

C. NEWS FROM THE U.S.

CALIFORNIA - LANT MODEL

Robert T. Bush (Dept. Phys., Cal Poly, Pomona, California), "Towards a Solid State Nuclear Physics: The LANT Model (Lattice-Assisted Nuclear Transmutation) for Cold Nucleosynthesis," preprint, to be published in *Fusion Technology* later this year.

AUTHOR'S ABSTRACT

The LANT Model (Lattice-Assisted Nuclear Transmutation) for so called 'cold fusion' is a synthesis of the author's new TRM Model (Transmission Resonance Model) and CAF Hypothesis (Cold Alkali Fusion). The important subcase L.A.N.T. (lattice assisted nucleon transfer) is treated: Proton transfer and neutron transfer are compared employing recent data correlating elemental and isotopic abundance shifts with excess heat in light water-based electrolytic experiments. Two separate mass spectrographic studies, one a SIMS

analysis and a second one, which involved a chemical separation of rubidium and strontium via an ion exchange column, coupled with the LANT Model and nuclear structure considerations provide strong evidence for the creation of an entire cold nucleosynthetic series consisting of isotopes of SR, Zr, Y, Nb, Mo, Bu, Tc, Rh, Pd, Ag, Cd, In, and Sn in connection with the production of excess heat by an electrolytic cell employing a nickel mesh cathode and a light-water based rubidium carbonate electrolyte. The total energy release of $(3.8 \pm 0.4) \times 10^{19}$ MeV associated with the production of isotopes in the cold nucleosynthetic chain is found to be in good agreement with the measured excess heat for the light water cell of $(4.0 \pm 0.8) \times 10^{19}$ MeV; i.e. (6.4 ± 1.3) MJ. Similar cold nucleosynthetic series based upon the alkali nuclides of sodium, potassium, and cesium are hypothesized, with that for potassium suggesting a nuclear solution to the Mills-Bush controversy. A "principle of lattice-assisted nuclear reactions" is hypothesized as a natural extension of the LANT Model. Hypothetical consequences of LANT are proposed in connection with the treatment of radioactive waste, the manufacture of useful stable isotopes, the earth's internal heat, the sun's power production, and the solar neutrino problem. LANT, if correct, provides the basis for an essentially new field of science; viz., Solid State- and Fluid-State Nuclear Physics.

CALIFORNIA - COLD FUSION REVIEW

Dana Rotegard (edited by Mark Goldes, AESOP Inst.), "Cold Fusion," *Solar Mind and EV News*, no 14, winter 1992, pp 3-4.

EDITOR'S REVIEW

This short article reviews the history of cold fusion, its rejection, politics, replication, the scientific journals that continue to publish its research, and the scientists that have made some of the most important advances. The support of cold fusion research in several countries and its early possible commercialization (with Japan at the forefront) are also discussed, and the announcement of a prototype cold fusion space heater this year is mentioned. One point made is that members of the current administration in Washington need to be careful what the science advisors are telling them about cold fusion, since in the past, some of their information has been inaccurate (attack or ignore, for instance). In view of worldwide success in research, the last paragraph states, "Leonardo da Vinci once made the comment that

'there are those that see, some can be shown, some will not see.' Many cold fusion critics are clearly in da Vinci's third group."

This issue of *Solar Mind and EV News*, on page 5, also reviewed the report by Jerry Bishop (staff reporter of the *Wall Street Journal*), "More Labs Report 'Cold Fusion' Results, Scientists are Unsure as to Why Heat is Generated," from the *Wall Street Journal*, Monday October 19, 1992. Bishop's article was positive in the respect that it pointed out some of the most successful researches and results, but still questioned if this could be a fusion reaction, especially in view of the light-water experiments that have given such a high return of energy. Five different light-water researches are mentioned, but none of them are quoted as having a theory as to the mechanism behind the excess heat results.

CALIFORNIA - PEER-REVIEW PROBLEMS

Courtesy of Dr. Miles

Dr. Melvin H. Miles (Naval Air Warfare Center, China Lake, CA) and friends have an elegant experiment that proves that hydrogen-4 is a byproduct of the successful operation of a Pons-Fleischmann type of cold fusion electrochemical cell. The paper of Miles et al. was recently rejected by the *Journal of Physical Chemistry*. The paper was submitted for peer review. Although this work by Miles et al. is one of the most important experimental works in cold fusion, three of three "peer-reviewers" made the judgement that it should not be published in the journal.

Miles writes, "...scientists in this field are being criticized for the fact that only a few journals will publish positive papers relating to anomalous effects in deuterated metals. This situation can only be corrected by the commitment of the editors of the various journals to scientific objectivity."

[Peer-review decisions should not be made for political purposes, such as the fear of loss of funding from DOE.]

COLORADO - BRANCHING RATIOS

Chemical Abstracts, 17 May 1993

F.E. Cecil, H. Liu, J.S. Yan, G.M. Hale (Dept. Phys., Colorado Sch. of Mines, USA), "Measurement of

Branching Ratios of Low Energy Deuteron-induced Nuclear Reactions on Deuterium, Lithium-6, and Boron-10," *Phys. Rev. C: Nucl. Phys.*, 1993, vol 47, no 3, pp 1178-1183.

AUTHORS' ABSTRACTS

We have measured the branching ratios ${}^2\text{H}(d,p){}^3\text{H}/{}^2\text{H}(d,n){}^3\text{He}$, ${}^6\text{Li}(d,p){}^7\text{Li}/{}^6\text{Li}(d,\alpha){}^4\text{He}$, and ${}^{10}\text{B}(d,p){}^{11}\text{B}/{}^{10}\text{B}(d,\alpha){}^8\text{Be}$ between c.m. energies of 3 and 15 keV, 20 and 135 keV, and 58 and 142 keV, respectively. These measurements of the ${}^2\text{H}-d$ reaction are in good agreement with *R*-matrix calculations of the branching ratio. We find no enhancement of the (d,p) branches of these reactions at the lowest observed energies. Implications of these findings to recent claims of anomalous production of heat from deuterium-metal systems are presented.

NEW JERSEY - CONTROLLING QUANTUM DYNAMICS

Warren S. Warren, Herschel Rabitz (Dept. Chem., Princeton Univ., New Jersey) and Mohammed Dahleh (Dept. Mech. Eng., U.C.S.B., California), "Coherent Control of Quantum Dynamics: The Dream Is Alive," *Science*, vol 259, 12 March 1993, pp 1581-1589, 51 refs, 4 figs.

AUTHORS' ABSTRACT

Current experimental and theoretical progress toward the goal of controlling quantum dynamics is summarized. Two key developments have now revitalized the field. First, appropriate ultrafast laser pulse shaping capabilities have only recently become practical. Second, the introduction of engineering control concepts has put the required theoretical framework on a rigorous foundation. Extrapolations to determine what is statistically possible are presented.

AUTHORS' INTRODUCTION

Since the early days of quantum mechanics, an implicit dream has been the desire to manipulate and control quantum-mechanical phenomena. This dream crystallized into an active pursuit with the development of the first high-power pulsed lasers in the 1960's. The objectives were focused toward manipulating events at the molecular scale. Special emphasis was given to the goal of selectively breaking bonds in polyatomic

molecules, as this capability could, in principle, significantly improve chemists' ability to build and otherwise alter complex molecular frameworks with high specificity. With this objective in mind, a flurry of activity ensued, extending over some 30 years, by chemists and physicists attempting especially to selectively break one bond versus another in polyatomic molecules, using a variety of laser sources. The basic approach seemed simple: identify the local mode frequency associated with the targeted bond, then pump intensely with a laser tuned to that frequency until the bond breaks.

UTAH - COLD FUSION COMMERCIALIZATION

Hal Fox (Editor-in-Chief of *Fusion Facts*), "The Number and Types of Cold Nuclear Fusion Devices and Suggested Uses," presented at the "Possibilities of Ecologically-Clean Energy Production and Energy Conservation" conference held in Minsk, Belarus, May 25-27, 1993.

AUTHOR'S ABSTRACT

Since the announcement of the discovery of **cold nuclear fusion** (March 23, 1989) researchers from over 25 countries have replicated and/or expanded on the creation of nuclear reactions involving hydrogen in the presence of a metal lattice. In addition to cold fusion effects from a lithium, palladium, heavy-water electrochemical cell, cold fusion effects have been expanded to light-water, alkali-metal electrolytes using a nickel cathode. Gas-loading experiments have expanded from deuterium, titanium-chips systems to the use of low-pressure deuterium gas in the glow-discharge region using moderately high voltages to achieve up to 500 percent excess heat. Other methods to achieve nuclear reactions include capillary cold fusion. In addition to cold fusion development there has been increased R&D activities involved in other enhanced energy devices. This paper reviews the several methods by which heat and other nuclear byproducts are produced in a variety of cold fusion devices and suggests some expected applications for a clean energy world. In addition, the paper briefly reviews some of the other enhanced energy developments in tapping space energy.

EDITOR'S COMMENTS

This review of the progress that has been made in the development of cold fusion was presented in a plenary session of the conference. This editor was pleased to be a presenter at this conference because there is no place on

earth where the damaging results of nuclear energy have been more devastating to human health. Belarus, although having minimal financial resources is supporting the development of cold fusion. Those of us who are dedicated to the improvement of this world's energy systems need have no greater goal than to provide alternate energy systems that will no longer destroy this planet and its inhabitants. See the lead article, this issue of *Fusion Facts*, beginning on page 1.

D. NEWS FROM ABROAD

BELARUS - SELF-VIBRATIONAL QUANTUM MECHANICS

A.V. Buliga (Belarussian Socio-ecological Union "Chernobyl", Minsk), "Possibilities of Self-Vibration Quantum Mechanics for Describing Cold Nuclear Fusion," presented at the "Possibilities of Ecologically Clean Energy Production and Energy Conservation" conference, Minsk, Belarus, May 25-27, 1993.

AUTHOR'S ABSTRACT

Possibilities of self-vibrational quantum mechanics developed earlier for describing cold nuclear fusion with excess energy release are discussed. Effect of superposition of certain quantum movement of hydrogen-like atoms and their classical movement, which is able to cause resonant self-vibrations of these atoms and reduce significantly their nuclear potential barriers and cold nuclear fusion, is easily justified in the framework of the proposed model.

BELARUS - COLD FUSION THEORY

V.A. Filimonov & E.N. Naumovich (Inst. of Physico-Chemical Problems, Minsk, Belarus), "Possibilities of Cold Fusion with a Positive Energy Balance," presented at the "Possibilities of Ecologically Clean Energy Production and Energy Conservation" conference, Minsk, Belarus, May 25-27, 1993.

AUTHORS' ABSTRACT

The model of synergetic activation of physicochemical processes in solids for highly non-equilibrium systems as applied to "cold" nuclear fusion of helium deuterium promotes a principal possibility for intense cold fusion

implementation in crystalline lattice of solids at usual temperatures, pressures and component concentrations.

BELARUS - SELF-ORGANIZING MATTER

Courtesy of S.P. Faile

V.A. Filimonov (Inst. of Physicochemical Problems, Belorussian St. Univ., Minsk, Rep. of Belarus, C.I.S.) "On the Probability of Cold Nuclear Fusion Implementation: Synergetic Hypothesis," *J. of Radioanalytical and Nuclear Chem.*, vol 162, no 1, 1992, pp 99-109, 36 refs, 2 figs, 1 table.

AUTHOR'S ABSTRACT

Self-organization of matter in non-equilibrium, deuterium-containing systems with dissipative structure formation and separation of subsystems, including atoms having equal excitation degree within them, leads to distortion of the Boltzmann atom distribution in the energy equation and to an increased probability of obtaining by deuterons a sufficient energy packet for nuclear fusion. Calculated intensity of cold fusion is equal to $1 \cdot 10^6$ original fusion events per 1 cm^3 in a second.

AUTHOR'S CONCLUSION

A fit of calculated and experimental cold fusion intensity values would be a decisive argument for the hypothesis given in this paper. However, calculation gives a number of original fusion events but chain fusion reaction is only possible in principle. Besides that, our calculations are based on the series of excitations of individual atoms and do not take into account both zone structure of energy levels and dissipative structure distribution in a quantity of atoms in them, which have to be expressed by a power function too. Incomplete-ness of subsystem separation process and geometry of the specimen, the surface-to-volume ratio must influence the CF intensity too. So real intensities of CF may differ from calculated values (from the proposed approximate model) for some orders of magnitude in both directions.

Nevertheless, the synergetic hypothesis of CF is the only one allowing: (1) to explain high CF intensities observed, and (2) to indicate causes of poor reproducibility of CF and ways to improve it.

BELARUS - CHAIN REACTION POSSIBLE

Courtesy of S.P. Faile

V.A. Filimonov (Inst. of Physicochemical Problems, Belorussian St. Univ., Minsk, Rep. of Belarus, C.I.S.), "Cold Nuclear Fusion: Feasibility and Methods of Realization," *Zh. Tekh. Fiz.*, vol 62, no 6, 1992, pp 219-222, in Russian.

AUTHOR'S ABSTRACT

An attempt was made to detect whether there is agreement between the experimentally observed and calculated values of nuclear cold fusion intensities. However, if one calculates that a number of primary fusion events occur, then the intensity of the latter will depend on a geometric factor and, in principle, a chain reaction of nuclear cold fusion is possible. The ratio of the sample volume V_{sample} to the area of its surface is this geometric factor, and it can exceed many times the values presented in a tube, i.e. the parameters of the cold fusion process during self-organization of a substance in a D-Pd nonequilibrium.

FRANCE - CALORIMETRY STUDY

Courtesy of the authors

Martin Fleischmann (Dept. Chem., Univ. of Southampton, UK) and Stanley Pons (IMRA EUROPE, Sophia Antipolis, Valbonne, France), "Calorimetry of the Pd-D₂O System: From Simplicity via Complications to Simplicity," *Physics Letters A*, vol 176, 1993, pp 118-129, 10 refs, 12 figs.

AUTHORS' ABSTRACT

We present here one aspect of our recent research on the calorimetry of the Pd-D₂O system which has been concerned with high rates of specific excess enthalpy generation ($> 1 \text{ kW cm}^{-3}$) at temperatures close to (or at) the boiling point of the electrolyte solution. This has led to a particularly simple method of deriving the rate of excess enthalpy production based on measuring the times required to boil the cells to dryness, this process being followed by using time-lapse video recordings. Our use of this simple method as well as our investigation of the results of other research groups prompts us to present also other simple methods of data analysis which we have used in the preliminary evaluations of these systems.

EDITOR'S COMMENT

Regardless of the results of the latest Fleischmann and Pons report, which also includes pictures of the boiling

electrolyte, Robert L. Parks of the American Physical Society posts the following from his computer (May 28, 1993): "Do you ever miss Fleischmann and Pons? Well, they're back. They still can't seem to get the hang of calorimetry. And the editor of *Physics Letters A* would not allow them to use the word 'fusion,' but they continue to claim that 'explanations in terms of chemical changes must be excluded.' That much is probably true--which leaves error and fraud. A good case can be made for both. They are still trying to use an open system, which they justify with a column warning about 'possible consequences' in closed systems. This is powerful stuff! Meanwhile, an Italian newspaper referred to F&P as 'scientific frauds,' which it compares to 'fornicating priests.' They are suing the paper."

After four years of replication and publication in peer-reviewed journals from over 200 labs in over 30 countries, it is amazing that any competent scientist, especially an officer of a scientific organization, could be so perennially misinformed.

ITALY - COLD FUSION CONFERENCE

On Wednesday, June 9, 1993, *21st Century Science and Technology* sponsored a conference entitled, "Cold Fusion -- the status of research -- research in Italy." Participants included Francesco Celani, Romano Cipollini, Daniele Gozzi, Giuliano Preparata (all of various Italian universities' cold fusion labs) and Evanthia Frangou Lupini, engineer and journalist, *21st Century Science and Technology*. We will have a report from this conference next month.

ITALY - SHADOW FUSION

Chemical Abstracts, 17 May 1993

A. Scalia (Dip. Fis., Univ. Catania, Italy), "'Shadow' Properties in Sub-barrier Fusion," *Phys. Rev. C: Nucl. Phys.*, 1993, vol 47, no 3, pp 1247-1250.

AUTHOR'S ABSTRACT

At energies below the Coulomb barrier the fusion process can be described as the shadow of the Rutherford scattering, but at very low energies it is not valid. However, if we define an effective Coulomb potential, the fusion can be described as the shadow of the elastic scattering relative to this effective potential. Then light

systems at very low energy show an anomalous behavior and the effective Coulomb potential is a way to describe it.

JAPAN - FUSION IN DENSE PLASMAS

Chemical Abstracts, 17 May 1993

Setsuo Ichimaru (Dept. Phys., Univ. Tokyo, Japan 113), "Nuclear Fusion in Dense Plasmas: Supernovas to Ultrahigh-pressure Liquid Metals," *Teubner-Texte Phys.*, 1992, vol 26 (Physics of Nonideal Plasmas), 20 refs, pp 269-277.

AUTHOR'S ABSTRACT

This review begins with classifying nuclear reactions in 3 elements: binary processes, few-particle processes, and many-particle processes, and thereby elucidates the special features for the nuclear fusion in dense plasmas. These analyses are then applied to estimation of the nuclear reaction rates in specific examples of the dense plasmas, namely, ^{12}C - ^{12}C reactions in a white-dwarf progenitor of supernova, p-p reactions in the solar interior, d-d reactions in PdH_2 , and p-d or p- ^7Li reactions in pressurized liquid metals. The special role that the many-particle processes play in dense plasma is highlighted and the similarity between nuclear reactions in supernovas and those projected in the ultrahigh-pressure liquid metals is particularly emphasized.

ROMANIA - SURFDYN CONCEPT

Peter Glück (Cluj-Napoca, Romania), "The Surface Dynamic Concept -- Basis for a Reproducible Cold Fusion Process," presented at the "Possibilities of Ecologically Clean Energy Production and Energy Conservation," Minsk, Belarus, May 25-27, 1993.

AUTHOR'S ABSTRACT

The key to the technological future of cold fusion is the achievement of a completely reproducible process. The SURFDYN concept, introduced by the author, has stated that the nuclear phenomena take place on the surface of some metallic hydrides in very restricted areas and are triggered by the surface dynamics. Cold fusion represents an extreme case of heterogeneous catalysis in accord with the principles of Gryaznov et al. On this basis, a rational explanation for the problems of reproducibility and an efficient way for the development of the field can be found.

RUSSIA - CATHODE IMPURITIES

Yan R. Kucherov, A.B. Karabut, I.B. Savvatimova (Scientific Industrial Assoc. "Luch", Podolsk, Russia), "Impurities in Cathode Material and Possible Nuclear Reaction Mechanisms in a Glow Discharge," Manuscript from author, 5 pages, 4 refs.

AUTHORS' ABSTRACT

Experimental results of impurity concentration measurements in a palladium cathode by different methods before and after deuterium glow discharge experiments are presented. The anomalous appearance of elements which could not be found in the discharge environment can be seen. An attempt to understand this situation on the basis of fission and fusion in the Pd-d system is presented.

AUTHORS' CONCLUSIONS

By assuming that mechanisms to overcome nuclear barriers exist, fusion and fission reactions for which conservation laws are fulfilled are taken into account. The analyses of the impurities, which appeared in pure palladium after glow discharge experiments, can be correlated with predicted elements. The given results are still preliminary, difficult to call final, but if in the future they are confirmed on the basis of larger statistics, they will require a new approach to the problem [of explaining cold fusion]. This will also initiate the search for long-lived resonances of nuclear shells of Pd and other elements, excited by inelastic scattering of discharge ions (analogous to the laser effect).

RUSSIA - BRONZE CRYSTAL FUSION

A.L. Samgin, (Inst. of High-Temperature Electrochemistry RAN, Ekaterinburg, Russia), "Influence of Electrochemical Treatment of Single Crystals on Reproducibility of Nuclear Reaction Implementation Under Reaction of Deuterium with Sodium-Tungsten Bronzes," presented at the "Possibilities of Ecologically Clean Energy Production and Energy Conservation" conference, Minsk, Belarus, May 25-27, 1993.

AUTHOR'S ABSTRACT

It is shown that using a new electrochemical method of sodium-depleted layers in sodium-tungsten bronze single-crystal specimens promotes enhanced neutron emission. The method is anodic treatment of single-crystals in 1N sulfuric and water solution electrolyte instead of anodic treatment in vacuum at high temperatures. As a result,

conditions of reproducible nuclear reaction implementation during the interaction of deuterium with sodium-tungsten bronzes are satisfied.

RUSSIA - GLOW DISCHARGE HEAT

A.B. Karabut & Irina B. Savvatimova (SRI Scientific & Industrial Assoc., LUCH, Podolsk, Russia), "Study of Excess Heat Release in the Case of Glow Discharge Deuterium Gas," presented at the "Possibilities of Ecologically Clean Energy Production and Energy Conservation" conference, Minsk, Belarus, May 25-27, 1993.

AUTHORS' ABSTRACT

Experimental results of the heat balance study of dynamical calorimetry method in the case of glow discharge in deuterium medium with palladium cathode are presented. A significant excessive heat release was observed at approximately 50 percent of experiments. The largest extra heat values reached up to 500 percent. Stable correlations between extra heat release and nuclear radiation production was noted. Control runs in protium (proton) media produced neither excess heat nor nuclear radiation. The nuclear reaction mechanism is still not clear.

RUSSIA - NEUTRON EMISSION

B.V. Lyakhov, A.G. Lipson, D.M. Dakov, B.V. Deryaguin (Inst. for Physical Chem., Moscow, Russia), "Reproducible Anomalous Heat Release of Non-nuclear Nature and 'Cold Fusion' in Pd/PdO Heterostructure Saturated with Hydrogen (Deuterium), An Electrochemical Method," presented at the "Possibilities of Ecologically Clean Energy Production and Energy Conservation" conference, Minsk, Belarus, May 25-27, 1993.

AUTHORS' ABSTRACT

Anomalous pulse heat release in Pd/PdO heterostructure saturated with hydrogen (deuterium) was found. Reproducibility of the effect is very high. Neutron emission was detected in the same experiments, but there was no temporal correlations between neutron emission and extra release [of heat].

RUSSIA - C.F. WITH LIGHT IMPURITIES

S.A. Tsvetkov (Sverdlovsk Branch of SRC INF for Energy Technique, Zarechnyi, Ekaterinburg Region,

Russia), "Initiation of Cold Fusion by Light Impurities," presented at the "Possibilities of Ecologically Clean Energy Production and Energy Conservation" conference, Minsk, Belarus, May 25-27, 1993.

AUTHOR'S ABSTRACT

A new approach to the cold nuclear fusion phenomenon based on deuterium interaction with light impurities is considered. Experiments carried out by other authors are analyzed from the indicated point of view. Results of evaluational experiments on enhanced frequency and magnitude of detected neutron pulses are presented.

UKRAINE - VARIOUS EMISSIONS

P.I. Golubnichy (Lugansk Mechanical Engineering Inst., Ukraine), "Fundamental and Applied Aspects of Cold Fusion: Correlations and Experiments in the Field and Modeling," presented at the "Possibilities of Ecologically Clean Energy Production and Energy Conservation" conference, Minsk, Belarus, May 25-27, 1993.

AUTHOR'S ABSTRACT

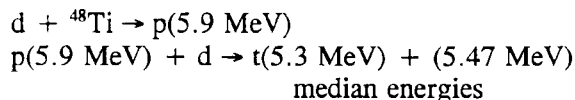
Special correlation experiments' results obtained using a high-effective automatic measuring and computing complex are shown. The experiments were made using different types of deuterated solid "nuclear" targets to establish some temporal and magnitude correlations between fast and slow neutrons, X-ray, beta, gamma, and also electromagnetic and acoustic emission detector signals. Results are discussed from the point of view of conventional cold fusion models.

E. SHORT ARTICLES FROM READERS

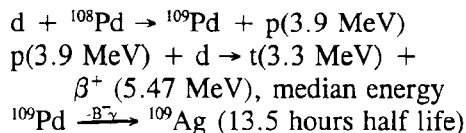
An Elementary Model of Deuteron Behavior in Deuterium-loaded Titanium or Palladium That May Account for Cold Fusion Phenomena

By David Moon

In cold fusion, data from a variety of very carefully performed experiments--verified and confirmed by many able scientists--have virtually established the reality of nuclear events occurring inside deuterated palladium and titanium metals. For example, data from charged-particle emissions, when titanium foil was implanted with deuterons at 350 eV (Naval Research Lab Memorandum Report 6927, G. Chambers et al.) is compelling and supports the occurrence of the following reactions:



Similar reactions are proposed to occur in deuterated palladium:

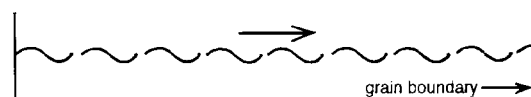


The decay of ${}^{109}\text{Pd}$ to ${}^{109}\text{Ag}$ can account for isotopic transmutations where abundance of silver in spent Pd electrodes has increased. Also, autoradiographs of Pd versus Ti targets at BARC (M. Srinivasan et al.) were, "unlike the deuterated titanium targets, the intensity of the fogging of the deuterated palladium foils reduced very rapidly" (*Fusion Technology*, vol 18, Aug. 1990, p. 83) can be explained by the decline in "perceived tritium" produced by ${}^{108}\text{Pd} \rightarrow {}^{109}\text{Ag} + \beta^-$.

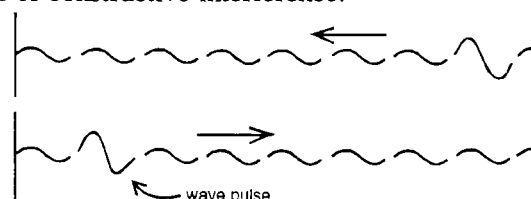
COHERENT DEUTERONS

For the reaction, $d + {}^{108}\text{Pd} \rightarrow {}^{109}\text{Pd} + p(3.9\text{MeV})$, the normal threshold energy required for d to enter the neutron-absorption cross-sectional area of ${}^{108}\text{Pd}$, (assuming this close approach is necessary) is 3.38 MeV. Since it is assumed this reaction occurs in deuterated palladium [forming tritium by the reaction: $p(3.9 \text{ MeV}) + d \rightarrow T + \beta^+$], billiard-ball physics will have to be abandoned in favor of quantum field coherence (G. Preparata, M. Fleischmann, see *21st Century Science & Technology*, winter 1992, pp 59-65).

Deuterons inside an active volume of the Pd or Ti lattice must behave collectively and coherently as one physical object. This model will describe the dynamic interaction of an organized assemblage of "deuteron waves" -- oscillating collectively and coherently within an active volume. This active volume is pictured as being defined by grain boundaries, which serve as reflective barriers (the mirrors in optical lasers) for an oscillating--and finally resonating--train of deuteron waves:



Reflection of the train of waves will eventually create a kind of constructive interference:



The growing deuteron wave pulse will intensify (increase its amplitude) --provided its collective deuteron energy was "pumped up" to a high enough level (the average deuteron energy was sufficient) --until it tunnels through the barrier to enact the reaction, $d + {}^{108}\text{Pd} \rightarrow {}^{109}\text{Pd} + p$, assuming the grain-boundary atom is Pd-108.

For a hypothetical example, let an "active length" within an active volume equal $\sim 10 \mu\text{m}$ ($\sim 10^5$ Pd). Let the average energy of the resonating deuterons equal 35 eV, so its velocity = $5.6 \times 10^6 \text{ cm/sec}$. Therefore, the frequency of the oscillating (resonating) wave pulse is:

$$f = \frac{5.6 \times 10^6 \text{ cm/sec}}{2 \times 10^{-3} \text{ cm}} = 2.8 \times 10^9 \text{ /sec}$$

(The value $2 \times 10^{-3} \text{ cm}$ represents twice the active length, or $2 \times 10 \mu\text{m} = 2 \times 10^{-3} \text{ cm}$)

The collective deuteron energy, assuming D/Pd = 1 (or $D \approx 10^5$), about $35 \times 10^5 \text{ eV} = 3.5 \text{ MeV}$ (which exceeds threshold of 3.38 MeV). Of course, these numbers cannot be viewed as a restriction of the active volume, since any combination of energies and active lengths may be possible.

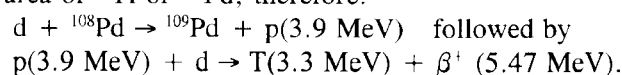
In this example, the frequency of oscillation of $2.8 \times 10^9 \text{ /sec}$ is of interest, since it is in the microwave range. The experiments at NRL used an electron cyclotron resonance (ECR) microwave (2.45 GHz) plasma source to produce the deuterium-ion beam. The MW intensity at the titanium sample during bombardment was $\sim 10 \text{ mW/cm}^2$. Further, researchers at NRL state that "the high particle production rate observed in these experiments was obtained using an ECR microwave ion source," but when a Kaufman ion source was used instead, high particle production rates were not observed (see page 4, 18 in NRL Mem. Report 6927).

TRITIUM, HE-4, EXCESS HEAT

Categorizing tritium, He-4 and excess heat data from hundreds of successful CF experiments may show a pattern, using the above reaction mechanism. It is well established that tritium and heat do not correlate (or rarely so). For example, M. Wadsworth (U of Utah) reported 35 watts of excess power for 90 minutes, for a total of 187,000 joules, (ERAB Report to DOE, Nov. 1989, p. 26). No increase in tritium was observed. Ed Storms at LANL, in replicating the Takahashi experiment, measured 20% excess heat--but no tritium.

On the tritium side, J.O'M. Bockris et al., measured significant tritium (7.6×10^{12} T) when the current was "cranked up" for 12 hours. Very interesting tritium measurements have been made at LANL (Claytor), where several thousand volts sent through Pd/Si layers produced significant tritium in D_2 gas cells--about 170 microcuries, or $\sim 3.7 \times 10^{15}$ T (Fire From Ice, E.F. Mallove, p. 201).

Preliminary conclusion: Formation of tritium occurs when the collective deuteron energy (at or above the minimum loading ratio) is sufficiently pumped up--perhaps requiring a nonequilibrium condition--in the above laser-like resonant deuteron-wave mechanism--sufficient to penetrate the n-absorption cross sectional area of ${}^{48}\text{Ti}$ or ${}^{108}\text{Pd}$; therefore:



It may be postulated that the positron formed will annihilate inside the metal atom's electron cloud. The resulting pair of gamma photons, still within the electron cloud, may accelerate electrons and thereby reduce the gamma intensity.

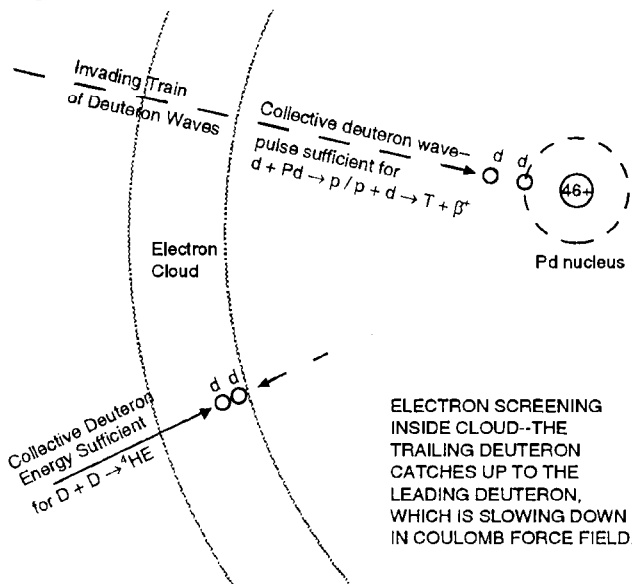
Cold fusion researchers are well aware that reports for finding helium-4 are improving, and the correlation with excess heat may yet be confirmed. Dr. E. Yamaguchi has had important He-4 results in gas-loading experiments. Dr. Melvin Miles and his colleagues report "presence of ${}^4\text{He}$ whenever there was excess heat and its absence when there was no heat." Quantitatively, Dr. Miles reported 5.4×10^{14} helium-4 over 4.44×10^3 seconds, an average production rate of $1.22 \times 10^{11} \text{ /sec}$, for a theoretical output of 0.466 watts, assuming the only contributing reaction is $\text{D} + \text{D} \rightarrow {}^4\text{He} + 23.8 \text{ MeV}$. Dr. Mile's measurement of 0.46 watts is remarkable and very convincing! [Note: ${}^4\text{He}$ can be the result of the fusion of $d + {}^6\text{Li}$ also. --Ed.]

Other groups occasionally report heat, tritium, and perhaps ${}^4\text{He}$ and/or low-level neutrons from the same sample. To account for all these CF phenomena using the above model, it is noted that deuterons oscillating collectively and coherently will have a range of parameters to consider, and it should be that small adjustments in voltage, current density, resistance (superconductive behavior)--assuming there is the proper loading ratio--will affect the collective and coherent behavior of the deuteron waves.

Work by Dr. Michael McKubre (Stanford Research Inst.) demonstrated that a loading ratio of 0.85 (after

reaching 0.95) was necessary for excess heat. Subtle changes in the crystalline structure at the higher loading ratio may create more active volumes--those volumes between grain boundaries where the collective deuteron energy may act coherently and resonantly.

Though there are many variable to consider in CF cell performance, this model will remain elementary and propose that (1) at higher voltage or high nonequilibrium states, the collective deuteron wave is sufficient to produce tritium by $d + Pd/Ti \rightarrow p(MeV)$, followed by $p(MeV) + d \rightarrow T + \beta^+$; (2) at lower input power (but within specific ranges) there is $d + d \rightarrow ^4He$ inside the metal's electron cloud, which carries away the 23.85 MeV. (These reaction modes are summarized in the diagram below.)



Dr. Eugene Mallove, in *Fire from Ice*, page 223, writes of Dr. G. Preparata's theories, "Their paradigm was a 'plasma' of charged particles within a lattice that were oscillating collectively around equilibrium positions ... the general direction he reported was the plasma of electrons inside the solid lattice carrying energy away from the deuterium fusion reactions, and in doing so suppressing the two usual outcomes of d-d fusion--the helium-3 and tritium branches."

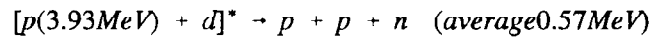
The d-d fusion inside the metal's electron cloud would be expected to provide energetic electrons. It has been recently reported that, "Direct conversion of cold fusion energy to electrical power in cold fusion batteries has already been reported," (*The Cold Fusion Newsletter*, P.O. Box 60642, Palo Alto, CA 94306, April 1993, page 2). Again, Dr. Mallove writes of Dr. Peter Hagelstein's theory, "that the energy [23.85 MeV] might

unload itself directly into the excitation of electrons ... and if the fusion is actually managing to couple to the current going through a palladium cathode, then the cold fusion process might become, in some sense, an amplifier of electrical power," (*Fire from Ice*, p. 128).

NEUTRONS

Neutron production in CF experiments typically runs 10^9 of excess heat, and from 10^5 to 10^9 of tritium production. In the reaction model using the oscillation deuteron wave train (diagram above), the heat-forming reaction, $d + d \rightarrow ^4He$ (inside e^- cloud), does not require neutron production with evolution of heat. However, with local agitation of the D-loaded lattice during heat production, it is conceivable that some small level of d-d fusion would occur, resulting in the usual 2.45 MeV neutron from the He-3 branch.

A more curious source of low-level neutrons may occur during tritium bursts. In the reactions, $d + ^{108}Pd$ (or Ti) $\rightarrow ^{109}Pd + p(3.93 MeV)$ followed by $p(3.93 MeV) + d \rightarrow T(\sim 3.3 MeV) + \beta^+(5.47 MeV)$, the p-d fusion is viewed to occur immediately inside the volume of the Pd (or Ti) atom. A certain chance for a breakup reaction exists:



*consumes 2.22 MeV

Using the conventional stopping distance of 10^{-6} cm for an energetic proton in deuterium (though the distance is probably $< 10^{-1}$ cm if p+d is immediate, an estimation of the neutron production rate can be made:

$$p(\leq 3.93 MeV) + d \rightarrow p + p + n [1.71 MeV].$$

Let: $\sigma_{pp} = 100 \text{ mb}$, $D/Pd \approx 1(10^{22}D/cm^3)$, and proton-flux density = $10^9/cm^2/sec$. Therefore,

$$\text{neutron rate} = (10^{25}cm^2)(10^{22}/cm^3)(10^9cm^2sec)(10^{-6}cm) = \underline{1 \text{ neutron per sec per cc}}$$

The n/T ratio becomes 10^9 , but this does not consider other anomalous neutron sources, including local d-d fusions yielding He-3 and n.

One of the more famous neutron-burst events occurred in a gas-loading experiment by Dr. Eiichi Yamaguchi. The sudden effusion of deuterium from a D-loaded palladium foil registered the emission of 10^6 neutrons in 1 second. The estimated power was on the order of a kilowatt. (*21st Century Science & Technology*, Fall 1992, p. 72). Although charged-particle emissions were not under surveillance, the following may have occurred:

- a.) $d + {}^{108}\text{Pd} \rightarrow {}^{109}\text{Pd} + p(3.9 \text{ MeV})$
 $p(3.9 \text{ MeV}) + d \rightarrow T + \beta^+$,
 where 10^{15} reactions \approx 1KW
- b.) $p(3.9 \text{ MeV}) + d \rightarrow p + p + n(1.71 \text{ MeV})$
 where $(10^{15} \text{ proton reactions})(10^{-9} \text{ n/p}) = 10^6 \text{ n}$
 in 1 sec.

Of course, this is not the only possible reaction scenario that can account for Dr. Yamaguchi's neutron and heat burst. Perhaps a burst of $d + d \rightarrow {}^4\text{He}$ occurred inside palladium's electron cloud (using the oscillating deuteron-wave model) at grain boundaries within the "accumulation layers." If so, then a 10^6 neutron burst might have come from $\sim 10^6$ fissions of platinum (as Pd impurity)--a reaction proposed by this author in an unpublished paper, "Fission of Platinum in Cold Fusion Electrolysis," March 1992.

A recent report states that "...there are a few scientists who are considering some new kind of cold nuclear fission as an explanation." (*The Cold Fusion Newsletter*, April 1993, p. 6).

Carol White describes a gas-discharge experiment by Y.R. Kucherov in which neutrons as high as 10^6 per second were measured in some experiments. She writes, "Interestingly, Kucherov entertains the hypothesis... of palladium fission. (*21st Century Science & Technology*, Spring 1993, pp 72-73). Dr. Kucherov measured 300 percent excess power. Therefore, his 10^6 neutron burst could not have the same origin as Yamaguchi's 10^6 n/sec, (postulated to be $p(\text{MeV}) + d \rightarrow p + p + n$), unless he also recorded a ~ 500 to 1,000 Joule output for that 1-second interval, as well as $\sim 10^{15}$ charged particles.

A SLICE OF THE π : Testing the Theory

It has been hypothesized that the deuteron-metal reaction in the lattice, $d + {}^M\text{M} \rightarrow {}^{M+1}\text{M} + p(\text{MeV})$, might correlate with the metal isotope's thermal-neutron absorption cross section. If there is a relationship, then a number of test cells come to mind. An electrode might be constructed of wafers of palladium, roughly an "active volume" thick (10, 50, 100 μm ?), alternating with perhaps 0.5- μm thick layers of the high n-absorbing element (for example, B, In, Cd, or Gd) to serve as the "grain boundary" for the collective deuterons. (Boron is interesting to test. The reaction should be $d + {}^{10}\text{B} \rightarrow {}^7\text{Li} + {}^4\text{He} + p$ --but probably not a good choice for a structurally sound cathode!) The idea is to promote either $d + d \rightarrow {}^4\text{He}$ or, more likely, the (example):

$d + {}^{113}\text{Cd} \rightarrow {}^{114}\text{Cd} + p(6.82 \text{ MeV})$ followed by
 $p(6.92 \text{ MeV}) + d \rightarrow T(6.2 \text{ MeV}) + \beta^+(5.47 \text{ MeV})$
 reactions. Some cells could also have a microwave flux applied to the electrode.

Who knows? In cold fusion, the world may yet be able to "have its π , and heat it, too!"

David D. Moon
 Minneapolis, Minnesota
 April 1993

COLD FUSION MAKES FRENCH HEADLINES

by Carol White

The week of May 3 was a big one on the cold fusion front, beginning with the publication by cold fusion pioneers Martin Fleischmann and Stanley Pons of a major article in the French physics journal *Physics Letters A*. In it, Fleischmann and Pons discuss their ability to produce excess heat at a power density exceeding that of a nuclear breeder reactor--3.8 kilowatts per cubic centimeter.

The appearance of this article was followed a day later by a full-page article in the French newspaper *Le Figaro*, advertised by a front-page banner headline that read "Cold Fusion: Contradictory Debate on an Energy of the Future." *Figaro* roundly condemned the hostile response of the scientific community to the breakthrough discovery four years ago by Fleischmann and Pons.

The flavor of the coverage is well conveyed even by the article's subhead: "The two electrochemists had, in 1989, raised the formidable hope of domesticating the Sun, before being violently criticized and practically banished by the scientific community. Japanese financing permitted them to resume their research."

The two scientists went to France in 1991, where they work at the IMRA Europe laboratory (financed by Japanese think-tank Technova, Ltd.). Finally, the French press seem to be taking favorable notice of them.

The article in *Figaro* was followed by one in the newspaper *Liberation*, one in the magazine *L'Express*, and television coverage. All were favorable to the extent of admitting that there is important new science involved in the experiments, and a challenge to existing scientific theory which must be answered.

On the question of the origins of the excess heat generated by the experiment, the writers are more cautious about endorsing the claims that it is nuclear in origin, but this is honest journalism.

New Federalist readers will find this paper's favorable coverage of cold fusion quite temperate compared to the report by *Le Figaro* science writer Jerome Strazzulla, who reviews some of the recent history of cold fusion research and various controversies involved, and then discusses the infamous Baltimore meeting of the American Physical Society in May 1989.

As a matter of fact, the French seem a bit distraught at the role of the Japanese in financing a \$24 million program, to be matched by funds from private industry. Far from making schlock, the Japanese have placed the Far East in the lead in cold fusion research.

The article in *L'Express*, the third in a series on cold fusion, mentions the fact that Los Alamos chemist Dr. Edmund Storms has reproduced a Fleischmann-Pons-type experiment using a slightly different configuration of the palladium electrode.

Storms' experiment is modeled on one designed by the Japanese physicist Dr. Akito Takahashi; Storms has been part of an international group of chemists and physicists who have successfully reproduced the Takahashi cold fusion experiment, and produced up to 20% excess heat over protracted periods. Also mentioned in the French coverage is the exciting new experiment by Jacques Duforts, a French researcher who works for Shell Oil Company in France. His experiment is modeled on the work of the Russian scientist Kucherov, and on that of Takahashi. Rather than using an electrolytic cell, he introduces deuterium in its gaseous form into his palladium cathode by using a spark discharge.

For an American readership, the fact that on May 6 the *International Herald Tribune* reported favorably on cold fusion, is of special interest. The *Tribune* is published in Europe, in English, as a collaborative effort of the *Washington Post* and *New York Times*. Naturally, we await such honest coverage here in the United States, from these two newspapers.

GARY TAUBES PUBLISHES!

The Short Life and Coming Hard Times of Bad Publishing

A Critical Book Review by Dr. Eugene F. Mallove
(Abbreviated for *Fusion Facts*)

A critical review of Bad Science: The Short Life and Very Hard Times of Cold Fusion by Gary Taubes, Random House, June 1993, 461 pages, \$25.00

The promotional flyer and the first page of the reviewer's "uncorrected proof" copy of Bad Science, shouts this small-minded book's preposterous bottom line: "In a fast-paced news-breaking account that reads like a novel, noted science journalist Gary Taubes brings to life one of the greatest scientific frauds of our times."

Remarkably, author Gary Taubes contends that cold fusion research is a widespread scientific fraud perpetrated by thousands of scientists, most of whom are obsessed with a quest for wealth and fame from a non-existing phenomenon. Because of his stubborn belief in this alleged **fraud**, Taubes dismisses the continuing scientific efforts of thousands of cold fusion research scientists and engineers in over a **dozen countries** [over 30 by FF count] and at scores of institutions -- including the U.S. Electric Power Research Institute (EPRI), the Japanese Ministry of International Trade and Industry (MITI), and numerous corporations -- mostly Japanese, and by a growing number of U.S. companies. The accusation of globe-girdling fraud is a pretty big tale to tell, especially when you are talking about the likes of NTT in Japan, one of the largest telecommunications giants in the world. In late 1992, NTT announced that one of its research groups had found major evidence to support cold fusion -- helium-4 found by high-resolution mass-spectrometry.

Taubes is bold and blunt in his summation: "Within six months of the announcement of cold fusion (on March 23, 1989), its public life had deteriorated into a dismaying struggle against reality in which the believers explained the insipid state of their science with all manner of causes, none of which was as simple as the reality itself. Cold fusion -- as defined by Stanley Pons and Martin Fleischmann, or Steven Jones, or as modified by John Bockris or Edmund Storms or Carol Talcott, or Bob Huggins - Stanford, or whomever -- did not exist. It never had."

The Bad Science promotion says, "no one was able to duplicate the findings" of Pons and Fleischmann, and that is exactly what Taubes says in his book. Mr. Taubes, a science journalist who claims at least superficially to be very thorough (he said he interviewed 260 people through

November 1992), apparently forgot to check the scores of technical papers on cold fusion that have been published since September, 1989 in *Fusion Technology*, a journal of the American Nuclear Society. He also forgot to examine many other fine technical journals, including *Physics Letters A*, the *Japanese Journal of Applied Physics*, half-a-dozen conference Proceedings, etc., etc. Just as Bad Science is about to go to press, *Physics Letters A* of May 3, 1993 has a peer-reviewed cold fusion calorimetry paper by Drs. Pons and Fleischmann.

The article [by Pons and Fleischmann] describes convincing evidence of massive excess energy of non-chemical magnitude, including reproducible boiling conditions in cold fusion cells that generate several kilowatts of excess energy per cubic centimeter of palladium cathode. This work was presented openly by Drs. Pons and Fleischmann last October [1992] at the Third International Conference on Cold Fusion in Nagoya, Japan. Video tapes of the boiling cells were shown publicly. Mr. Taubes wasn't there, nor was he at the Second Annual International Conference on Cold Fusion in Como, Italy in 1991. It is highly unlikely that Mr. Taubes will attend the Fourth International Conference of Cold Fusion in December, 1993, which will be sponsored in Hawaii by EPRI, the research arm of the U.S. electric utility industry.

Bad Science tells about Mr. Taubes's 1990 unsubstantiated and later disproved accusation in *Science* magazine that cold fusion cells were probably deliberately spiked with tritium at Texas A&M University. Allegations of fraud in the adulteration of cold fusion cells with tritium are dredged up at length **again** in Taubes's sordid and tedious account in Bad Science. A high-risk game for Mr. Taubes, one would think, because tritium has since been found in numerous cold fusion experiments at dozens of laboratories ranging from the Bhabha Atomic Research Center to the DOE-supported Los Alamos National Laboratory, to the U.S. Naval Research Laboratory. Some laboratories have achieved **completely reproducible** tritium generation.

A Simple Message

The message of Bad Science is as simple as it is pernicious: nuclear reactions at low energy (temperature) are impossible, therefore, all the experimental results from cold fusion experiments are either: The result of experimental incompetence or Fraud. The part of the book in which we are told what happened after the Utah announcement of March 23, 1989 is called "Book II: A Collective Derangement of Minds." That is another theme of Taubes: people who came to believe that there was anything to the evidence for cold fusion were captured by

a global scientific hallucination, they were drawn to the exciting hunt for excess heat and nuclear products and were ensnared in mass delusion. To Mr. Taubes, it was only the "smart" fellows at Caltech, MIT, Harwell Laboratory, and Yale, etc. who got it right, did "good" experiment, decided cold fusion was nonsense after they "failed" to confirm Pons and Fleischmann, and then left the field exhausted and disgusted.

Mr. Taubes tells the cold fusion saga in chronological order, but he mysteriously manages to arrive at page 400, still not out of cold fusion's first year! From page 400 to 423 he covers another year to March 1991. By page 427 Taubes is in June 1992, and then he devotes only one more page in the "Epilogue" to everything thereafter. This is a measure of how Taubes views cold fusion -- he thinks it lost all credibility in 1989, but it continues to live on in some weird self-perpetuating, near-death state. Taubes calls cold fusion "a small, however perverse, subject" ... Taubes claims that the "social phenomenon" of cold fusion "peaked" in May, 1989 and has gone downhill since then. **This proves that Taubes doesn't know what he is talking about.**

In his very first sentence Mr. Taubes makes two assertions and then spends the rest of his book egregiously violating his own precepts! This is a marvelous joke on Taubes, who is ever the glib dispenser of jibes at other, though it will be not too much longer before Taubes realizes that the joke is on him this time. He writes: "The cold fusion episode teaches two lessons that can be applied as meaningfully to journalism as to science: 1. Do your research, because nothing is as simple as it seems. 2. Make sure you've got the story right before you publish." **Taubes neither got the story of cold fusion right before he published, nor did he realize that cold fusion is not as "simple as it seems."**

Taubes confidentially explains it all. He says that many cold fusion scientists seem to have "renounced a life of science for one of faith." He says that an atmosphere of "blind faith" pervades cold fusion. But Taubes himself has a foolish "faith" that "all is known" about what goes on in hydrided metal lattices, a simplistic view that boggles the mind [and unusual for a so-called science journalist]. He has this comment, "All those cold fusion proponents who were claiming that something magical happens within the lattice of the palladium were strenuously neglecting the fact that what happens in the lattice was already understood."

Taubes has another peculiar "faith" - faith that nuclear physicists know that there can't possibly be anything of a nuclear character brewing within the palladium lattice. He writes, "...the absence of neutrons strongly implied, if one had any faith in nuclear physics, that the tritium was not

formed in the cell at all. Rather it must have come together, so to speak, elsewhere and entered the cell in a more circuitous manner." Mr. Taubes means fraud -- deliberate spiking of cells at Texas A&M. What we have from Taubes is a shocking new operating condition in science: Beware of reporting results that in any way seem to grossly conflict with "accepted" wisdom -- especially if the results are of a sporadic character.

Character Assassination

Bad Science is replete with extended character assassinations. Stanley Pons bears the brunt of much of Taubes's fury, although Steven Jones of BYU [Provo, Utah] is also mercilessly reviled. Martin Fleischmann is attacked less than Pons or Jones. He fares better, but not that much.

Taubes is brutal about cold fusion theorist MIT Professor Peter Hagelstein. He says Hagelstein "concocted" a flimsy, flawed theory to explain non-existent cold fusion. He cites an unnamed researcher who describes the "Hagelstein myth" as a "myth of scientific creativity warring in one person against morality.." Taubes style is to use the words of others to disparage those he faults.

Of Texas A&M University cold fusion researcher Professor John Bockris, Taubes says: somewhere along in his scientific career he "began propagating flamboyant errors in lieu of good science."

He [Taubes] cites physics Nobel laureate Norman Ramsey of Harvard as "the most credulous" of the DOE panel members who investigated cold fusion. He says that while Ramsey "was off hiking," panel co-chairman Huizenga had spent the summer of 1989 poring over cold fusion reports. Ramsey, says Taubes, wanted to "go soft" on Pons and Fleischmann.

Taubes praises journalists who ignored cold fusion even in its early days, and he mocks those who have given it any credence. To Taubes, Jerry Bishop of *The Wall Street Journal*, who has written extensively about cold fusion, is merely a "gullible" journalist who is singularly responsible for the continuation of cold fusion research. Says Taubes, "With the help of *The Wall Street Journal* cold fusion began to play like a nuclear version of the emperor's new clothes." ...

The "Good" Parts

Taubes certainly didn't learn very much about the science of cold fusion in his vaunted taped interviews. But his marvelous little recording machine has gloriously

preserved the bigoted, pathetic remarks of the opponents of cold fusion research. The following are examples:

DOE Cold Fusion Panel member Dr. William Happer told Taubes of an interview he had with a *Scientific American* reporter a few days after the Utah announcement: "The thing I didn't have the nerve to do was to say that just by looking at these guys on television, it was obvious they were incompetent boobs." We get from Taubes that Happer said Bockris had "this collection of pathetic student and postdocs."

We learn many times from Taubes that Petrasso [MIT professor] had a "distaste for glib bullshit," meaning the Pons and Fleischmann press conference. Petrasso's nearly uncontrollable rage against cold fusion is evidenced in many quotes in Bad Science.

We already know his public arrogance, now we meet the privately arrogant Nathan Lewis of Caltech, who apparently initially told a colleague that Pons and Fleischmann's experiment "wasn't worth more than one day's effort."

Mocking Truth and Decency

Mr. Taubes lacks common decency. Not even the dead are safe from his attacks. Taubes had the unmitigated gall to quote a former associate of Stanley Pons, Kevin Ashley, concerning the death of electrochemist Andrew Riley in the January 2, 1992 cold fusion experiment explosion at SRI: "The worst sin of this whole affair is (Riley's) death." Dr. Riley was extremely dedicated to the cause of cold fusion research, and like his colleague Dr. Michael McKubre of SRI, felt it to be a subject of extraordinary importance. One might say Andrew Riley died a hero in the quest for scientific understanding and truth.

Taubes has a weird theory of science. He seems to suggest that mass delusion will feed cold fusion indefinitely. The madness will not stop. He paraphrases DOE panelist, Alan Bard, who says that "cold fusion research will never end abruptly, because the tail of the distribution simple trails off indefinitely, edging ever close to zero, but never becoming exactly zero. The horizon will always serve up yet another researcher, an iota farther out on the tail, who will be capable of botching the experiment, either consciously or unconsciously, and willing to say publicly that he has confirmed." These will be "sloppy scientists," "bad scientists," "opportunists," and those "working far outside their fields." Taubes actually muses whether cold fusion "pathological science" might be like a "kind of infection like the measles, that attacks the scientific community periodically and has to run its predestined course."

As Taubes' book amply shows, a band of scientific establishment people in the U.S. went after cold fusion and thought they could kill it. They failed, of course, but before they severely curtailed cold fusion research in this country. In 1993, cold fusion is gradually winning acceptance as new results, new experiments, and new insights are gained about one of nature's most startling and spectacular mysteries -- the appearance of nuclear reactions "in the cold." Truth will overwhelm the scientific community and authors like Taubes.

"Men, it has been well said, think in herds; it will be seen that they go mad in herds, while they only recover their senses slowly, and one by one." Just as in this Taubes quote from author Charles Mackay, cold fusion is advancing in the scientific community one person at a time -- as the herd madness of the anti-cold fusion camp crumbles. Unfortunately for the publisher and author, there is no Bigger Lie than the title of this book. Taubes and others who write obscene, preposterous books like Bad Science, will be among the last to come to their senses, but come they will, dragged and screaming all the way.

Note: Words enclosed with square brackets [] are FF editorial comments.

AND..... A LETTER FROM EUGENE MALLOVE TO GARY TAUBES

Dear Gary Taubes:

As you requested, I enclose a copy of my recent review of your book, Bad Science. It is unfortunate that you were so one-sided and blatantly incorrect in your conclusions about cold fusion. Sooner than you can imagine, both you and Random House will be very embarrassed by Bad Science. It was your choice to ignore the facts--especially new developments since 1989 and the examination of flaws in the supposedly 'negative' cold fusion experiments done early on. You took the MIT, Caltech, and Harwell results as unassailable experiments, and these 'experts' led you astray. Had you read my book carefully -- and you had two years to do so-- you would have been informed on these matters. Of course you also chose to ignore and/or mock significant new cold fusion experiments.

I am enclosing a signed copy of Fire from Ice as you requested during our telephone conversation, and I hope to receive a copy of Bad Science to add to my library of cold fusion literature--the good, the bad and the ugly. I have inscribed your copy of Fire from Ice thus: "To Gary Taubes, who got the cold fusion story mostly wrong, from one who got it mostly right. Better luck on your next book."

For your information I have also enclosed the following tiny fraction of what I could have sent you. These will be a good starting point for a reexamination of your views, should you wish to get serious about studying the science and technology of cold fusion:

1. Order form for *Frontiers of Cold Fusion: Proceedings of the Third International Conference on Cold Fusion* (Nagoya, Japan, October 1992).
2. My report on the May 5, 1993 Fusion Energy hearing before the Subcommittee on Energy of the U.S. House Science, Space and Technology Committee.
3. List of companies and institutions that participated in the Nagoya conference.
4. Article by Dr. Mitchell R. Swartz (*Fusion Facts*, August 1992) "Reexamination of a Key Cold Fusion Experiment: 'Phase-II Calorimetry by the MIT Plasma Fusion Center;" plus copies of the MIT PFC excess heat data for light water and heavy water cells -- July 10, 1989 (unpublished) and July 13, 1989 (published).
5. Scientific correspondence by Drs. Noninski concerning the Caltech and MIT cold fusion calorimetry experiments: "Notes on Two Papers Claiming No Evidence for the Existence of Excess Energy....," to be published in *Fusion Technology*, July 1993.
6. Invitation to the Forth International Conference on Cold Fusion, Maui, Hawaii (A nice place to be, December 6-9, 1993!)

Since you are a "Contributing Correspondent" for *Science* magazine, perhaps in the future you might wish to investigate some of the scandals of misinformation from MIT and Caltech that led you so astray. You should know that the Harwell data is brought into serious question in the Nagoya proceedings. Future publications on Harwell will be even more severe. However, none of this sad "past history" will be as important to you as the continuing stream of positive results and the commercial development of abundant energy from water -- the concept that you seemed to find so amusing. I believe you called it a "chimera." No, we will not have to wait 50 years for the "Stan Pons Memorial Power Plant from a Glass of Water" -- or so you joked today. Within the year, you'll see the beginnings of that technology in home heating systems. The power plants will likely come within a decade or two.

Sincerely,

Eugene F. Mallove, Sc.D.

F. LETTERS TO THE EDITOR

LETTER FROM PETER GRANEAU

I recently listened to a lecture by Frank Close on his book Too Hot To Handle: the Race for Cold Fusion. The meeting was held at Birkbeck College of the University of London. As you know, Close takes the view that cold fusion is at best a joke, and at worst, a scientific fraud. The book was published in 1990 when Close was the Head of the Theoretical Physics Division at the Rutherford Appleton Laboratory, a British government laboratory supported by sterling-taxes.

In spite of all that has happened since 1990, Frank Close made no apologies. His contention remains that there exist no nuclear ashes, and therefore we are dealing with a non-nuclear phenomenon. About the excess heat he said in 1990, "Qualitatively there do seem to be bursts of heat whose origin has to be explained. The question is whether they are **interesting**, in the sense of being a genuine effect originating within the cell and instigated by the electrolysis of heavy water, or **uninteresting**, in the sense of being the result of incomplete bookkeeping in the heat ledger." Today Close no longer disputes the generation of excess heat in cold fusion cells, but he adamantly argues that this must be chemical energy. He gave no indication of what is being 'burned' in the fusion cells.

Frank Close had seen the latest Fleischmann and Pons paper in Physics Letters A (vol 176, p 118, 1993) and reported to the meeting that the discoverers of cold fusion had now reliably produced a few watts of excess power per cubic-centimeter of palladium. The figure quoted in the paper actually is "more than 1 Kw/cm³." When they defend science dogma, theoreticians are prone to misread experimental data. While in London, I discovered that Thomas Harriot, the 'English Galileo,' carried out free fall experiments a few years before the Italian Galileo did them in Pisa. Harriot wrote in his notes that there was "scarce any difference" in the fall of lead and iron. He did not publish his result because he had hoped to confirm Aristotle's theory that the rate of fall is in proportion to the weight of the body.

What I found most disappointing was Close's negative attitude to experimental research. There is nothing to be discovered, according to him, that is not already implied in our textbooks. If that were correct, progress in science would come to a grinding halt. The history of science tells a different story. Real progress was always

made by the unexpected experimental discovery. Cold fusion is a good example of this.

I was prepared to take Frank Close to task about capillary fusion. This was discovered in Germany twenty-five years ago and well publicized. It always works and produces neutrons while the temperature is less than 50,000°K. It is a form of cold fusion because thermonuclear reactions require millions of degrees.

Frank Close said he had never heard of capillary fusion, nor had he seen our recent papers on this subject in Physics Letters A. This brought the debate to a quick conclusion. So much for the professor who, in his book, is hailed as one of Britain's leading theoretical physicists and an international authority on nuclear and particle physics.

LETTER FROM DANA ROTEGARD

About 100 graduate chemical engineers, cold fusion enthusiasts, and broad-minded physicists attended a lecture on Tuesday, May 11, 1993, titled: "New Results and Old Prejudices from the Established Field of Cold Fusion," by Dr. Edmund Storms.

The MCFA put out about 50 press releases to the local media and politicians. The only direct response was a letter of regrets from Minnesota State Auditor Mark Dayton (an unsuccessful US Senate candidate in 1982). We also taped the lecture on Hi-8 video, courtesy of Swan Holding Ltd. The academic turnout was about twice what the seminar's organizers had expected and the audience gathered up all the handouts and gave Dr. Storms a warm response.

Dr. Storms gave an overview of recent findings. Of particular significance to me was a Los Alamos graph verifying the SRI data showing a decline in electrical resistance above a loading of .85 deuterons per palladium atom in a cold fusion cathode. He talked at some length about the different "chemically assisted nuclear reactions" that have been reported in various labs.

During the question period, Dr. Storms discussed Japanese reports of transmutations of Sodium to Magnesium in living cells and, as of yet unpublished, reports of transmutations of Palladium to both Rhodium and Silver on "Takahashi" cathodes. This raised a few eyebrows but did not elicit any hostile questioning. One

of Dr. Oriani's original team later commented that little in the way of lab procedure had been unveiled that was new to active U of M researchers.

We held a working meeting of the Minnesota Cold Fusion Alliance immediately after the lecture. Besides Dr. Storms, the group included Professor Emeritus Dr. Richard Oriani and his grad assistant Dave Dean from Northern States Power, Norm Kenneth Te Water and John MacNamee from Swan Holdings Ltd., James Swiderski from National Project Innovation, Maj. Kurt Laughinghouse, Chuck Walter and Dana Rotegard from MCFA. After some debate about the state of the art it was agreed that a concrete proposal for fully-funded research at the U of M could have active support from Congressman Sabo and Senator Wellstone along with other movers and shakers. Dr. Oriani promised to write up a "wish list" budget. I felt that major introductions had been made and there were at least four people in the room who could raise the funding needed. Swan Holdings is a mini-conglomerate partially owned by Control Data Corp. I am working with them to close transactions directly related to commercializing cold fusion in Minnesota.

experiments and the newer methods of creating cold fusion. And, also heard from are those who discount the entire idea of cold fusion -- a majority that is slowly eroding away as more and more scientists become convinced that something extraordinary did happen in Utah four years ago.

For further information call Brian Ekman, publicist, CBC News, Toronto, (416) 975-7831.

PATENT • TRADEMARK • COPYRIGHT CAUSES

STEPHEN A. ROEN
PATENT ATTORNEY

212-355-1825
420 EAST 64 ST., SUITE E12K, NEW YORK, NY 10021

G. MEETINGS AND MISCELLANEOUS

PRESS RELEASE

"The Secret Life of Cold Fusion"

A CBC Prime Time News Documentary
Thursday, June 24 at 9:00 p.m. EST

Canadian Broadcasting Company Prime Time News presents this half-hour investigative documentary as research continues quietly in laboratories around the world on a scientific breakthrough that, if it proves as good as it seems, could help solve the world's energy problems beyond the next millennium.

Since the Pons and Fleischmann announcement and the subsequent loud denial from the scientific establishment, cold fusion has virtually disappeared from the headlines. But a number of elite and powerful research labs and companies around the world have been conducting their own experiments, away from the glare of publicity. In researching this story, Prime Time News has been contacted by 29 institutions that have reported positive results.

Interviews with Dr. Pons, as well as scientists from research institutes in Great Britain, Russia, Japan and the United States cover both the original heavy water

IECEC - 28th INTERSOCIETY ENERGY CONVERSION ENGINEERING CONFERENCE

August 8-13, 1993
Hyatt Regency Hotel, Atlanta, Georgia
Sponsored by the American Chemical Society

The IECEC provides a forum to present and discuss engineering aspects of energy conversion, advanced and unconventional energy systems/devices, energy conversion/utilization, environmental issues, and policy implications in research, development, and implementation of technologies. Papers dealing with all engineering facets of terrestrial and aerospace power, and advanced energy systems, which fell into the above topic have been selected for presentation.

**For more information call the ACS Meetings
Department:
(202) 872-6286 or Fax (202) 872-6128.**

COLD FUSION
to be the focus of a Gala New York Meeting.

New York City -- cold fusion researchers, technologists, and supporters -- including author and futurist Arthur C. Clarke -- will speak in Manhattan to a group of influential citizens on Thursday evening, June 24. "**The Manhattan Project, Part II: Peace**" gathering is being held to promote public understanding about the revolutionary energy-from-water discovery that so captivated the world in 1989, only to be temporarily submerged by heated and occasionally irrational debate.

Now the work of thousands of researchers in over a dozen countries -- including a strong effort in Japan -- has **confirmed** the controversial discovery, although a generally agreed-upon theoretical explanation remains elusive. **A new era is beginning to emerge. Thus, the theme of the meeting: "Cold Fusion, an Awakened State!"**

Thursdays gathering will convene from 6:30 to 10:00 p.m. at the Plaza Hotel. Meeting attendance is by invitation only. The event is sponsored exclusively by Deak Sonotech, Inc., a New York-based corporation that is working on cold fusion power systems and other cutting-edge products in the field of ultrasonics.

The evening's program will feature two MIT professors who continue to be deeply involved in cold fusion research, Professors Peter L. Hagelstein and Keith H. Johnson. Also speaking will be physicist-artist Dr. David Deak, President of Deak Sonotech and engineer-author Dr. Eugene Mallove, a Vice President of the company.

Dr. Mitchell Swartz of Jet Technology of Weston, Mass. will talk about innovation and entrepreneurship in the cold fusion field. Mr. Jed Rothwell will discuss the rapidly expanding Japanese cold fusion effort, which is in stark contrast to the U.S. scene.

Arthur C. Clarke, who is always many steps ahead of the rest of the world in technological forecasting, will address the meeting via an AT&T VideoPhone-2500 link from his home in Sri Lanka. Also contributing to the program will be physics Nobel laureate Julian Schwinger, a prominent theorist who has been outspoken in supporting an open-minded approach to cold fusion.

A high point of the evening will be the viewing of the half-hour television investigative program, "The

Secret Life of Cold Fusion," which has been produced by the Canadian Broadcasting Corporation (CBC).

For further information and questions about media coverage, please contact: Deak Sonotech, Inc., New York City (Dr. David Deak), Phone 212-219-2984; Fax 212-226-3357; or Bow, New Hampshire (Dr. Eugene Mallove), Phone 603-228-4516; Fax 603-224-5975.

**4th INTERNATIONAL
CONFERENCE ON COLD FUSION
December 6-9, 1993
Hyatt Regency Maui, Hawaii**

Participation is open to all interested scientists and technologists. In particular, the following are encouraged to attend: nuclear and solid-state theoreticians, advanced energy technologists and long range utility planners. There will also be an exhibit of scientific instruments and supplies by various manufacturers.

The proposed agenda is as follows: Morning sessions will be devoted to one keynote presentation and a number of shorter, invited presentations. Afternoon presentations will be divided into a number of subject-organized parallel sessions. Papers reporting the results of simultaneous measurement of different kinds are particularly encouraged. Subject areas to be covered include: Materials and Fundamentals, Calorimetry, Nuclear Measurements, Solid-state Theory, Electrochemical Studies, and Safety Issues.

CALL FOR PAPERS

Those wishing to present papers should submit two copies of an abstract containing the title of the presentation, contact author, affiliation(s), etc. to S.Crouch-Baker, SRI International, 333 Ravenswood Ave., Menlo Park, CA 94025. Mark these submissions "ICCF-4 Abstract." Two-page abstracts are due by Sept. 10, 1993. Author notification by Oct. 10, 1993.

Abstracts should be no more than two pages including figures and tables; 10-point type, single-spaced. A bound volume of abstracts will be produced for distribution to attendees at the conference, so abstract submittal in magnetic form is encouraged. (Mac users: Word 4.0 +, sys. 7; PC users: Word 4.0+ is preferred,

but will accept other w.p. programs or ASCII.) Be SURE to include two hard copies.

Poster sessions will be used to supplement presentations and discussions. Presenters are encouraged to prepare a poster of 3' x 6' maximum size.

The co-chairs are Dr. T.O. Passell (EPRI) and Dr. M.C.H. McKubre (SRI) who can be reached at (415) 855-2070 and (415) 326-6200 respectively, for technical information.

The registration fee of \$300 covers conference proceedings, continental breakfasts, three luncheons, and an evening reception. To register, contact Linda Nelson, Conference Coordinator (EPRI) at (415) 855-2127 or Fax (415) 855-2041. Hotel reservations can be made with the Hyatt Regency Maui (mention ICCF-4 conference to obtain the special group rate), call for information: (808) 661-1234 or Fax (808) 667-4499. Reservation deadline Nov. 6, 1993.

NEW ENERGY NEWS

This new science periodical is published monthly by the Institute for New Energy as a free service to its members. It will bring an overview of all fields of energy and enhanced energy research, providing information on discoveries, publication, patents, and conferences. Yearly subscription rate to corporations, libraries, and universities is \$60. Individual membership rates are \$25 per year. Contact *NEW ENERGY NEWS* for membership and submissions information at P.O. Box 58639, Salt Lake City, Utah, 84158-8639. Phone (801) 583-6232, Fax (801) 583-6245.

NOTICE TO ALL *FUSION FACTS* SUBSCRIBERS

Due to an increased amount of subscriptions, we are able to lower the subscription rate of *Fusion Facts* to only \$300 per year for both current and new subscriptions.

FUSION FACTS STAFF & CORRESPONDENTS

Hal Fox.....Editor-in-Chief
Eva Call.....Circulation
Dineh Torres.....Publication

Technical Correspondents:

Dr. Robert W. Bass, Registered Patent Agent,
Thousand Oaks, California
Dr. Dennis Cravens, Texas
Dr. Samuel P. Faile, Cincinnati, Ohio
Avard F. Fairbanks, Resident Sr. Engineer
V.A. Filimonov, Minsk, Belarus
Dr. Peter Glück, Romania
Dr. Maurice B. Hall, Resident Sr. Physicist
Marge Hecht, Washington, D.C.
Prof. Xing Zhong Li, Beijing, China
Dr. Takaaki Matsumoto, Hokkaido U., Japan
Jed Rothwell (Japanese Translations), Chamblee,
Georgia

Fusion Facts Subscription Office

P.O. Box 58639
Salt Lake City, UT 84158
Phone:(801) 583-6232 FAX:(801) 583-6245

Street Address: 391--D1 Chipeta Way
University of Utah Research Park
Salt Lake City, UT 84108

FUSION FACTS Each Issue Mailed First Class.

12 ISSUES.....\$ 300
36 ISSUES.....\$ 800

FUSION FACTS SINGLE ISSUES

CURRENT ISSUES EACH..... \$ 30
3 MONTHS OR OLDER ISSUES EACH.....\$ 10

All back issues available.

SUBSCRIPTION REQUEST

For your convenience you can order by phoning (801) 583-6232, or FAX (801) 583-6245, or use the **Mail**.

Send *Fusion Facts* to:

NAME: _____

COMPANY: _____

PO BOX, DEPT: _____

CITY: _____

STATE _____ ZIP _____

Send check or money order with order and receive one extra issue free. Make checks payable to *Fusion Facts*.