

FUSIONfacts

A Monthly Newsletter Providing Factual Reports On Cold Fusion Developments

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

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COMING IN OCTOBER

Fusion Facts is preparing a special database containing the names, titles, and publications of all articles reviewed by this newsletter during its 40 months of publication. Diskettes containing this database will be given to attendees at the Nagoya Third Cold Fusion Conference and mailed to current subscribers as our gift to you.

QUESTION OF THE MONTH:

Which major technological or scientific breakthroughs were fostered by the peer review process?

A. THE SCIENTIFIC METHOD AND PEER REVIEW

By Hal Fox, Editor-in-Chief

INTRODUCTION

Innovative, successful and formally uneducated, the founding president of Ajax Press, Inc. made an insightful observation: "The trouble with these new engineers is they know so many things that ain't so." He was uneducated by college standards, but highly educated by practical standards. His insight poses an interesting question about our scientific conventions and innovation.

Most of the money spent on the development of new technology is spent in large government, industrial, and university laboratories. Much of the development, perfection, and commercialization of technology comes from these institutions. However, most of the major scientific and technological discoveries that change the world come from the efforts of ill-funded, highly-motivated "radicals" who do not fit the accepted mold desired for employment in the large industrial, government, or university laboratories. A few examples of these radicals are Thomas Alva Edison (light bulb, voice recording, motion pictures), Nikola Tesla (alternating current generation and distribution), the Wright brothers (aircraft), Albert Einstein (photo-electricity, relativity), John McCormick (agricultural machinery), Eli Whitney (mass production), Henry Moray (first to make and use transistors), and currently Ken Shoulders (EVology).

THE PEER-REVIEW PROCESS

Science has gradually introduced a practical method by which charlatans can be separated from good scientists. When a new discovery or theory is presented for

publication, two or three "peers" are sent copies of the submitted manuscript. These peers are chosen for their knowledge in or close to the subject presented for publication. They read, look for novelty (not previously published), check equations, and submit questions to be clarified by the author(s). Some papers do not pass the peer-review process and the papers are not published. Many papers submitted for publication are revised due to comments by the "peer-reviewer." In general, the process works and the scientific journals are therefore a more valuable source of new and valuable information. The process is kept confidential so that fellow scientists do not get angry at one another or so that personalities are not involved. The process also depends strongly on the quality of the "peers" and the skill of the journal editor in selecting the best reviewers. Sometimes the process fails. Sometimes a new insight into the universe is so different that it fails to be acceptable to the "peer-review" process. Not all inventors or persons who discover new knowledge submit their work for publication or for peer review. In addition, one large failing of the peer-review process is that a person submitting an acceptable paper must be a recognized member of the scientific community. In other words, a scientist must have a doctoral-level degree or have his work co-authored with a recognized member of "the club." Some scientists are unwilling to submit to the procedure. Edison and the Wright brothers are good examples.

WHO IS A PEER?

One of my scientist friends mentioned to a prestigious school (Cal Tech) professor about the work of a scientist at a small university. "Who's he?" the professor said, "I've never heard of him. Nothing worth reading could come from that school!" These comments dismissed the subject. Obviously, to this Cal Tech professor, another Ph.D. was not a peer and not worthy of his time because he was not on the faculty of a distinguished institution. But note that of the three awards given as "Fusion Scientists of the Year" none went to major eastern universities. Awards were to scientists at University of Utah, University of Hawaii, and California Polytechnic University at Pomona.

Occasionally, in the scientific community, a person survives the educational process (which by its very nature condones conformity and often abhors the radical non-conformist) and becomes an innovative, brilliant scientist. These are the ones who often make radical changes in science. These are the ones whose work sometimes require that the foundations of science be restructured to accommodate new science. Some of these giants of innovation have been Nikola Tesla, Charles P. Steinmetz, Albert Einstein, Thomas Alva Edison, and Robert H. Goddard. At the time of their important discoveries, who were there peers? Who would you have called on to vote on their work. As a matter of history, some of these

innovators did not seek to have their work peer-reviewed. Not all world-changing ideas stem from the Ph.D.'s. Michael Faraday was trained as a bookseller and bookbinder and yet became known as one of the great experimentalist of all time. He was not deemed, by some scientists of his time, to be worthy of making a presentation before "real scientists" most of who's names are no-longer remembered.

The peer-review process is valuable and works well most of the time. However, there are occasions when it is most difficult to find a "peer" to evaluate the work of another person.

PEER-REVIEW: THE "FIASCO OF THE CENTURY"

John R. Huizenga is the Tracy H. Harris Professor of Chemistry and Physics at the University of Rochester. HE was co-chairman of the United States Department of Energy-- Energy Research Advisory Board (ERAB) Cold Fusion Panel. In his book, Cold Fusion, the Scientific Fiasco of the Century, the Huizenga discusses "The Scientific Process." (See page 235.) The two paragraphs herein are quoted in full, with permission:

"The University of Utah's handling of cold fusion is a striking illustration of what happens when scientists circumvent the normal peer review process, when scientists use the press as a conduit to disseminate information about a claimed discovery in an unrealistic and overly optimistic tone, when scientists require too many miracles to account for their results, when research is done in isolation by scientists who are outside their field of expertise, when data are published by private communication rather than by those responsible, when administrators use potential royalties to force premature publication and when university administrators lobby for large federal funds before the science is confirmed. Cold fusion is an example of bad science where the normal rules and procedures of the scientific process were violated. One can only be amazed by the number of scientists who reported confirmation of cold fusion by press conference, only to follow later with a retraction or at least a confession of irreproducibility. Reproducibility is the essence of science. It has taken upwards of some fifty to one hundred million dollars of research time and resources to show that there is no convincing evidence for room temperature fusion. Much of this effort would not have been necessary had normal scientific procedures been followed. The idea of producing energy from room temperature fusion is destined to join N rays and polywater as another example of a scientific aberration."

AN ANALYSIS OF HUIZENGA'S COMMENTS:

In the following we have copied the sentences of Huizenga's above paragraph in italics and follow each comment with the known factual background.

The University of Utah's handling of cold fusion is a striking illustration of what happens when scientists circumvent the normal peer review process,

Pons and Fleischmann performed their early experiments using their own funds. Their experiments were based on anomalies found in some of their previous experimental work. They continued until they had adequate evidence that they had found unusual anomalies. They moved their experiments into University of Utah facilities. They used some graduate students. They kept proper records. They kept their work confidential. After significant discoveries had been made, sometimes with less than adequate equipment, they wrote a scientific paper and submitted it for peer-review and publication early in March 1989. The University was properly informed about potential valuable patents. Patent applications were initiated. These steps are consistent with the standard scientific method with the exception that much of the early work was performed using their own funds (unusual in this age of grants and contracts) because they doubted that anyone would believe that their line of research had any possibility of showing useful results. In other words, it is unlikely that any "peer" would have recommended this line of research.

when scientists use the press as a conduit to disseminate information about a claimed discovery in an unrealistic and overly optimistic tone,

Due to the inefficiency of the peer-review system, at least one copy of the early Fleischmann-Pons' paper was sent to several "colleagues." These recipients of the paper which was submitted only to two or three "peers" for review were so excited that faxes and photocopies of Fleischmann and Pons' original paper begin to circulate around the world. The copy that this editor first received in April 1989 had been recopied so many times that it was barely readable. Obviously, the University of Utah began to receive calls concerning this unusual research. Over the objections of Pons and Fleischmann, the University of Utah staff called a press conference. After briefing from legal counsel to advise these two scientists on the possible loss of patent protection if a full public disclosure were made concerning details of patent applications yet to be filed, Pons and Fleischmann made a brief and simplified explanation of their research findings. Pons and Fleischmann did not use the press as a conduit for scientific information. They had no reason to do so. However, they did attend the press conference, they gave a presentation, and they answered questions.

when scientists require too many miracles to account for their results,

In their presentation and in their peer-reviewed (in process at the time of the press conference) paper, Fleischmann and Pons were careful to state that they had measured too much excess energy (over and above input energy) for the process of heat generation to be classified as chemical. In their paper they had carefully listed known nuclear reactions that could possibly be used to account for their experimental findings and added, "is due to an hitherto unknown nuclear process or processes (presumably again due to deuterons)." In no case did they call on the supernatural or the miraculous to explain the anomalous data observed.

when research is done in isolation by scientists who are outside their field of expertise,

Under Dr. Pons tenure as head of the Department of Chemistry at the University of Utah, the amount of contract work per professor was the largest of any chemistry department in any university in the United States. Professor Martin Fleischmann is a Fellow of the Royal Society and held a prestigious chair, until his retirement at The University, Southampton, England. Both are noted electrochemists and had co-authored over 50 papers on various electrochemical topics. Along with Dr. John O'M. Bockris (University of Texas), these two men are considered world experts in electrochemistry. Within days after their press conference, Dr. Bockris had replicated some of the experimental results of Pons and Fleischmann. It would be difficult to find scientists who were more qualified and more competent to discover and work within this field of expertise.

when data are published by private communication rather than by those responsible,

In the context of the Fleischmann-Pons experimental work, their submission of a preliminary paper to the *Journal of Electroanalytical Chemistry* (before a press conference was held) was absolutely proper and is the procedure followed by most scientists. Pons and Fleischmann were the responsible parties.

when administrators use potential royalties to force premature publication

Premature publication was not forced by administrators. After the initial publication was submitted for peer review and after the failure of the confidential nature of the peer-review process, the administration of the University of Utah made a decision to hold a press conference so the public would know the truth and not be working on rumors and suspicions.

and when university administrators lobby for large federal funds before the science is confirmed.

After the press conference was held on March 23, 1989, members of the Utah State Board of Regents met with the governor of the State of Utah. The result was that five million dollars in research funds were recommended by the governor and were later approved by the Utah State Legislature. After replication had been achieved, notably by Dr. Bockris, the University of Utah administration with help from Utah members of the U.S. Congress, made an unsuccessful request for federal funds. Such actions are normal, consistent, and often followed to obtain funding for far less important discoveries than cold fusion.

Cold fusion is an example of bad science where the normal rules and procedures of the scientific process were violated.

Except where inadequate neutron-monitoring equipment was used and some misunderstanding of the observed results in measuring neutrons occurred (which data was later withdrawn) there is no question but that the scientific process was properly observed. Later replication of the neutron data did verify that neutrons were indeed produced by the Fleischmann-Pons type of cold fusion cells.

One can only be amazed by the number of scientists who reported confirmation of cold fusion by press conference, only to follow later with a retraction or at least a confession of irreproducibility.

Fusion Facts has been collecting publications and papers about cold fusion since the day of its first press conference. Except for one University group who at first found excess heat and then discovered that they had incorrectly interpreted temperature data and a second group who first found and later failed to replicate the excess heat data, we do not know of any U.S. groups who found and then retracted their experiments. By contrast, at the Workshop on Anomalous Effects In Deuterated Materials, October 1989, (cosponsored by EPRI and the NSF) investigating cold fusion some 32 papers were invited with the ratio about equal between negative and positive results. However, by the time of the conference most of the experimental teams who had previously reported negative results had obtained positive evidence for cold fusion with the result that only two negative papers were presented.

Reproducibility is the essence of science.

The essence of science is the discovery of new science, the moving outward of the boundaries of knowledge, and sometimes the restructuring of inadequate theories and beliefs forced by newly discovered facts. A scientific fact is nicely defined as the close agreement of a series of observations of the same phenomena. The essence of

science has little to do with the ease or difficulty of replication. One hundred experiments that fail to observe a phenomena are not as important as one experiment that does replicate the same phenomena. Replication also involves the concept that those performing the replication are expected to be skilled in the technology. Many so-called multi-disciplinary teams which attempted replication had no electrochemists of the caliber of Pons, Fleischmann, and Bockris.

It has taken upwards of some fifty to one hundred million dollars of research time and resources to show that there is no convincing evidence for room temperature fusion.

The Department of Energy funds about ten National Laboratories. After the announcement of cold fusion came to the attention of the Secretary of the Department of Energy, the word went out to the National Laboratories to investigate cold fusion claims. Scientists at Brookhaven, Oak Ridge (two teams), Los Alamos (three teams), and Sandia found positive results. However, some peculiar findings from Sandia were shown in a poster session at the May 1989 conference but, to our knowledge, were never published in unclassified papers. The truth or falsehood of the above sentence involves the definition of "convincing evidence." After over 200 hundred positive papers by scientific teams in over 25 countries, author John R. Huizenga still found no "convincing evidence." This only demonstrates that John Huizenga is not an unbiased observer.

Much of this effort would not have been necessary had normal scientific procedures been followed.

The normal scientific method is for unbiased and friendly discussions among "peers," the sharing of full data, and the relative unemotional scientific search for fact. The ERAB Cold Fusion Panel, led by Dr. Huizenga visited labs where heat was being produced and the panel reported that the calorimetry was faulty; visited laboratories where tritium was being produced and reported contamination; and visited laboratories where neutrons above background were being measured and reported that only background radiation could have been measured. The Cold Fusion Panel did not follow normal unbiased scientific procedures nor did it take advantage of many other scientific verifications of cold fusion found in other parts of the world.

The idea of producing energy from room temperature fusion is destined to join N rays and polywater as another example of a scientific aberration.

We only need to cite the many new cold fusion discoveries in the U.S., Japan, Taiwan, China, India, Italy, Russia, and several other countries to demonstrate that this statement is false.

With this background, we can now comment on another of Huizenga's statements (page 234) which we quote by permission:

Within the first few weeks after the University of Utah press conference, several multidisciplinary research teams could not replicate any of Fleischmann and Pons' reported claims. Such teams were necessary to investigate quickly the cold fusion claims. Had Fleischmann and Pons formed an interdisciplinary team in their early experiments, cold fusion might have had a very short lifetime.

There is no question but that this is a true statement. Many teams were formed to investigate cold fusion. Some of them could not replicate cold fusion. A few teams that were more lucky, or more likely, teams that were better prepared, did replicate some or all of the cold fusion claims of Pons and Fleischmann and extended the knowledge of cold fusion. It is certainly true that if Fleischmann and Pons had formed an average interdisciplinary team to investigate cold fusion, the received doctrine of what is expected in nuclear reactions in hot fusion would have prevented positive results from being observed. Cold fusion indeed would have had a very short lifetime. Thank the powers that be, that Fleischmann and Pons did not form an interdisciplinary team. In fact, we are also thankful that neither Edison, the Wright brothers, Goddard, nor Einstein formed a multidisciplinary team. Had they done so, the light bulb, voice recordings, flying machines, rocket propulsion, and the theory of relativity might have been discovered and developed elsewhere.

IN SUMMARY

The author hopes that the above analysis of "peer-reviewed" writings is helpful to the reader. The scientific educational process is supposed to be capable of disseminating scientific facts. Unfortunately for the reader, it is difficult to separate scientific facts from science dogma or from deliberate or unintended dissemination of non-facts. All authors make mistakes. No publication is entirely without error. To be adequately informed requires a close evaluation of a variety of documents relating to the same subject. Remember that a scientific fact is "the close agreement of a series of observations of the same phenomena." Observations of a not-replicated phenomena should not be given the same consideration as a careful experiment in which the phenomena is observed and reported. The validity of a difficult scientific experiment is not determined by votes nor by counting successes versus failures.

B. 21st CENTURY SCIENCE AND TECHNOLOGY REPORTS ON COLD FUSION

Editor's Note: *21st Century Science and Technology* together with *Fusion Technology* and *Fusion Facts* have been the three most consistent publications in telling the facts about the steady growth and development of cold fusion. *21st Century* has earned a lead article position in this issue of *Fusion Facts* and our congratulations for diligence and integrity in recognizing cold fusion as an emerging science.

The following two articles describe the now famous experiment designed and carried out by Professor Akito Takahashi, a Japanese physicist who heads the Department of Nuclear Engineering at Osaka University:

Carol White (Editor-in-Chief), "Takahashi Brings Cold Fusion Results And New Theory to U.S.," *21st Century Science and Technology*, Summer 1992, Vol 5, NO. 2, pp 63-69, illus., 4 figs.

Laurence Hecht (Associate Editor), "The Osaka Cell Design," *21st Century Science and Technology*, Summer 1992, Vol 5, NO. 2, pp 65, 14 fig.

EDITOR'S COMMENTS

Takahashi's experiment is a modification of the Fleischmann-Pons electrochemical cell wherein heavy water, palladium cathode, platinum anode, and lithium deuterioxide are used in an electrochemical cell. The changes are the use of a thin foil of palladium encircled by a rectangular wire helix (the platinum anode) plus the use of a high, low pulsating d.c. current.

The cell has produced an average of 70% excess heat and up to 100 watts per cubic centimeter of power from the cell's postage-stamp sized palladium cathode. In addition to measuring excess heat, Takahashi has also measured the production of neutrons and tritium as by-products of some type of nuclear reaction(s) taking place in the cell. Carol White's article presents Dr. Takahashi's theory in which he proposes that multi-body collisions of deuterium ions are responsible for some of the observed results.

These two articles cover much of the briefing materials that Dr. Takahashi presented to scientists at MIT and at Texas A&M during his early summer trip to the United States. See the May 1992 issue of *Fusion Facts*, page 8, for another report on this excellent information sharing by Prof. Takahashi.

NO RESPONSE FROM SCIENTIFIC AMERICAN

Staff Writer, "Scientific American, Cold Fusion, and Lyndon LaRouche," *21st Century Science and Technology*, Summer 1992, Vol 5, NO. 2, pg 70.

EDITOR'S COMMENTS

In the May issue of *Scientific American*, a half-page ridicule of cold fusion made statements that Takahashi's results had not been published nor replicated. In fact Takahashi's article was published in the March issue of *Fusion Technology*. The *21st Century S & T* article quotes from *Fusion Facts*, where we had traced down the comment attributed to Lyndon LaRouche and found that it had been made by an NBC journalist. We must give credit to the Japanese edition of *Scientific American* which did publish a report on the Takahashi work. Meanwhile, calls by *21st Century* staff to writer John Horgan of *Scientific American*, got the following retort, "You people are scum. Don't call me again." It is amazing that successes with cold fusion could elicit such unscientific treatment from a staff writer of one of the world's premier scientific publications.

JAPANESE MEDIA COVERS TAKAHASHI'S TOUR

Staff, "Japanese News Weekly Features Takahashi Tour," *21st Century Science and Technology*, Summer 1992, Vol 5, NO. 2, pg 71, illus.

EDITOR'S COMMENTS

This article reports on Takahashi's visit to the United States by *AERA*, a popular Japanese weekly news magazine. The *AERA* article was written by Atsuko Tsuji who notes that while Japanese research is performed under normal accepted conditions, similar research in the United States is sometimes carried on in the basements of scientists unable to do the research at their institutions. Tsuji describes her interview with Professor Ikegami who heads up the Japanese National Institute of Fusion Science. Tsuji describes Ikegami as a modern Copernicus who is willing to challenge accepted beliefs and pursue truth.

INTERVIEW WITH PREPARATA

Staff, "Italian Physicist Denounces Witch-hunt in Cold Fusion to Washington Press," *21st Century Science and Technology*, Summer 1992, Vol 5, NO. 2, pp 72 & 75, illus.

EDITOR'S COMMENTS

The famous Italian theoretical physicist, Dr. Giuliano Preparata, from Milan University gave a presentation at

the National Press Club in Washington, D.C. on March 27, 1992. This article is a report on that conference. Preparata reviewed the many positive, substantial, and repeatable results on cold fusion presented at the July 1992 Second Annual Conference on Cold Fusion held in Como, Italy and published under the title, The Science of Cold Fusion, produced by the Italian Physical Society. Dr. Eugene Mallove opened the press conference with a short history of the development of cold fusion and the hideous treatment accorded to cold fusion researchers by their peers, usually with the help of the misinformed media. Preparata emphasized the importance of the birth of this new science. Preparata responded to questions about failure to reproduce cold fusion experiments by some groups with an explanation of the difficulty of loading the palladium with deuterium which is a prerequisite to success. He comments that many experimenters working with solid-state physics, where some experiments are much more difficult to reproduce, are not questioned about their scientific competence nor the validity of their results. Preparata also carried a message from Dr. Stanley Pons who is working with a group of 10 assistants in a lab in Nice, France. Pons related that they are achieving about 1,000 watts per cubic centimeter of excess heat in their cells and expect to have a demonstration cold fusion boiler operating by the end of this year.

C. NEWS FROM THE U. S.

CALIFORNIA - ALKALI-HYDROGEN FUSION MODERN-DAY ALCHEMY

Robert T. Bush (Calif State Polytechnic Univ., Pomona), "A Light Water Excess Heat Reaction Suggests that 'Cold Fusion' May be 'Alkali-Hydrogen Fusion'," *Fusion Technology*, Vol 22, No 2, Sept 1992, pp 301-322, 2 figs, 61 refs.

AUTHOR'S ABSTRACT

Mills and Kneizys presented data in support of a light water "excess heat" reaction obtained with an electrolytic cell highly reminiscent of the Fleischmann-Pons "cold fusion" cell. The claim of Mills and Kneizys that their excess heat reaction can be explained on the basis of a novel chemistry, which supposedly also explains cold fusion, is rejected in favor of their reaction being, instead, a light water cold fusion reaction. It is the first known light water cold fusion reaction to exhibit excess heat, it may serve as a prototype to expand our understanding of cold fusion. From this new hypothetical vantage point, a number of potential nuclear reactions are deduced, including those common to past cold fusion studies.

This broader pattern of nuclear reactions is typically seen to involve a fusion of the nuclides of the alkali atoms

with the simplest of the alkali-type nuclides, namely, protons, deuterons, and tritons. Thus, the term "alkali-hydrogen fusion" seems appropriate for this new type of reaction with three subclasses: alkali-hydrogen fusion, alkali-deuterium fusion, and alkali-tritium fusion. A significant part of the difference between alkali-hydrogen fusion and thermonuclear fusion is hypothesized to involve an effect that is essentially the opposite of the well-known Mossbauer effect. Transfer of energy to the lattice is shown to be consistent with the uncertainly principle and special relativity. The implications of alkali-hydrogen fusion for theoretical models for cold fusion are considered. Boson properties are suggested to be unimportant for alkali-hydrogen fusion, which apparently rules out the prospect that a Bose-Einstein condensation could be involved in cold fusion.

A new three-dimensional transmission resonance model (TRM) is sketched that avoids Jandel's criticism of the one-dimensional TRM. When the new TRM is coupled with the alkali-hydrogen fusion hypothesis for cold fusion, it suggests a solution for the surface, or near-surface, excess heat effect for cold fusion in the form of a reaction between ${}^6\text{Li}$ and a deuteron to produce ${}^4\text{He}$, or between two deuterons to produce predominantly ${}^4\text{He}$. A lattice effect essentially opposite to an "umklapp" process suggests that energy should be given to the lattice in the reaction.

Finally, preliminary experimental evidence in support of the hypothesis of a light water nuclear reaction and alkali-hydrogen fusion is reported. Excess heat has been detected with light water-based electrolytes for the separate cases of K_2CO_3 , Na_2CO_3 , Rb_2CO_3 , and RbOH . Preliminary evidence for a correlation between the amount of elemental strontium produced in the case of Rb_2CO_3 as the electrolyte, or of elemental calcium produced in the case of K_2CO_3 as the electrolyte, and the total excess heats produced in the respective cells has been mixed. Evidence is presented that appears to strongly implicate the transmission resonance phenomenon of the new TRM.

AUTHOR'S CONCLUSION

It is important to remember that the nuclear reactions presented here, with their dependence on the atomic lattice, are hypothetical at this stage. However, if the excess heat process discovered by Mills and Kneizys and independently corroborated by Noninski and Bush and Eagleton is a light water cold nuclear reaction (alkali-hydrogen reaction or other) in accord with the present thesis, it is of signal importance for this emerging branch of science. The realization of an important new reaction related to the Fleischmann-Pons excess heat effect, but discovered outside the cold fusion community, that can be achieved robustly and in a highly reproducible fashion using essentially ordinary water, could eventually result in

a return to greater objectivity concerning cold fusion on the part of the general scientific community. Additionally, if the light water work constitutes a subrevolution within cold fusion, as the author maintains, the economic ramifications could be immense in view of the relative expense of heavy water (approximately \$1000/gal) to that of deionized, or distilled, water (pennies per gallon). Finally, it can be concluded that, should this general picture, in which the heavy water excess heat reactions and those of light water are viewed as two sides of a coin of a new realm, hold up under objective examination, it would be another step enroute to the creation of an essentially new branch of science, namely, **the physics of low-energy nuclear transmutations.**

EDITOR'S COMMENTS

Dr. Bush states that experimental work by Bush and Eagleton used a nickel cathode, a platinum anode, and a 0.57 M potassium carbonate electrolytic solution. Bush and Eagleton measured excess power using current densities ranging from about 2 to about 40 mA per sq. cm. of cathode material. The peak excess power was about 4 watts and the total excess heat measuring about 0.3 MegaJoules. Details will be presented in a forthcoming paper. While Bush applauds Mills and Kneizys' demonstration that excess heat can be produced in light water electrochemical cells, Bush suggests that their explanation is flawed.

Dr. Bush describes in Section VII an effect which "essentially opposite to the Mossbauer Effect." This effect suggests that below a certain lattice temperature there is a significant probability of recoilless emission in which all of the deexcitation energy from the nuclear reaction goes into the emitted gamma-ray photon because the entire lattice recoils to conserve the linear momentum. Above this temperature of the lattice most of the energy from the nuclear reaction is expected to be absorbed by the lattice. Another interesting discussion by Dr. Bush is in the use of Duane's Rule and subsequent work by Lande to extend the TRM into a three-dimensional model.

In Section X, Dr. Bush relates the results of some early experiments performed by Bush and Eagleton. Some of the more interesting results were derived from the use of rubidium carbonate in light water as the electrolyte. After obtaining excess heat, it was determined that strontium was probably present in the nickel cathode. A more definitive measure of this finding will be reported in a later paper. Because much of the experimental work done by Dr. Bush and his colleague, Dr. Robert Eagleton, has been replicated by others (e.g. three chemistry teams at BARC in India), this early report is deemed to be a significant extension of the Pons-Fleischmann cold fusion work. The ${}^4\text{He}$ measurements by Miles et al, would support this Bush theory in that the helium is derived

from a lithium + deuterium nuclear reaction in which ${}^8\text{Be}$ is formed and immediately breaks down to form ${}^4\text{He}$. Thus the Pons-Fleischmann work is explained by this same upgraded TRM which explains and extends the light-water/nickel/alkali-metal-carbonate electrochemical cells. We assume that further information from Bush and from workers in India will be presented at the forthcoming Nagoya Conference.

If Dr. Bush is correct, the new TRM supports the concept that cold fusion can involve the transmutation of elements using, for example, alkali carbonates as the electrolyte. If the nuclear additions of hydrogen, deuterium, or tritium ions can combine in nuclear reactions with the alkali metals and produce stable isotopes, then the ground work has been laid for modern alchemy. Obviously, this discovery is only a first step toward the creation of new elements from existing elements. If nickel serves to catalyze nuclear reactions by which the column I elements in the periodic table can become elements in column II or higher then it may be possible to find other catalysts for other nuclear reactions. If one wants to stretch his/her imagination, then the transmutation of desired elements may be the electro-nuclear chemistry of the future. Perhaps, modern-day alchemy has begun.

CALIFORNIA - SAN DIEGO ENERGY CONFERENCE

Courtesy of Marge Hecht, 21st Century Science & Technology

"New Technologies for Energy Utilization Advanced and Innovative Concepts," Printed in *Final Program, 27th Intersociety Energy Conversion Engineering Conference*, August 3-7, 1992, Town & Country Hotel, San Diego, California, page 3.

PARTIAL TEXT OF ARTICLE

Some of the technical papers in the Advanced and Innovative Concepts sessions contain material that ranges from theoretical analysis to experimental testing of concepts that may appear to be in conflict with currently understood laws of physics. Although SAE has attempted to eliminate any such material that directly violates the accepted laws of thermodynamics, there may be some papers that represent technologies or phenomena that cannot be explained by current theory and, like cold fusion, may be controversial in their content. Therefore, these papers have been included in the interest of stimulating unconventional thought. However, SAE accepts no responsibility for their accuracy or content. [Emphasis added. Ed.]

EDITOR'S COMMENTS

We are pleased to learn that the SAE is serving to eliminate material in violation of accepted doctrine and yet permit some papers that can stimulate unconventional thought. We trust that the filter they use will continue to promote the growth and development of enhanced energy conversion systems. To paraphrase Omar, "We wonder often if what the vintner sells is half so precious as the things refused." And we must confess that even at *Fusion Facts* we get items that we do not publish.

ILLINOIS - SUPERCONDUCTIVITY THEORY

Courtesy of Dr. Samuel P. Faile

P. Monthoux, A.V. Balatsky, & D. Pines, "Spin-Fluctuation-Induced Superconductivity," *High T_c Update*, (author's work reviewed), Aug 15, 1992, Vol 6, No 16, page 1.

SUMMARY OF AUTHOR'S WORK

The beginnings of a microscopic theory for high-temperature superconductivity based upon a spin-fluctuation mechanism are described in a preprint furnished by the authors. [Balatsky is affiliated with Los Alamos and Landau Inst. Other two authors listed as Illinois.] Starting from a nearly antiferromagnetic Fermi liquid, the authors show that the retarded interaction between quasiparticles on a two-dimensional square lattice induced by the exchange of antiferromagnetic paramagnons leads uniquely to a transition to a superconducting state with $d_{x^2-y^2}$ symmetry. The authors emphasize the importance of experimentally verifying the prediction of such a pairing state and of exploring its effects on other aspects of the superconducting state. The authors find that the effective quasiparticle interaction responsible for superconductivity possesses considerable structure in both momentum and frequency space. They show by explicit calculations that, if one wishes to obtain quantitatively meaningful results, it is essential to allow for that structure (the authors call this the No-Free-Lunch Theorem) in solving the full integral equations that determine the superconducting transition temperature and other superconducting properties.

MASSACHUSETTS - 1-D MODEL OF F-P CELL

Mitchell R. Swartz (Jet Technology, Weston, MA), "Quasi-One-Dimensional Model of Electrochemical Loading of Isotopic Fuel into a Metal," *Fusion Technology*, Vol 22, No 2, Sept 1992, pp 296-300, 2 figs, 11 refs.

AUTHOR'S ABSTRACT

A quasi-one-dimensional model examines the electrochemical loading of isotopic fuel into a metal

cathode. Both the competitive evolution of gas at that cathode and the ratio of the electric energy to thermal energy may control the spatial distribution and loading rate.

AUTHOR'S SUMMARY

A simple qualitative quasi-one-dimensional model is derived to consider the loading of deuterium into palladium. Both competitive gas-evolving reactions at the metal surface and the ratio of the applied electric energy to thermal disordering energy ($k_B \times T$) may be decisive in controlling the loading of the metal by the deuterons obtained from heavy water. There appear to be possible implications for the shape of the cathode and for codeposition methods of loading the cathode.

EDITOR'S COMMENTS

Dr. Swartz carefully lists the approximations that are made in the mathematical construct of this model. One of the outcomes predicted by the model is the calculation of the magnitude of the electric field that must be met to achieve loading. The author shows that the magnitude of such field may occur in the vicinity of sharp-points (dendrites) on the cathode surface. Swartz also shows that the model implies that the codeposition of deuterons and palladium may provide a more rapid achievement of excess energy because the analysis suggests that such a codeposition may be close to "fully charged" as it is created.

MASSACHUSETTS - TWO HAGELSTEIN PAPERS

Courtesy of Dr. Peter L. Hagelstein

Peter L. Hagelstein (MIT, Research Lab of Electronics, Cambridge), "Coherent and Semi-coherent Neutron Transfer Reactions II: Transition Operators," submitted to *Fusion Technology*, to be published, 16 manuscript pages, 14 refs.

AUTHOR'S ABSTRACT

We have recently proposed a new model which describes the transfer of neutrons to and from nuclei which are embedded in a lattice. In this work we verify the derivation of the phonon operators, and provide formulas which allow for practical computations. We identify two distinct effects which can result in phonon generation: one effect is the analog of the Duschinsky effect (which depends primarily on the phonons modes of the lattice), and the other effect is a recoil effect which is strongly dependent on the nuclear structure. An experiment is discussed where the non-Duschinsky recoil effects would in principle be observable. A computation of the nuclear

matrix element for neutron capture using Fermi's model is included.

EDITOR'S COMMENTS

The first paper in this series of four appeared in the August issue of *Fusion Technology* and was reviewed in the August issue of *Fusion Facts*. See below for the third paper. The fourth paper is nearing completion. It is our judgement that this series of four papers may be the best theory developed from basic principles to explain much of the cold fusion phenomena. Even if you have problems following Hamiltonian equations, it is highly recommended that you read between the formulas to get an appreciation for the physical principles that form the background for this work.

THIRD HAGELSTEIN PAPER

"Coherent and Semi-coherent Neutron Transfer Reactions III: Phonon Generation," submitted to *Fusion Technology*, to be published, 17 manuscript pages, 3 refs.

AUTHOR'S ABSTRACT

We have recently proposed a new model which describes the transfer of neutrons to and from nuclei which are embedded in a lattice. In this work we explore the coupling between the nuclei and lattice phonons, focusing on the question of whether it is possible under any conditions for anomalously large energy transfer to or from the lattice to occur during a neutron transfer reaction. By studying the gamma lineshape, we find that no anomalies are expected for a ground state lattice or for a thermal lattice. Under certain conditions, the frequency of a phonon mode can be shifted significantly in a neutron transfer reaction; phonons initially present in that mode are shifted in frequency during the reaction. This effect produces an anomalous energy shift in the event that [or when] the mode is initially strongly excited.

EDITOR'S COMMENTS

In the Summary and Conclusions to this paper, Hagelstein discusses the implications of his findings to date and suggests that the model as developed could explain some cold fusion experimental observations. He makes the following closing statement, "Alternatively, an ionization step could occur first (with energy transfer to the lattice), leading to a virtual intermediate state which contains an unbound neutron. A subsequent neutron capture brings the system back to resonance. In this proposed second order process, a neutron transfer occurs and a significant net energy transfer to the lattice occurs. In future works we shall explore this mechanism further to see whether it has the potential to account for some of the reported anomalies." We are looking forward to Hagelstein's

fourth paper of this series. In a private communication, Dr. Hagelstein mentioned that he would be defending this model in a meeting involving members of the MIT faculty.

MINNESOTA - MANUFACTURING FUTURE

Courtesy of the Author

Earl C. Joseph (Editor), "Economic Driven Futures, Manufacturing Change & Futures," *Future Trend Newsletter*, Sept 1992, Vol 23, No 7, pg 1, published by Minnesota Futurists, a Chapter of the World Future Society, 245 East 6th St, St. Paul, MN 55101.

EDITOR'S COMMENTS

Professor Joseph describes eight previous manufacturing eras characterized by important technical and philosophical changes: 1800s - use of precision machine tools; 1850 - Interchangeable parts; 1900s - scientific management of labor; 1930s - statistical process control; 1950s - numerical control; 1960s - robotics; 1970s - Computer Integrated Manufacturing; and 1980s - factory automation. Joseph asks the question as to what will be the revolution in manufacturing for the 1990s. Candidate process for the 1990s include Just-in-time logistics; Lean operations; Outsourcing (separating manufacturing from service); Re-engineering; and Total Quality Management. We would like to suggest another technological revolution that would be expected to make dramatic changes in manufacturing: The integrated total power system built into selected manufacturing equipment. This would allow factory floor configurations to be changed without the expense of hooking up the equipment to outside energy sources. When a product changes, rearrange the total manufacturing layout for rapid down-line production. Cold fusion or other enhanced energy systems will make this possible. In addition, such equipment can be designed without regard to the problems of installation and hookup that changes with geography. If a manufactured item is characterized as labor intensive, such a machine could be set down in a third-world village where labor was plentiful without regard to available "infrastructure" except for transportation.

NEW YORK - GRAVITY IS LOOPED?

Courtesy of Dr. Samuel P. Faile

John Horgan (staff writer), "Gravity Quantized," *Scientific American*, Sept 1992, pg 18-19.

EDITOR'S COMMENTS

Professor Abhay Ashtekar, Syracuse University, has proposed a theory of quantized gravity. The fundamental elements (or quanta) of gravity are mathematically treated

as tiny loops. Shortly after Ashtekar reported on his work in 1985 other scientists determined that his approach could yield exact solutions to some of the quantum equations. Among these were Theodore A. Jacobson (University of Maryland), Carlo Rovelli (University of Pittsburgh); and Lee Smolin (Syracuse University). These scientists have jointly demonstrated (mathematically) that these miniature loops are enormously small (about 10^{-35} meter). Such scale of sizes are known as the Planck scale and at this scale quantum gravitational effects are deemed to become significant. The end result of these mathematical manipulations may lead to a better understanding of the nature of gravity or even to some new physics. *Fusion Facts* enjoys articles that suggest that there may still be room in the world for new physics because that seems to have been strongly suggested by the numerous anomalies that have been found in cold fusion experiments.

NEW YORK - CLUSTER-IMPACT REVISED

From Chem Abstracts, August 10, 1992.

R.J. Beuhler, G. Friedlander, L. Friedman (Chem Dept, Brookhaven Natl Lab, Upton), "Cluster-impact fusion [Erratum]," *Phys Rev Letters*, 1992, Vol 68, No 13, page 2108.

AUTHORS' ERRATUM

An error in artifact contributions has been discovered. Cluster-impact fusion rates had been overestimated by at least 2 orders of magnitude and artifacts were primarily responsible for events that were ascribed to cluster-impact fusion. The error was not reflected in the abstract nor in the index entries.

EDITOR'S COMMENTS

The exciting report previously reported by these scientists led to the replication of their experiments in various parts of the world. In addition, other scientist helped to develop and publish theories showing that this experimental data appeared reasonable. We understand that the possible source of the error the authors found was suggested to them by a scientist who has been just as skeptical of cold fusion results. The authors have properly and publicly submitted this paper to clarify their previous data. Skeptics of cold fusion will now be more prone to expect that the many published papers that have replicated the cold fusion experiments and the results first reported by Pons and Fleischmann will sooner or later be retracted. In these two cases, it must be pointed out that only a few papers have reported the replication of the data reported by Beuhler et al. In contrast, over 200 papers from more than 25 countries have reported successful replication of the Pons-Fleischmann data.

There is a lesson for all of us. There is no question as to the integrity of Beuhler, Friedlander, and Friedman. They are competent scientists, they reported their findings, they accepted criticism, they found an error, and they published a correction. Pons and Fleischmann are competent scientists, they have been severely criticized, they have increased their understanding of their experimental work, they have improved on it, they have gathered more data, they have been present in and shared information with colleagues in professional meetings, and they have no reason to retract the report of the bulk of their original measurements.

PENNSYLVANIA - NUCLEAR CORROSION

Courtesy of Dr. Samuel P. Faile

Digby D. Macdonald (Director, Center for Advanced Studies, Penn State), "Corrosion in Boiling Water Nuclear Reactors," *Earth and Mineral Sciences*, 1992, Vol 61, No 2, pp 27-32, 8 figs, 9 refs.

AUTHOR'S INTRODUCTION

In this article, I will focus on one of the corrosion problems experienced by operators of boiling water nuclear reactors, identifying the cause of this problem and its impact on plant operation, and discussing various remedies that have been tried or proposed. I end with a brief discussion of the "institutional problem," because in my opinion the way we established the nuclear industry in this country has had a major impact on its current problems.

EDITOR'S COMMENTS

In his *Fusion Commentary*, for September 1992, Don May reported on a Georgia nuclear facility that is now at least four years behind schedule and two other (Oregon & San Onofre) nuclear power plants that would be closed early. Then we received this article which reports that about 50% of all unscheduled outages are due to the corrosion of power plant systems... amounting to about \$3 million per day for a 1200 megawatt electrical plant. At least part of the problem appears to be the sensitizing of stainless steel upon welding so that intergranular fractures occurs and leads to premature failure of the piping system. In addition, the article discusses the combinations of hydrogen embrittlement and the added effect of radiation embrittlement of the piping structures. The end result can be a major financial embarrassment for the facility that bought and operates the nuclear power plant. As scientists and engineers involved in the technologies that will replace nuclear power plants with enhanced energy systems, we should be aware of some of the pitfalls of inadequate testing and evaluation of systems components used under new conditions, such as were

found in the presence of radiation in these nuclear fission power plants.

VIRGINIA - CLUSTRON MEDIA COVERAGE

Several reports from several sources.

Emily T. Smith (Editor of *Developments to Watch*), "This Theory may make Sense of Cold Fusion," *Business Week*, August 24, 1992, page 77.

SUMMARY: The article cites Ronald A. Brightsen's work at MIT as setting the stage for a new theory of nuclear physics in the 1980s that finally "leapt into the spotlight" with the Clustron press release. His model conceives that clusters of neutrons and protons make up nuclei and that the binding energy can be released in several different ways. His model may explain why cold fusion experimenters report forms of energy that conventional physics does not account for.

The following courtesy of Dr. Faile and Patrick Kujawa:

Mark Potts (Staff Writer), "Va. Firm Claims Cold-Fusion 'Breakthrough'," *The Washington Post*, August 11, 1992, page E1.

SUMMARY: A Virginia company claims a breakthrough that explains both the structure of atoms and the problems with cold fusion. Potts writes, "There have been sporadic reports of other cold-fusion successes in the three year since, but most scientists have continued to be highly skeptical." John Huizenga, for example, is quoted as saying, "I can assure you that cold fusion is not for real." Brightsen is quoted as saying, "A whole new nuclear physics will flow out of this thing." Brightsen predicted that such technology as cold-fusion residential heating systems would be on the market in "three to 10 years." Russell George, President of Clustron Sciences Corporation, is quoted as saying, "I think as the world wakes up to the fact that cold fusion is a reality and that we will be able to control and enhance it...we are going to see a tremendous revolution in energy."

The following courtesy of Dr. Sam Faile:

Lucy Reilly (Senior Staff Writer), "Cold Fusion Warms Anew," *Washington Technology*, August 13, 1992, Vol 7, No. 9.

SUMMARY: The company filed for a patent on August 10, 1992 just prior to making an announcement of the formation and staffing of Clustron Sciences Corporation. [In addition, two technical papers, one by Brightsen, and one by Mallove and Brightsen, were submitted to *Fusion Technology* prior to the public announcement. Ed.] Russell George, President, said that the company is

looking toward launching new physics and a new science. Contract work for the next 3 to 6 months will be awarded to universities, with the company bringing all work in house once the company is fully staffed. Brightsen, CEO, stated that the initial efforts will be toward obtaining patents. Although highly confident, the group appears ready for criticism. Dr. Eugene Mallove, Vice President, mentioned that there is clearly an "anti-cold fusion" conflict between the hot- and cold-fusion communities. "It's like a war."

D. NEWS FROM ABROAD

ARGENTINA - CO/K/Ni(110) SYSTEM

Courtesy of Dr. Samuel P. Faile

A. Ramirez Cuesta & G. Zgrablich (San Luis), "Kinetics and energetics of adsorption for the CO/K/Ni(110) system," *Surface Science Letters*, 1 Sept 1992, Vol 275, Nos 1&2, L636-L639, 5 Figs, 15 Refs, in English.

AUTHORS' ABSTRACT

Thermal programmed desorption spectra for the CO/K/Ni(110) system are analyzed through Monte Carlo simulation. Results support a picture for the coadsorbate phase based on different sites for the adsorption of K (four-fold coordinated sites) and CO (on-top sites) with a direct, short ranged, attractive K-CO interaction whose intensity is estimated to be -0.25 eV.

EDITOR'S COMMENTS

The author's introduction to this paper states, "Coadsorption of alkali metals and gases on noble and transition metal surfaces have received a great amount of attention both due to its importance in catalysis and to the fact that several interesting physical and chemical aspects remain to be studied. Among these aspects we mention the problem of the description of the structure of the coadsorbed alkali metal-molecule complex and the problem of the nature (direct or through substrate) and range of alkali metal-molecule interaction (naturally these two problems are interconnected)." The authors found that their simulation closely fits the available data. Their conclusions support the idea that there are difference adsorption sites on Ni(110) for K (four-fold coordinate). Further that the presence of K induces a new CO adsorbed state.

CHINA - D & h IN PALLADIUM

From Chem Abstracts, August 24, 1992.

Qinghua Dong, Wanchuan Qiu, Fuxing Gan, & Naicai Cai (Chem Dept, Wuhan Univ), "Behavior of deuterium and

hydrogen in palladium," *Gaodeng Xuexiao Huaxue Xuebao*, 1992, vol 13, no 6, pp 847-849, in Chinese.

AUTHORS' ABSTRACT

The absorption and diffusion of deuterium and hydrogen in palladium, and the positron lifetime of palladium during electrolysis were investigated by hydrogen permeation method and positron annihilation spectroscopy. The results show that the electrochemical behavior of deuterium is almost the same as that of hydrogen, but the amount of deuterium remaining in palladium is slightly less than that of hydrogen and the diffusion coefficient of deuterium is slightly greater than that of hydrogen. The positron lifetime in palladium after electrolysis is increased by 10.5%. The behavior similarity of deuterium and hydrogen and the possibility of "cold nuclear fusion" are discussed.

CHINA - DEUTERON STRUCTURE

From Chem Abstracts, August 24, 1992.

Liming Qin & Tansheng Cheng (Physics Dept, Peking Univ), "What can we learn from the magnetic structure function of the deuteron?," *Quark-Gluon Structure, Hadrons Nucleus, Proc. Int. Workshop, 1990*, (Published in 1991), pp 291-293, in English.

AUTHORS' ABSTRACT

In order to get quantitative quark cluster effects, relativistic treatment is required. In particular one needs to investigate the deuteron wave function, especially for the short range part, and meson exchange currents as well as form factors corresponding to every process. A more sophisticated quark model of neutrons may also be needed.

ENGLAND - INTERVIEW WITH FLEISCHMANN

Courtesy of Chris Tinsley, Nottingham, U.K.
(Via Jed Rothwell and Dr. Eugene Mallove)

Chris Tinsley, "Interview About Cold Fusion with Dr. Martin Fleischmann," transcribed from Channel 4 News, Independent Television News, 27 August 1992, England.

The following is an abstract from Tinsley's transcription:

Scientists who three years ago claimed to have discovered cold fusion - a safe and cheap form of nuclear energy - now say they have proof. Professor Martin Fleischmann from Southampton University and his American colleague Stanley Pons were largely discredited when other scientists couldn't reproduce their results. But now, working in secret in the south of France, they say their energy source

can, size for size, generate more power than a nuclear reactor. Tonight Professor Fleischmann will report his results to scientists at the British Association meeting in Southampton. Channel 4 News has obtained the first film of his work. Our science correspondent, Andrew Beech reports: [video shows cold fusion cell with clock at 9:11]

Beech: In a secret laboratory in the mountains near Cannes in the south of France, heavy water boiled in a test tube. [Video shows CF cell boiling hard, clock at 9:48.] Working with Japanese scientists, Martin Fleischmann has developed an energy source which he says is producing power at the rate of one kilowatt per cubic centimeter (presumably of Pd or of Pd/Ni alloy in the cathode. Ed.) [Video shows clock at 12:56.] Size for size, the equivalent of the energy output of the most efficient nuclear power station. [Video cuts to Fleischmann.]

Fleischmann: The quick way of looking at it; it's about the same as a fast breeder reactor.

Beech: That's an awful lot of energy.

F: That's a lot of energy, a great deal of energy. [Video shows Pons moving about the laboratory with lots of electrochemical cells.]

B: Three years ago, Prof. Fleischmann and his American colleague Stanley Pons called this discovery cold fusion ...

F: We said that we have a great deal of energy, we have more energy than corresponds to a chemical reaction, and therefore we thought that had to be a nuclear process. . . . the title of our first paper was supposed to have a question mark in it, because we didn't want to polarize the discussion so far that way. We said there has to be a nuclear reaction. Of course the likelihood was that it is fusion, but you couldn't say that, and until you had absolutely conclusive proof, . . . you shouldn't call it fusion. You should just call it an anomalous process involving deuterium.

B: So you still call it a new energy source, rather than fusion?

F: Yes, but I think it will turn out to be fusion!

B: . . . [Video shows other scientists failing to replicate C.F.] Physicists who had invested decades of work and billions of pounds in developing hot fusion could not accept that the same result could be obtained by a couple of chemists [Video shows Pons again] working with nothing more complicated than deuterium, derived from sea water, and palladium. [Video shows bottle labeled "Spongy Palladium"] The physicist Frank Close insists in his history of the affair, called Too Hot to Handle, that

Fleischmann was wrong. [Video switch to Close walking in open air]

Close: What I'm absolutely certain of is that the original claims that were made, for nuclear power from test tubes, are not for real. Now if indeed there is something going on of a chemical nature - and if that is indeed what they are now beginning to think, from what I'm hearing, then I encourage them in that direction. (I have no idea where Close gets "from what I'm hearing". We have never heard Pons and Fleischmann backtrack from the idea that the enormous excess energy now being produced in anything but nuclear. Ed.) [Video showing a cell labeled in both English and Japanese.]

B: . . . The Japanese are calling it 'hydrogen energy' rather than nuclear fusion. The problem, according to Fleischmann, will come in scaling up the process. The heavy water in this tube [Video shows an electrochemical cell] evaporated in eleven minutes. The device generating the heat is only four millimeters across. [Video shows four electrodes] Anything bigger might explode. . . .

Fleischmann: If you can get it to work, then it would be a very significant energy source. And moreover, it would be possible to engineer it at various different levels, so its impact on our society would be very large.

B: That's pretty conservative.

F: That's very conservative actually, [laughs] it would be very large indeed, the impact on society, it really changes the ground rules. [Video cuts to lecture hall.]

B: At the British Association meeting in Southampton today, Professor Fleischmann was challenged to explain his results. [Video cuts to hesitant questioner.]

Questioner: We are presented with the position of an experiment which cannot be reproduced at one of the premier laboratories in this country, (obviously referring to Harwell. Ed.) which you are, were, a consultant, and also which is going by a process previously unknown to science.

F: Yes.

Questioner: It's quite a lot to take in.

F: Well, it's up to you to either take it in or reject it. When there is a large number of institutions who have reproduced the phenomena, it should give cause for, to make a pause and look at the literature. I think it has been an appalling episode, which people will come to regret. I regretted it at the time, but I think there will be many more people who will regret it in the future. [Video cuts to Close.]

Close: I do have this feeling that we've been promised that cold fusion will be proved, for as long and on as many occasions as the (British) Chancellor has promised us an end to the recession, and the success rate seems to be similar at the present time.

B: Martin Fleischmann expects an academic grilling when he gives details of his research to a full meeting of the British Association here in Southampton later this evening. But after three and half years he has become used to such criticism. [Video cuts to cottage view.]

F: It had been any other project we would have ditched it, of course. But there is here the possibility that it is technologically important, and therefore you have a moral obligation to continue. [Video cuts to a plaque on outside wall.]

Plaque: "Let thy life pass, but be thy work well done." St. Austell.

ENGLAND NEWSPAPERS REPORT

Courtesy of Dr. Eugene Mallove

Tim Radford (Science Editor), "Professor Fleischmann stands by claims," *The Guardian*, Aug 28, 1992, page 5.

Clive Cookson (Science Editor), "Doubters of cold fusion confronted: British Association for the Advancement of Science," *The Financial Times*, Aug 28, 1992, pg 12.

Tom Wilkie (Science Editor), "British Association for the Advancement of Science: Scientists shown video of cold fusion reaction," *The Independent*, Aug 28, 1992, pg 4.

SUMMARY: These three articles all mention, to some extent, the negative belief structure surrounding cold fusion. In addition here are some of the more interesting reports from these articles: Radford states that Pons and Fleischmann were supported by a think-tank which had substantial backing from the Japanese. Fleischmann states that over 40 research institutions had confirmed his results. Fleischmann stated that he would have liked to have had more research time before his first article was published. Fleischmann is quoted as getting between 5 and 50 neutrons per watt of energy produced. Current experiments take about one week to reach "a spectacular energy release" which could be observed for about 15 minutes. Cookson states that Fleischmann showed a palladium electrode about 1 inch in diameter and six inches high [I think this size is unlikely. Ed.] immersed in heavy water. Fleischmann was unable to demonstrate a live working cell at the meeting, due to technical factors. He is quoted as saying, "It takes about a week to initiate the process and then you have about 15 minutes to observe the phenomenon." [Possibly due to the boiling

away of the heavy water? Ed.] The process needs to be more controllable and sustainable before anyone could build a practical energy-producing device says Fleischmann. Cookson states that Japan is making a strong effort to pursue cold fusion as a practical energy source for the next decade. Tom Wilkie was the only writer that stated that Pons and Fleischmann were funded by Technova. Close is quoted as saying that the cold fusion claims contradicted general laws of physics and if anything is going on it is a chemical reaction. Fleischmann showed his colleagues (members of the British Association for the Advancement of Science) a video of the reaction taking place in a test-tube. Fleischmann is quoted as saying that he and Pons had not viewed this process for more than one hour. "They turned off the apparatus for safety reasons, he said."

[Interestingly enough, *The Financial Times* gave the most favorable report of Dr. Fleischmann's presentation to the British Association for the Advancement of Science. Ed.]

GERMANY - TRITIUM IN BIOLOGY

Silvia Diabate & Siegfried Strack (Hauptabteilung Sicherheit Abteilung Biophysik Und Okologie, Karlsruhe), "Tritium Behavior in Biological Systems and Application of Current Knowledge to Dose Calculation Models," *Fusion Technology*, Vol 22, No 2, Sept 1992, pp 278-280, 14 refs.

AUTHORS' ABSTRACT

Within the framework of safety considerations for the Next European Torus (NET), a report has been compiled to review current knowledge of the behavior of tritium in biological systems. Furthermore, a range of models for dose calculation are evaluated with respect to the methods and assumptions used in estimating the dose resulting from tritium uptake due to the ingestion pathway.

EDITOR'S COMMENTS

This article compares several tritium ingestion models. This subject should be of considerable interest to cold fusion workers. At least one scientist we know attributes the ingestion of tritium (while working with nuclear fission) to more than one birth defect in his family. Tritiated water should be treated with the same respect given to battery acid. Don't ingest either one!

ITALY - IMPACT ONTO LITHIUM DEUTERIDE

From Chem Abstracts, August 10, 1992.

G.F. Cerofolini, G. Ottaviani, R. Tonini (Inst. Guido Donegani, San Donato), "Search for nuclear reactions

produced by the impact of heavy molecular ions onto lithium deuteride," *Nuovo Cimento Soc Ital Fis, A*, 1992, vol 105A, pp 741-750, in English.

AUTHORS' ABSTRACT

Preliminary evidence for light element fusion induced by the impact of heavy molecular ions, with mass around 430 atomic mass units (obtaining by fragmentation of $\text{Re}_2(\text{CO})_{10}$) and energy of 140 keV, onto a LiD target is presented. The experimental arrangement excludes the impact of fast light particles due to fragmentation inside the acceleration column and supports the idea of a new underlying physics.

JAPAN - BLACK HOLES OR EVs?

Takaaki Matsumoto (Dept of Nuclear Engrg, Hokkaido Univ, Sapporo), "Searching for Tiny Black Holes During Cold Fusion," *Fusion Technology*, Vol 22, No 2, Sept 1992, pp 281-286, 4 figs, 6 refs (all are papers by Matsumoto).

AUTHOR'S ABSTRACT

A previous technical note suggests that cold fusion is a small-scale simulation of events that occur in cold stars far away in the universe. Therefore, it is expected that tiny black holes might be produced during cold fusion. A search for tiny black holes whose traces might have been recorded on nuclear emulsions is described. Several traces suggesting the production and evaporation of tiny black holes have been successfully observed.

EDITOR'S COMMENTS

The figures in this article are most interesting and show a variety of features. Because of the similarity of the "black holes" in the nuclear emulsion to holes made in witness plates by EVs, it is suggested that the experimental design of the cold fusion cell may be creating EVs. (See *Fusion Facts*, May 1992, page 17ff for a description of the properties of EVs.) If an electrochemical experiment creates bubbles of gas in the vicinity of any metallic conductor, especially in the vicinity of a sharp point (dendrite or otherwise) the breaking of the bubble can act as a local "switch" in a portion of the electrical circuit and create local kilovolts of charge. The combination can produce an EV. A single EV (as shown on very thin film witness plates) can have a dimension of about 1 micron; a necklace of EVs (several EVs that tend to form in a necklace-like toroid) are nominally about 20 microns in diameter. EV necklaces can also have considerable disorganization such as pendants to the necklace or show up (especially near to the point where they are formed) as erratic globs consisting of several EVs. Witness plate photographs often show the separate

EVs in such a disorganized cluster. As an EV consists of a minimum of several million closely bound electrons, an EV can punch a hole through thin foils and, one would suppose, through nuclear emulsions. Alternatively, a disintegrating EV can produce X-rays. Using Occam's razor (simplest explanation), the presence of some of the observed small diameter holes observed in cold fusion experiments may be due to the formation and disintegration of EVs. Regardless of this speculation, Matsumoto continues to provide us with interesting emulsions tracks and is constantly seeking appropriate physical explanations for these observed cold fusion effects.

JAPAN - COMPLEX Pd CATHODE

Yoshiaki Arata & Yeu-Chang Zhang (Osaka Univ.), "Reproducible 'Cold' Fusion Reaction Using a Complex Cathode," *Fusion Technology*, Vol 22, No 2, Sept 1992, pp 287-295, 13 figs, 9 refs.

AUTHORS' ABSTRACT

A new complex cathode was developed, consisting of a nickel (or palladium) rod with a palladium layer applied by plasma spraying. High reproducibility of a "cold" fusion reaction is confirmed by using this cathode. The palladium layer activates the surface functions of the deuterated cathode, and reliable evidence is obtained that a new type of heat generation occurred in the complex cathode.

AUTHORS' CONCLUSIONS

In most of the previously published research on neutron generation in cold fusion, statistical analyses have been used, and the background condition has been the basis for calibration. The reliability of such analysis for cold fusion is not high. The authors' repeated experiments with a complex Pd(Ni) cathode, using a calibrated ^{252}Cf neutron source as the basis for comparison with the cathode-generated neutron flux, allowed demonstration of a high degree of reproducibility for a cold fusion reaction. Moreover, the sprayed palladium surface layer of the complex cathode was seen to substantially activate the absorption and discharge of deuterium. This was shown by the detection of a substantial exothermic reaction in the air. The authors believe this to be the reaction heat from oxidation of deuterium in the palladium surface layer.

EDITOR'S COMMENTS

The authors used a 20 mm diameter x 50 mm long Ni rod coated with about 300 micrometers of Pd. This basic

cathode also includes a cylindrical extension in which a hole is bored to facilitate measuring of the cathode temperature from the inside. The results of neutron measurement showed a significant higher count rate for the Pd(Ni) cathode used in heavy water and slightly above background when using light water. The temperature change of the cathode is shown to be most dramatic when the loaded cathode is taken out of the cell and exposed to the air. As one would expect, the combination of the gas leaving the Pd would be oxidized in the air and cause considerable surface heating of the palladium rod. The authors showed that the addition of the Pd to the Ni rod by plasma spraying in a low vacuum provided a higher "degree of activation". They stated, "The activation is likely due in large part to the uneven and hence enlarged surface area and to the numerous active microdefects in the palladium layer."

studied. The characteristic features of the optical potentials near 400 MeV -- the wine-bottle shape of the central part and the enhanced spin-orbit strength -- are pure relativistic effects mainly due to the (+-) and (-+) propagations, whereas the effects of the (--) propagations are small.

RUSSIA - GLOW DISCHARGE FUSION

From Chem Abstracts, August 24, 1992.

V.A. Romodanov, V.I. Savin, M.V. Shakhurin, V.T. Chernyavskii, & A.E. Pustovit, "Nuclear fusion in a solid," *Zh. Tekh. Fiz.*, 1991, Vol 61, No. 5, pp 122-125, in Russian.

AUTHORS' ABSTRACT

The feasibility was studied of accomplishing cold fusion during the interaction of gaseous D with different metals under conditions of a glow discharge at 100 to 1000 volts with current density of 25 to 500 amps per sq. meter, and D pressure maintained at 500 to 15,000 Pa. The temperature of the sample during the process was 300 to 2100 K. Cathode materials used were Pd, Ti, Zr, Y, Nb, Ta, V, Er (all hydride forms) and Cu, Mo, Fe, Ni, W, Al, Ag, and Pb (not forming hydrides under ordinary conditions). The results are reported of recording the neutrons fluxes (with cathodes of Cs, Pd, Ti, B, Be, Li) and of measuring the beta-activity of D samples with T using V cathodes. To record neutrons, which can develop during the bombardment of surfaces of materials by accelerated ions, additional shielding of standard recording devices from electromagnetic vibrations both from the input circuit as well as the supply line is needed. A substantial increase of the T concentration in the D during passage of the latter through metal bombarded by accelerated ions from a glow discharge plasma was noted.

JAPAN - NMR STUDY OF Pd HYDRIDE

From Chem Abstracts, August 10, 1992.

T. Erata (Tsukuba Univ.), "NMR study on the behavior of hydrogen in palladium hydride," *KEK Proc.*, 1992, vol 92-1 (Current Status Future Prospects), pp 14-30, in Japanese.

AUTHOR'S ABSTRACT

Metal halide as a means for storage of energy, examination of the possibility of low-temperature nuclear fusion, NMR spectra of hydrogen in palladium and deuterium in palladium, and NMR spectral shapes of hydrogen in metallic palladium at different temperatures are discussed. It was concluded that hydrogen in PdH_x probably occupied both tetrahedral and octahedral sites.

JAPAN - DEUTERON-NUCLEUS SCATTERING

From Chem Abstracts, August 24, 1992.

Kiro Miyazaki (Osaka Univ.), "Effects of negative-energy propagations in deuteron-nucleus scattering," *Prog. Theoretical Physics*, 1992, vol 87, no. 6, pp 1421-1433, in English.

AUTHOR'S ABSTRACT

The effects of negative-energy propagations in the effective optical potentials for relativistic deuteron-nucleus elastic scattering are investigated using Breit approach. First, we consider the effects of the (+-) and (-+) propagations. They represent that one of the nucleons in the deuteron propagates in its positive-energy state, while another propagates in its negative-energy state. Second, the effects of the (--) propagation, which represents that both the nucleons propagate in their negative-energy states, are

RUSSIA - LOW-TEMPERATURE FUSION

From Chem Abstracts, August 24, 1992.

I.L. Gerlovin, R.Kh. Baranova, P.S. Baranov, "New approach to low-temperature nuclear fusion," *Zh. Obshch. Khim.*, 1992, Vol 62, No. 1, pp 230-232, in Russian.

AUTHORS' ABSTRACT

A first communication is presented on the results of a principally new approach to low-temperature fusion based (1) on a new, unique fundamental (not Coulomb) field theory; (2) on the experimental confirmation of the hypothesis of the theory; and (3) on the discovery of the feasibility of practical use of the obtained results. Even a constant magnetic field substantially affects the entire course of the process and especially the neutron yield.

The verification process involves the following: (a) the production of neutrons in the experiment occurs even if one used distilled water as the electrolyte and saturation of the electrodes with deuterium is absent; and the energy characteristics of the process depend on the method and magnitude of orientation of the nuclei both in the electrode material as well as in the electrolyte.

RUSSIA - COLD FUSION THEORY

From Chem Abstracts, August 10, 1992.

B. Ya Moizhes (Fiz.-Tekh. Inst. im. Ioffe, Leningrad), "Formation of compact molecules of deuterium in interstices as a possible explanation for cold fusion," *Pis'ma Zh. Tekh. Fiz.*, 1991, vol 17, no. 15, pp 15-17, in Russian.

AUTHOR'S ABSTRACT

One hypothesis for explaining the mechanism of cold fusion involves the possibility of accelerating nuclei to large energies, e.g. during the cracking of crystals. Another hypothesis is concerned with the feasibility of a statistical approach of the deuterium nuclei up to small distance owing to the screening of the Coulombic repulsion of the electrons. The latter mechanism was studied in this paper. Despite the approximate nature of all the estimates, the hypothesis concerning the possibility of explaining cold fusion by the formation of compressed D_2 molecules in the interstices or in some kind of defect in the crystal serves as an approach to more detailed experimental and theoretical confirmation.

SWEDEN - STRONG INTERACTION

Courtesy of Charles Becker, San Antonio

Arne Bergstrom (Research Inst of National Defense, Stockholm), "Electromagnetic Theory of Strong Interaction," *Physical Review D*, 15 Dec 1973, Vol 8, No 12, 29 references.

AUTHOR'S ABSTRACT

From dielectric-diamagnetic properties shown to be inherent in the electromagnetic interaction itself by its very nature, and the fact that the dielectric attraction effect in a charged dielectric medium may dominate over the pure Coulomb repulsion, a hypothetical mechanism, which under special circumstances seems to be able to hold a charged object together, is presented, the diamagnetic property making the mechanism independent of the velocity of the object. This approach is shown to give a Yukawa-type equation for the electromagnetic field within a charged medium, and leads to a tentative electromagnetic interpretation of strong interaction

analogous to the theory of plasmons. In addition to the prediction of the pion mass from the nuclear interaction range as in the Yukawa theory, the electromagnetic approach also predicts the existence of a lighter stable structure with a mass which agrees in order of magnitude with the mass of the electron, and suggests the existence of an excited state of this structure with a mass which agrees with the mass of the muon. On a macroscopic scale, the hypothetical charge-confinement mechanism presented gives energy contents for ball lightning which are of the same order of magnitude as the extremely high value (about 10^7 Joules) reported for this phenomena.

AUTHOR'S INTRODUCTION

The subject of this paper is the mysterious fact that although physical experience seems to tell us that charged substances tend to fly apart as a result of the Coulomb repulsion, still in nature there are objects like ball lightning, atomic nuclei, and elementary particles, which seemingly contradict this experience. [We can now add high-density charge clusters of 10^8 electrons. Ed.] Ingenious theoretical models have been proposed to explain the forces necessary to counterbalance the repulsive forces in these cases, such as the Yukawa theory for the strong nuclear interaction, through which the existence of the pion was also predicted. Ascribing the mechanisms holding the objects together to forces outside electromagnetism, however, introduces a logical inadequacy in the electromagnetic theory: on one hand, electromagnetism is a relativistically invariant theory, and on the other hand, one then has to resort to forces outside electromagnetism in order to construct a relativistically correct energy-mass relationship for a finite charged object. In view of this, an attempt will be made here to find a mechanism for the strong interaction within the framework of electromagnetism.

The principle upon which the theory of this paper is built is a phenomenon which has been known ever since ancient times and which even has given electricity its name: the fact that, e.g., a piece of amber after rubbing will attract uncharged objects. This implies that even if the objects are charged with the same kind of charge as the piece of amber itself, the attraction due to the polarization in the objects may dominate over the Coulomb repulsion. . . .

EDITOR'S COMMENTS

Many skeptics of new technology, such as cold fusion, regularly cite the "Coulomb Barrier" as being the physical principle that must be overcome for, specifically, cold fusion to work. Although this article is almost twenty years old, the subject is timely both for cold fusion and also for its possible application to high-density charge clusters of 10^8 electrons (as taught by Ken Shoulders'

patents.) We now know that "beads," "strings," and "necklaces" of electrons can be formed, measured, controlled, and used. Therefore, this article that predicts some such "charge-confinement mechanism" deserves your review. The author provides an excellent paper based on Maxwell's equations to derive the wave equations for an electromagnetic field within a charged cloud. The paper discusses the assumptions made that there is no relative motion within the charged cloud. It would be of considerable interest to determine the mathematical consequences of treating these charges as though they were in an intense toroidal motion to see if one could derive from Bergstrom's work a model of the EV or electron bead.

other scientists particularly in Japan set up apparatus and began to look into the possibility of fusion in solid metals. The reaction from workers in the hot fusion field, who had pursued the dream of infinite clean fusion power for decades, was outrage.

Most of the workers in the hot fusion field are plasma physicists. This group includes scientists from most of the major defense and applied science labs in America: Los Alamos, Lawrence Livermore, MIT, Princeton, et al. The present Department of Energy (DOE) hot fusion research budget is about \$500 million a year. This group has tremendous clout in Washington because of its importance in classified cold-war weapons research such as star wars. The reported discovery of cold fusion by private chemists was a major blow to plasma physicists' prestige, credibility and career prospects.

E. SHORT ARTICLES FROM READERS

COMMENTS ON COLD FUSION

By Dana Rotegard

Cold fusion is one of the most positive developments of twentieth century science and could replace fission and fossil fuel through the sheer pressure of microeconomics. Unlike wind and solar power, it is a concentrated "hard" energy source capable of powering many devices such as cars and ships. Unlike fission, it is safe and produces few or no nuclear wastes; unlike hot fusion, it is in prototype NOW and is simple; unlike fossil fuels, its fuel is virtually infinite, apolitical, and non-polluting. It seems too good to be true but after reading papers from this field and talking to key scientists and entrepreneurs I agree with the Japanese magazine *Bungeishunju* that ran an article last year entitled, "The reality of cold fusion can no longer be denied." The fact that Japan's Ministry of International Trade and Industry (MITI) is backing cold fusion commercial development convinces me that the wall of denial and misinformation will soon be shattered by the unrefutable presence of prototypes for a variety of uses.

Several Department of Energy funded teams have replicated the original cold fusion experiments from Utah. Dr. Edmund Storms of Los Alamos National Laboratory had compiled 363 positive references in the technical literature as of May 1991. Established journals such as *Fusion Technology*, *Journal of Electroanalytic Chemistry*, *Scientific American-Nikkei Science*, *Physical Review Letters*, and a host of other technical journals around the world have published these results.

The press conference on March 23, 1989 at the University of Utah where Drs. Fleischmann and Pons announced cold fusion was one of the major events of modern science. Within a month labs at Texas A&M, Stanford, Brookhaven, Moscow, and elsewhere had announced at least partial replication of the results while hundreds of

In 1989 cold fusion was driven off the front pages and back into the chemical journals. Work continued at Stanford, Texas A&M, University of Utah, The University of Minnesota, Cal Poly, Los Alamos, Brookhaven, and other reputable labs. It was primarily done at private expense and/or on a small budget. The results have been reported for over three years though *Fusion Facts*, published in Salt Lake City, Utah and results have appeared on various computer nets but not reported in mass media science reporting. Cold fusion has now been "independently verified" to the point of overkill.

By the end of August 1992, *Fusion Facts* reported a total of over 90 international patent filings (mostly Japanese), several hundred positive peer-reviewed and published papers from over 25 countries and at least four working experimental prototype systems reliably producing excess energy in commercially-useful quantities. Many more scientists have done the experiments, published positive results, but kept a low profile, apparently for fear of misinformed attacks. According to a major paper published in the September 1992 issue of *Fusion Technology* by Dr. Robert T. Bush, cold fusion is a hydrogen-alkali-metal nuclear fusion reaction that takes place in or on the surface of solid metals such as palladium, nickel, and titanium.

Ordinary hydrogen atoms are apparently combined with potassium ions on or near the surface of a nickel cathode. This action takes place in an electrochemical cell (similar to that disclosed by Pons and Fleischmann in their 1989 landmark paper). In the presence of an electrical current and, for example, a nickel cathode, a nuclear reaction takes place using the potassium and hydrogen to produce calcium and excess energy from the "mass defect" (left over small portion of mass) in accord with the famous Einstein formula $E=mc^2$. A scientific consensus is emerging among cold fusion scientists that this cold fusion model (Bush's new transmission resonance model) explains

the experimental results from the Fleischmann-Pons experiments, the Bush-Eagleton experiments, and of many other cold fusion replications. Every paper I have read reporting positive cold fusion laboratory results is consistent with this theory and it also explains why the physicists were so off base on cold fusion in 1989.

Scientists in America, India, Japan, and elsewhere are seeking to find commercial backers to engineer and market a new, inexpensive, safe, environmentally benign source of power that runs on water and ordinary chemicals. In Japan, cold fusion is accepted as fact and there is a bidding war for the scientific talent. The Japanese MITI is backing the modified Fleischmann and Pons approach of Dr. Takahashi of the University of Osaka, and the Japanese firm Technova Inc. has hired the much abused Fleischmann and Pons, who are working in France. The simplicity of the technology and its human scale suggests that massive market penetration could take place once commercial prototypes are developed for selective market niches such as space heating, water heating, powering electric cars, or generating non-grid electricity. This work has enormous commercial implications as was swiftly realized by Japan's MITI. Cold fusion already has official support from Japan, India, Italy, Russia, Spain, and the Electrical Power Research Institute (EPRI) in Palo Alto, California.

The Department of Energy in Washington and the science advisors to the current administration have either attacked this work or are ignoring it. This action has made it difficult for American cold fusion scientists to find commercial backers despite that fact that many of the best patents and much of the scientific work are American in origin. Leonardo da Vinci once made the comment that there are "three classes: those who see; those who see when shown; and those who do not see." America deserves better than third-class thinking on energy policy.

SOME DATA TO BE CONSIDERED FOR CLUSTRON MODEL

Dr. Samuel P. Faile suggests that the experience of Dr. Dennis Cravens be cited in consideration of the Brightsen Clustron Model. Dr. Cravens found that when he added about 10% light water to a working Pd/LiOD electrochemical cell that the generation of excess heat was stopped. In addition, M. Srinivasan (personal communication) cited BARC work in which an addition of 25% of D₂O did not appear to greatly effect the production of excess heat from Ni/potassium carbonate/H₂O electrochemical cells. Further information concerning extensive experimental work with light-water/nickel cells is expected to be presented at the Nagoya Cold Fusion Conference in October, 1992.

F. LETTERS TO THE EDITOR

LETTER FROM DR. MATSUMOTO

Dept of Nuclear Engineering, Hokkaido University

Dear Mr. Fox,

I am pleased to inform you that the program of the Japan Atomic Energy Society will be held October 20 to 22, 1992, at Nagoya University. This meeting partially overlaps the International Conference on Cold Fusion. The building for both conferences are nearby. Here are some cold fusion papers that will be presented October 20, 1991 from 9:30 to 10:55 a.m.

A1: Cold fusion and width of cracks, by N. Yabuuchi (Kouken Institute).

A2: Nuclear fusion by electron bombarding H, D molecules in Aluminum, by K. Kamada (Nuclear Fusion Institute).

A3: Analysis of fusion rate at D-ion irradiation of hydride solid, by R. Aitohh, A. Kitamura, Y. Furuhashi, M. Nakajima (Kobe Marine Univ.).

A4: Primary cold fusion experiment by D beam, M. Fukuhara, T. Iida, J. Datemichi, A. Takahashi (Osaka Univ.).

A5: Charged particle emission by pulsed electrolysis, by R. Taniguchi, T. Yamamoto (Osaka Prefec. Univ.).

Yours sincerely, /s/ T. Matsumoto

[Dr. Takaaki Matsumoto is an Associate Professor in the Department of Nuclear Engineering at Hokkaido University in Sapporo, Japan. We thank him for this list of papers. Ed.]

CONGRESSMAN RESPONDS ON COLD FUSION

Courtesy of Dana Rotegard

The following letter was sent by the Honorable Martin Olav Sabo, member of the U.S. Congress from Minnesota:

Dear Dana:

Thank you for contacting me about cold fusion research.
...

I have discussed this issue with the House Science and Technology Committee, which apparently has been approached by a number of people about the U.S. Government's lack of support for cold fusion. The Committee does not believe that a hearing is the best way to analyze the validity of the claims that have been made

for cold fusion, but hopes to encourage the Department of Energy to review the claims made for the technology.

Unfortunately, the Committee has been unable to locate a major researcher who is willing to allow DOE the data access that would be needed to verify and replicate the claims that have been made for cold fusion. As you may know, DOE spent several million dollars trying to replicate the results claimed by scientists in Utah, but was unable to do so. Without independent verification of experimental results, it would be very difficult for the government to devote major resources to this field.

I would be happy to convey to the Science Committee the names of any major cold fusion researchers who would be willing to work with DOE on this effort. ...

Thank you again for contacting me.

Sincerely, /s/ Martin Olav Sabo, Member of Congress

EDITORS NOTE: Nearly all of the world's "major cold fusion researchers" read *Fusion Facts*. Are there any volunteers? If so please write to the Honorable Martin Olav Sabo at 2201 Rayburn House Office Bldg, Washington, D.C. 20515 or telephone his office at (202) 225-4755.

It is an intellectual tragedy that DOE "trying to replicate ... but was unable to do so" when the published reports from at least three DOE-funded national laboratories and from at least six teams of researchers were not only able to replicate cold fusion but to advance the state of the art. Congressman Sabo is a member of the Permanent Select Committee on **Intelligence**. Perhaps he can find out how to ship some to DOE; they appear to have misplaced theirs.

SENATOR WRITES ABOUT COLD FUSION

Courtesy of Dana Rotegard

Dear Mr. Rotegard:

I received a copy of the correspondence that you sent to Scott Adams regarding the lack of Federal support for cold fusion research. I want to thank you for keeping me informed of the matter. My office continues to examine the current research allocations within the Department of Energy and the need to consider cold fusion.

I hope that we can help your efforts on behalf of cold fusion. If you would like further assistance from me, or have additional information to share, please contact Scott Adams at my St. Paul office: ...

Sincerely, /s/ Paul Wellstone, United States Senator

EDITOR'S COMMENTS: It appears that Mr. Rotegard and other concerned Minnesota concerned citizens are doing something to get some federal interest in cold fusion. In our opinion, they will be successful in getting one or more of their Minnesota universities funded for further cold fusion research. We applaud their efforts.

G. MEETINGS AND MISCELLANEOUS

THIRD ANNUAL COLD FUSION CONFERENCE

Hal Fox, Editor-in-Chief of *Fusion Facts* will attend the forthcoming (October 21 to 25, 1992) Third International Conference on Cold Fusion to be held in Nagoya, Japan. We look forward to again hearing from the scientific stalwarts who are pursuing the new science of cold fusion.

If you are presenting a paper at the conference please bring an extra copy for the *Fusion Facts* staff. We want to be sure that we help to get your important information brought to the attention of our many readers around the world. Thank you in advance for this courtesy.

2ND ANNUAL CONFERENCE PROCEEDINGS

Tullia Bressani, Emilio Del Giudice, Giuliano Preparata, Editors. VOLUME 33 - THE SCIENCE OF COLD FUSION, Conf. Proceedings published by Societa Italiana di Fisica, 46 figs, 528 pages, ISBN 88-7794-045-X.

Three years after the first announcement by Martin Fleischmann and Stanley Pons, it is possible to make a balanced appraisal of the discovery of cold fusion. This book contains the *Proceedings of the Como Conference*. Through the language of science, hints are presented of the subtle and fascinating mechanism by which an enormous amount of energy is stored inside matter and the difficulties met in trying to unlock this treasure.

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The goal of *Fusion Facts* is to present the latest information on enhanced energy devices in the **shortest possible time**. Therefore, we use only our local staff, correspondents, and scientist friends in making acceptance decisions on submitted articles.

We are especially interested in any new discoveries that improve the replication of cold fusion electrochemical cells or of other devices that provide excess energy. We are also interested in simply-stated summaries of your theories or models, especially as they pertain to improvements of devices that produce excess energy.

Brief **Letters to the Editor** are also welcome. Topics of interest include latest business developments related to cold fusion, patent information, and your constructive criticism of any cold fusion concepts. We especially welcome news of any **enhanced energy devices** that have been reduced to practice.

Remember to keep your written material simple but precise. A large fraction of our subscribers do not have English as their primary language.

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