

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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UPCOMING CONFERENCES

4th ICCF - December 6-9, Maui, Hawaii
Russian Conference on C. F. - Sept. 28-Oct. 2
International Forum on New Science - Oct 13-17
Minsk Conference on New Energy - May 1994

A. COLD FUSION: A CAPITAL SUBJECT

A Report by Dr. Eugene F. Mallove and Jed Rothwell on the "Cold Fusion Information Seminar," held in the Rayburn House Office Building, July 23, 1993.

Three representatives of Cold Fusion Research Advocates, Jed Rothwell, Eugene F. Mallove, and Thomas Benson organized "The Cold Fusion Information Seminar" for all members of Congress and their staffs. The seminar included a showing of the video documentary, "The Secret Life of Cold Fusion," that was produced by the Canadian Broadcasting Corporation and aired in Canada on June 24, 1993. At the seminar, both Jed Rothwell and Eugene Mallove made brief presentations and handed out literature.

Several days before the cold fusion seminar, every Representative and every Senator was sent the following items:

1. An invitation to the July 23rd showing of the "Secret Life of Cold Fusion," signed by Congressman Swett.
2. Another invitation to the July 23rd showing of the "Secret Life of Cold Fusion," signed by Jed Rothwell and Eugene Mallove.
3. The August 1993 issue of *Popular Science*, with the cover story by Jerry Bishop, "Cold Fusion, Fact or Fantasy."
4. A copy of the London *Sunday Times* article by Neville Hodgkinson, "Storm in a Bucket: What Happened to the 'Greatest Scientific Discovery of the Century'?"

Congressman Swett's message to his 534 colleagues was the following:

Dear [First Name],

I would like to call to your attention the upcoming showing of a documentary on a fascinating emerging field of energy research.

This Friday, July 23rd, Cold Fusion Research Advocates will be showing a half-hour video which documents surprising new results from recent research efforts. Attached is a letter inviting you to attend.

Although it is far too early to predict where this research will eventually lead, I'm sure you'll agree that we need to be alert to any potential new energy sources. I hope to see you or a member of your staff Friday morning.

With warmest regards,
Dick Swett
 Member of Congress

Members of Congress and their staff now have in their hands all the information they need to determine that cold fusion is an active field of investigation in Japan, in the U.S., and elsewhere. Furthermore, both the *Popular Science* and London *Sunday Times* articles leave little doubt that **something new and revolutionary has been discovered**, despite the pathetic, vague protests of negativists such as Drs. Huizenga, Close, and Petrasso.

About 25 people showed up for the seminar, including Representative Jay Kim (R-CA), and several technically knowledgeable people who came from the Energy Subcommittee of the House SST Committee. Many of the staffers appeared to understand the issues and they asked detailed technical questions. Also distributed were additional copies of the CBC tape, the August *Popular Science*, copies of Arthur C. Clarke's PASOLS speech, and technical papers by Pons and Fleischmann, McKubre, Miles and others.

After the CBC video was shown, Jed Rothwell read the following statement to the assembled guests:

My name is Jed Rothwell. My area of expertise is cold fusion in Japan. The video touched on this subject, but it did not bring out the fact that Japan leads the world in this research. I speak Japanese, and I have been in contact with researchers, government officials, and science journalists there frequently. The information I

am presenting today comes from national newspapers, technical magazines and journals, and official Japanese Government publications. Let me address a few questions that people often ask me:

1. What is the Ministry of International Trade and Industry (MITI) doing?
2. What is the size of the effort, how many Japanese companies are involved?
3. What are the results; how close are they to commercialization?
4. What do they think it is?

Question 1: In 1992, MITI organized a cold fusion research and development consortium including 10 of Japan's largest corporations. In the spring of 1992, the newspapers reported that five other corporations asked to join. Public interest in cold fusion picked up, and last July MITI's plans were featured in the mass media. The Yomiuri newspaper trumpeted the news in a first page headline: "Nation Begins Full Scale Research." Cold fusion research in Japan is not secret.

Last fall, MITI invited me to a planning session of the consortium, where I learned about their plans in some detail. The members of that consortium include: the Chubu Electric Power, Hitachi, Toshiba, Fuji Electric, Toyota and others. The research is directed by a team of top scientists from these corporations, led by the distinguished Professors Pons and Fleischmann, in their role as senior advisors to MITI. They work for Toyota, but they also help direct the government program.

Question 2: I estimate government and private industry in Japan together spend at least \$90 million per year on cold fusion. The number that you hear sometimes is \$25 million over 4 years from MITI, but that is only the tip of the iceberg. The director of the MITI program explained that the \$25 million is a special fund for extra equipment, travel, and other expenses at the National Laboratories which exceed normal discretionary funding levels.

To get an idea of how serious they are, a list of Official Sponsors for the Nagoya Conference includes: The Physical Society of Japan, The Japan Society of Applied Physics, Atomic Energy Society of Japan, The Institute of Electrical Engineers of Japan ...and 36 others. This is the crême-de-la-crême of Japanese science. I have the latest edition of a top scientific publication: the *Journal of the Japan Society of Applied Physics*. It includes 6 articles on cold fusion.

Forty-six Japanese corporations sent representatives to the October 1992 Nagoya Conference. The head of the Government program, Professor Ikegami, estimates that 20 of the big corporations are "**serious about this research.**" Some of the smaller companies I talked to had only one or two people. Big companies appeared to have 10 or 20, and Toyota, which is the biggest, had at least 80. I estimate there are 150 scientists [working on cold fusion] in government and at least 450 in industry, a total of 600. With salary and overhead the cost comes to 90 million dollars. That figure does not count capital expenditures like the new Toyota lab. (It was built from the ground up for cold fusion research, so it must have cost tens of millions.)

Question 3: The video gave you a good idea of the timing for commercialization. Starting from scratch in 1989, they [including Pons & Fleischmann] have increased the strength of the cold fusion reaction, one hundred fold. They achieved 150 watt reactions last year, with 10 times the power density of commercial fission reactor rods, and produced high temperatures which boil water. This is a key point: if you want to generate electricity, you have to boil water. By the end of this year, as you saw, they hope to have 10,000 to 20,000 watt reactors that operate continuously. MITI has said that they expect to see prototype electric power generators by 1997.

Question 4: They are not sure whether the observed energy is nuclear fusion or not. They know it is not an experimental error, and they know it is not chemical energy. So, every single Japanese scientist and government official has told me: "We don't know what it is. That's what we are trying to find out." These are pragmatic people. In 1989, they decided that cold fusion might just be a real phenomenon, so they decided to investigate it. They found out it works. As the Director of the MITI program said to me, "I don't care what it is, as long as it works." That what's happening in Japan. Now, I would like to make one more point.

The video said that if you are not an expert, you can't understand the issues, because this is a complex scientific debate. That is just not true. Toyota has demonstrated a device the size of a match that generates 150 watts of heat. There can be no mistake about that! Hold your hand over a 150 watt incandescent light bulb and you will see how easy it is to detect that much heat. Now, when you light a match, it burns and generates roughly 150 watts -- that's fire, a form of chemical energy. After a minute, the fuel is exhausted and the fire goes out. Some of the cathodes

shown in the video remained hot for four hours. **Not a minute or two: four hours.** So it can't be a chemical reaction. It continues 250 times too long. You don't need to be a scientist to understand that a match can't burn for four hours.

Thank You, Jed Rothwell

Following Jed's statement, Eugene Mallove quoted Professor Ikegami from the Proceedings of the Nagoya Conference: "It is my belief that cold fusion will become one of the most important subjects in science, one for which we have been working so patiently, with dedication and with courage, for future generations, for those who will live in the twenty-first century."

Then Eugene discussed the key CFRA action points:

Proposed Federal Actions to Regain U.S. Leadership in Cold Fusion

I. Remove Obstacles

- * Allow NAS Study on Alternative Fusion (\$300K)
- * Request Cold Fusion Research Category for SBIR Proposals at DOE
- * Identify Reasons for Obstacles at Patent Office

II. Promote Involvement at National Level

- * Hold Hearings on Cold Fusion (in Relevant House and Senate Committees) to:
 - Review New Developments
 - Examine International Aspects
 - Develop U.S. Initiatives, Including a DOE Program

III. Fund Research

- * Existing Individual Ad Hoc Cold Fusion Research at Federal Labs
- * University Research in Cold Fusion
- * Innovative Research by Individuals and Corporations

The two key action items emphasized were: (1) To allow a \$300K study by the National Academy of Sciences (NAS) of "Alternative Fusion Energy" and (2) Hold hearings on cold fusion in the relevant House and Senate Committees. These are the goals which CFRA feels are most immediately attainable. We have confirmation that HSST Chairman, Congressman George Brown (D-Calif) did, indeed, send a letter to House Appropriations

Committee member, Rep. Tom Bevill (Chairman of the Subcommittee on Energy and Water) specifically requesting that the \$300K be appropriated for the NAS study. Most unfortunately, that request has been sidetracked, in part due to the behind-the-scenes maneuvering of several New Jersey congressmen who were protecting the Princeton University hot fusion enclave.

This July 23rd the CFRA initiative was the most intense lobbying effort that we could muster with our limited energy and resources. It was a step in the right direction, but not nearly enough for what must be accomplished in Congress. We have been told by Congressional staffers that we simply MUST have a permanent presence in Washington, D.C., or we will continue to flounder. Virtually every major interest has some kind of office in the Washington, D.C. area, so that Congressmen and Senators can be reached repeatedly and efficiently. Lacking such a presence, CFRA and the cold fusion community are simply relying on a "wing and a prayer" to carry the day. That simply will NOT work!

The fight is just beginning and we are ill-prepared without a serious Washington presence. CFRA will continue to fight the good fight in an informal way. Until those who have the resources to support Congressional lobbying actually put up the necessary funds, we will do no more active lobbying of Congress. We will move on to pressing research and business activity. Those of you who have ideas for carrying on the struggle in Washington are welcome to contact us at Cold Fusion Research Advocates, 404-451-9890 or at 603-228-4516.

B. THE PATHOLOGICAL SKEPTICS

By Hal Fox

The highly respected Admiral William Leahy, naval aide to President Franklin Roosevelt, emphatically stated in 1945, "...the biggest fool thing we've ever done. The atom bomb will never go off and I speak as an expert on explosives." More recently we have heard from other experts:

Dr. Robert K. Adair, nuclear physicist at Yale: "I would certainly bet only at long odds that there is any such things as cold fusion," 1991.

Dr. John Huizenga, Professor Emeritus at University of Rochester, N.Y.: "...during 1989 the Department of Energy spent tens of millions of dollars on this [cold fusion]...And the prognosis was that there just simply wasn't anything there." Stated on National Public Radio, June 25, 1993. Four government funded labs had replicated Pons and Fleischmann's results.

These kinds of statements have been appropriately labeled by Dr. Edmund Storms as "pathological skepticism." Each new major advancement in science has historically been unacceptable to some group of scientists. After a distinguished career and, in many cases, a productive career based on the acceptable science of their generation, some scientists seem more prone to condemn than to accept major new discoveries. They forget that the major tenet of science is discovery.

In a recent article, Edmund Storms [1] lists the byproducts of cold fusion experiments as follows: (1) Heat; (2) Tritium; (3) Helium; (4) Gamma radiation; (5) X-radiation; (6) Neutrons; (7) Strange Particles; (8) Transmuted atoms. The list is in the order of supposed decreasing reaction rates. Edmund Storms dealt with many of these topics in his detailed summary report on cold fusion [2].

Cold fusion skeptics have proclaimed that if fusion-type nuclear reactions were to occur in a Pons-Fleischmann electrochemical cell that there would be a vast number of neutrons produced. This strong reaction against cold fusion is based on (1) the supposition that the only nuclear reaction would be d+d and (2) the belief that any electrochemically-produced nuclear reactions would be essentially the same as the results of gas-plasma experiments. **Because neither supposition is correct, the cold fusion skeptics have been indulging in verbal sword-fighting with straw men.**

This verbal sword play has produced three books [3,4,5] and an enormous amount of misguided media articles. This expensive effort at discrediting cold fusion, especially in the U.S., has borne fruit. Here are the results:

The Japanese are spending an estimated total of \$90 million per year on **new hydrogen energy** R&D and the U.S. is spending an estimated \$5 million per year.

It has taken most of the past four years for the reality of cold fusion to become sufficiently evident that the media is now questioning the opponents. *The Sunday Times* of London (June 27, 1993), *Popular Science* (August 1993), the Canadian Broadcasting Corporation's Prime Time News (June 24, 1993); National Public Radio (June 25, 1993); and the U.S. Congress (see story on page 1) have all had recent favorable reports on cold fusion. The Department of Energy has yet to discover the reality of cold fusion even though four national energy laboratories have achieved positive results.

The U.S. Navy has become a leading government agency in support of cold fusion. This support of a new energy science would be expected to come from the DOE.

The Department of Commerce's Patent and Trademark Office has been denying constitutional rights to its citizen inventors by refusing to recognize that cold fusion is a real science.

The United States has again turned over to foreign companies an enormous opportunity for jobs, export income, and national prestige.

Fusion Facts would like to pay special tribute to those honest and dedicated scientists who, in the face of unwarranted ridicule, have continued their research, made new discoveries, and have organized and held international cold fusion conferences in Salt Lake City & Provo, Utah; Como, Italy; Nagoya, Japan; Minsk, Belarus; in October 1993 in Abrau Durso, Russia; and the upcoming Fourth Annual Cold Fusion Conference in Hawaii. A similar tribute is paid to those who held regional conferences or added cold fusion sessions in China, India, Japan, Italy, Russia, Denver, Los Angeles, Miami, and Atlanta. Finally, plaudits to those who have published cold fusion papers. These are today's heroes.

Sufficient peer-reviewed literature has accrued to convince any honest investigator that cold fusion, regardless of received doctrine, is new science. Not a month passes but that new information is added to substantiate this knowledge. In addition to the experiments designed to discover the precise nature of the rich variety of cold fusion phenomena, many are now involved in steps to commercialize this new science.

The pathological skeptics have lost the war. The only battles left to be determined are which countries will be the leaders in the development of practical applications for cold fusion phenomena.

The pathological skeptics appear to abound in the U.S. and Europe. The U.S., England, France, and Germany are apparently scheduled to be the biggest losers. The end result will be enormous changes in the world-wide distribution of wealth as money is exchanged for new, non-polluting energy systems.

REFERENCES

- [1] Edmund Storms, "The Status of Cold Fusion As a Significant Phenomenon," *21st Century Science & Technology*, Summer 1993, pp 84-88, illustrated.
- [2] Edmund Storms, Review of Experimental Observations about the Cold Fusion Effect," *Fusion Technology*, Vol. 20, Dec. 1991, pp 433-477, 359 refs.

[3] Frank Close, Too Hot to Handle, Princeton University Press, c1991.

[4] John R. Huizenga, Cold Fusion, The Scientific Fiasco of the Century, Univ of Rochester Press, c1992.

[5] Gary Taubes, Bad Science, The Short Life and Weird Times of Cold Fusion, Random House, c1993.

C. NEWS FROM THE U.S.

COLORADO - BRANCHING RATIOS

F.E. Cecil, H. Liu and J.S. Yan (Dept. Phys., Colorado Sch. of Mines, Golden, Colorado) and G.M Hale (Los Alamos Nat. Lab., New Mexico), "Measurement of Branching Ratios of Low Energy Deuteron-induced Nuclear Reactions on ^2H , ^6Li , and ^{10}B ," *Physical Rev. C*, vol 47, no 3, pp 1178-1183, 20 refs, 8 figs.

AUTHORS' ABSTRACT

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

AUTHORS' CONCLUSIONS

There is one area of investigation upon which the present results have a profound implication. This area includes the recent claims of significant heat production from deuterium-metal systems, cold nuclear fusion. Remarkable to these claims is the absence or near absence of the production of energetic neutrons concurrent with the production of heat. Specifically, we would expect, based on the near equality of the (d,p) and (d,n) branches of the d-d reaction at low energies, that if the d-d nuclear reactions were responsible for the reported heat production, then there would be about 10^{12} fast neutrons per watt of heat generated. **We must conclude either that the (d,p) to (d,n) ratio for the d-d reaction changes by many orders of magnitude as the energy drops from a few keV to room temperature or that some other nuclear or non-nuclear reaction is responsible for the heat production.**

Similar conclusions obtain for the suggested possibility that the source of heat in electrochemical experiments involving LiOD electrolyte is the $d\text{-}^6\text{Li}$ reactions. If our observation of the lack of enhancement of the (d,p) to (d, α) branches of the $d\text{-}^6\text{Li}$ reaction may be used to infer that there is a corresponding lack of suppression of the (d,n) branch of the reaction, then we could similarly conclude that the production of heat from the $d\text{-}^6\text{Li}$ reactions must be accompanied by enormous fluxes of fast neutrons. **On the other hand, if the earlier reports of the energy dependence of the (d,n)/(d,p) ratios in the $d\text{-}^6\text{Li}$ and $d\text{-}^9\text{Be}$ reactions may be interpreted as suppression of the (d,n) reactions at very low energies, then the possibility of a near aneutronic ^6Li reaction at very low energies should be considered.**

[There is increasing evidence to support heat-producing aneutronic (no neutrons) reactions. --Ed.]

MASSACHUSETTS - AMPERIAN RECOIL

Peter Graneau (Ctr. Electromag. Research, NE Univ., Boston, Massachusetts), "Amperian Recoil and the Efficiency of Railguns," *J. Appl. Phys.*, vol 62, no 7, Oct. 1987, pp 3006-3009, 11 refs, 3 figs.

AUTHOR'S ABSTRACT

In this paper the mechanical efficiency of the railgun is defined as the force accelerating the armature-projectile combination divided by the total electrodynamic force generated in the gun. The energy expended in a shot may then be equated to the ohmic loss plus the kinetic energy that would have been developed in the absence of mechanical losses. In this way it can be shown that the overall energy efficiency can never be greater than the square of the mechanical efficiency. Comparing calculations with experimental data makes it clear the reported disappointing performance of railguns is due to some ill-understood mechanical deficiency. A simple experiment is described which reveals buckling and distortion of the rails by recoil action. This explains the mechanical inefficiency. In relativistic electromagnetism, the recoil force should act "on the magnetic field" and absorb field-energy momentum. The Ampère-Neumann electrodynamics, on the other hand, requires the recoil forces to reside in the railheads and push the rails back toward the gun breech. Experiment confirmed the latter mechanism.

NEW YORK - C.F. NOT DEAD

Courtesy of David Lewis

Robert F. Service (With Martha Brant in N.Y. and Hideko Takayama in Tokyo), "Cold Fusion: Still Going," *Newsweek Focus*, Jul 19, 1993, pp 2-4, illus.

EDITOR'S SUMMARY

With the table of contents lead-in, "Cold, but not dead. Scorned as bad science, cold fusion makes a comeback", the article presents a fair evaluation of the current status of cold fusion research in both heavy- and light-water experiments. The article presents the progress of cold fusion as having died but unwilling to stay dead. We at *Fusion Facts* never had believed the numerous obituaries because we have been in periodic communication with many scientists and their cold fusion success stories on an on-going basis prior to July 1989 when we published our first issue. The *Newsweek* article quotes Gary Taubes (science writer), Richard Petrasso (MIT), and Steven Koonin (Cal Tech) as the sources of informed opponents (none of whom are noted for their expertise in electrochemistry). On the proponent side, the article cites the work of Michael McKubre (SRI, International), Akito Takahashi (Osaka Univ.), Edmund Storms (Los Alamos National Lab.), Eiichi Yamaguchi (Nippon T & T), Robert Bush (Cal Poly - Pomona), Randell Mills (HydroCatalysis Power Corp, Lancaster, PA), & Reiko Notoya (Hokkaido Univ). The latter group all have had extensive successful experiments in cold fusion and have all published peer-review articles or given peer-selected technical papers in international conferences. The article cites Robert Bush's reaction to the pathological skeptics, "The critics in the ivory tower can't tell me what I'm seeing in my lab." The article ends with a reasonable suggestion by Kelvin Lynn (physicist at Brookhaven National Laboratory) welcoming government funding to settle the question. "We would all benefit by knowing whether it is good science or mistakes," says Kelvin Lynn.

EDITOR'S COMMENT ON GOVT. FUNDING

Because the entry cost of getting into cold fusion R&D is so low (\$100,000 can get a lab to successful replication of some of the excess heat experiments) *Fusion Facts* has maintained that we don't need government funds as much as we need government truth. The DOE's mission includes finding and reporting on viable alternate energy systems. It is unfortunate that the government has allowed its energy policy to be determined by biased and inadequate investigation of the cold fusion phenomenon that dates back to 1989. This ERAB cold fusion committee entirely ignored the tritium data in 1989 and denied other data of excess heat and of neutrons to achieve their negative report on cold fusion. The peer-reviewed

literature is now rich with a variety of ways by which nuclear reactions are produced in relatively simple laboratory experiments (simple compared to Tokamak experiments.) If DOE would assign some of their unbiased (if any) well-paid energy experts to review the literature and then make an honest summary of the results of such a survey, it is strongly expected that there would be a great increase in corporate investment in cold fusion. **As a matter of fact, corporate America is being informed by publications such as *Newsweek*, *Business Week*, *Sunday Times*, & *Popular Science*.** It will soon not matter whether DOE endorses cold fusion or not, the acceptance of cold fusion as a new science is strongly increasing, especially outside of the U.S. and Western Europe.

NEW YORK - ANTIGRAVITY REALITY?

Courtesy of John A. Thomas, Jr.

John A. Thomas, Jr., "Antigravity: The Dream Made Reality. The Story of John R.R. Searl," published by the Author, 373 Rock Beach Rd., Rochester, New York, 14617-1316, 140 pages, 4 figs, 28 photos, \$25.

EDITOR'S REVIEW

This booklet reports on the life and work of John R.R. Searl who, according to the book, is the successful inventor and developer of a powerful Searl Effect Generator (SEG) which could also be called a Space Energy Generator. When he discovered that the operation of the SEG caused levitation, Searl then spent years in developing and controlling various models of devices that have the discus shape of a typical flying saucer. The booklet relates that about 1970, Searl demonstrated his "levitating disk" to scientists at the Edward's Air Force Base in California. Objections to the device, as reported, were that the speed and turns were so sharp that they doubted anyone could survive. In addition, one of the scientists viewing the demonstration was concerned that there appeared to be no inertia. The end result was that the inventor and project were dismissed with comments about the technology being outside their [U.S. Air Force] accepted technology.

This booklet discusses the theoretical work of Karl Schappeller of Castle Aurozlmunster in Innviertel, Austria (died 1947). Schappeller describes "glowing magnetism," or "ether precipitation" and is reported to have designed a device that exhibits the effect and also produces some material substance that causes the atmosphere to glow [ionize] when the device is properly operated. Searl's levitating disks are reported to have exhibited a similar visual effect when operating.

After building and flying some 40 levitating disks of various sizes, many of which were lost due to the lack of suitable controls, Searl was nearing completion of a large man-carrying disk when his work was abruptly stopped. Searl has now recovered some of his early experimental equipment (dating back as far as 1946) and is writing books and lecturing to obtain funds to again produce a three-man space-worthy levitating disk.

A video is available that has many pictures (although of poor quality) of the construction of some of his flying disks. The video and other books by Searl are available from John Thomas, Jr.

[Editor's note: In a recent report a student of science spent his summer vacation trying to track down rumors that the U.S. Air Force is flying vehicles that glow when in operation and that also exhibit the capacity to make abrupt turns when in flight. He observed these vehicles flying at night above a remote Nevada test site and also observed similar craft from a hill overlooking an advanced aircraft testing facility near Edward's Air Force Base in California. In a trip to Romania early in 1993, I picked up a Romanian newspaper that cited this secret work of the U.S. Air Force. Could there be a connection to Searl's demonstration? Hal Fox.]

TEXAS - CATHODE COOLING

Chemical Abstracts, June 28, 1993

Bruce E. Gammon (Thermodyn. Res. Cent., Texas A&M Univ., USA), "Cathode Cooling by Expansion of Hydrogen in Calorimetric Tests for Cold Fusion," *Fusion Technology*, vol 23, no 3, 1993, pp 342-345.

AUTHOR'S ABSTRACT

Expansion of H and its isotopes from H-absorbing cathodes can transfer significant amounts of energy to the surrounding aqueous media. In calorimetric efforts to confirm cold fusion, allowance must be made for thermal conduction along electrical leads. In conjunction with consideration of the extent of cathode cooling by expansion of H, the rupturing of the cavities within the cathodes and limitations to charging of the electrode by H flowing from fresh cracks are briefly addressed.

TEXAS - TRITIUM PRODUCTION

Dalibor Hodko and John O'M. Bockris (Chem. Dept., Texas A&M Univ., College Station, Texas),

Possible Excess Tritium Production on Pd Codeposited with Deuterium," *J. Electroanalytical Chem.*, vol 353, no 1-2, 1993, pp 33-41, 20 refs, 6 figs, 1 table.

AUTHORS' ABSTRACT

Tritium production was measured in the liquid and gas phases on Pd codeposited with deuterium from $\text{PdCl}_2 + \text{LiCl} + \text{D}_2\text{O}$ solutions. During two weeks of electrolysis, in four out of six cells, average excess tritium levels of 1.9 times in the gas phase and 1.6 times in the liquid phase were found over those expected from the separation factor. The largest excess of tritium found was three times that calculated theoretically from the separation factor. The excess tritium observed exhibited a 'burst' nature, both in the gas and liquid phases. On two occasions, where tritium production was within classical limits, no bursts were observed. A separation factor of 1.6 was measured in these two cells. This method has the advantage that the tritium concentration in the bulk of Pd was measured in solution before the Pd was deposited on an Au substrate.

WASHINGTON D.C. - TRITIUM EMISSION

Chemical Abstracts, July 12, 1993

G.P. Chambers, G.K. Hubler, K.S. Grabowski (Naval Research Lab., Washington D.C.), "Evidence for MeV Particle Emission from Titanium Charged with Low Energy Deuterium Ions." *Report 1991, NRL-MR-6927*, 34 pages, 6 figs, 2 tables, from *Govt. Rep. Announce. Index (U.S.)* 1992, vol 92, no 7.

AUTHORS' ABSTRACT

Thin Ti films were bombarded with low energy (350 eV) D ions at high current density (0.2-0.4 mA/cm²) to investigate the reported occurrence of nuclear reactions at ambient temperatures in D-charged metals. A Si charged particle detector was used to search for charged particles produced by such reactions. Evidence is reported for the detection of H isotopes with 5 MeV energy at a rate of 10-16 events/d pair/s. Low energy D (350 eV) ions produced by an ECR microwave source impinge normally on a thin metal film in vacuum, while a Si particle detector placed directly behind the film detects particle emission. The advantages of this method are rapid and efficient D charging of any material (including insulators), high particle detection efficiency and sensitivity (low background), and the ability to measure the particle energy and detect the particle type. Ti was chosen as the target because previous work by Jones had shown *n* emission and because Ti retains more H near room temperature than does Pd.

WASHINGTON - THEORY

Chemical Abstracts, July 12, 1993

T. Frederico, J.J. de Groot, J.E. Hornos, M.S. Hussien (Dept. Phys, Univ. Wash., Seattle, Washington), "Microscopic Calculations of the Molecular-nuclear $d + d \rightarrow {}^3\text{He} + p$ Reactions at Close to Zero Energies," *Braz. J. Phys.*, vol 23 no 1, 1993, pp 96-99.

AUTHORS' ABSTRACT

Microscopic calculations of the astrophysical interesting reaction $d + d \rightarrow {}^3\text{He} + n$ and $d + d \rightarrow {}^3\text{He} + p$ were performed using nuclear reaction theory and a Born-Oppenheimer type molecular calculation of the $d + d$ initial stage. The sensitivity of the fusion rate to the behavior of the $d + d$ wave function at close to zero separation was assessed. The relevance of the results to the cold fusion problem is discussed.

D. NEWS FROM ABROAD

AUSTRALIA - COLD FUSION SCREENING

Heinrich Hora, J.C. Kelly (Sch. Phys., Univ. N.S. Wales, Australia), J.U. Patel, G.H. Milev, J.W. Tompkins (Fusion Studies Lab., U. of Illinois and Rockford Technology, Assoc., Illinois), and Mark A Prelas (U. of Missouri), "Screening in Cold Fusion Derived from D-D Reactions," *Physics Letters A*, vol 175, 1993, pp 138-143, 25 refs, 2 figs.

AUTHORS' ABSTRACT

Based on the few reliable and reproducible cold fusion experiments, the power law of reaction probability on nuclear distance arrived at a value of 3 pm which is in agreement with results derived by a different method (Vigier and Rambaut) of 2.5 pm. For our plasma and swimming electron model we calculate a screening factor of 14.

AUTHORS' CONCLUSIONS

The recent experimental results by Yamaguchi and Nishioka have emphasized that there are two different categories of cold fusion experiments, (a) those associated with phase transitions in the palladium metal plates which cause jumps in temperature, with mechanical deformations, and with bursts or released gas, but not necessarily cold fusion reactions, though they may do so under special circumstances; (b) continuous and reproducible production of fusion neutrons and X-rays, with spectra showing 8.1 MeV peaks. To explain this high energy peak we extended the model of plasma and swimming

electron layers to evaluate the screening needed to reproduce the repulsion of deuterons that would allow separations of the 3 pm necessary for the observed cold fusion reaction rates. It turns out that the screening factor has to be about 14 to reduce the Coulomb repulsion sufficiently. This rather high screening seems to coincide with an evaluation of the Preparata plasmon model where the screening is implicitly taken into account. Our results based on the power law [equation given in paper] for reaction rates depending on the nuclear densities and reliable experiments in cold fusion resulted in a reaction distance of 3 pm in agreement with the 2.5 pm derived from a different model of Vigier and Rambaut. Further conclusions of the ^4He production are given by a mechanism leading to the only stable isotopes of Co from Ni or Rh from Pd.

BRITAIN - FUSION REACTIONS SOURCE

Chemical Abstracts, July 12, 1993

N. Rowley, I.J. Thompson, G. Baggle (Daresbury Lab., SERC, Warrington UK), "Fusion Reactions with Exotic Beams and Isospin Dependence of Cross Sections," *Int. Workshop Phys. Tech., Second. Nucl. Beams*, 1992, pp 117-140, 19 refs.

AUTHORS' ABSTRACT

Fusion at energies close to the Coulomb barrier is greatly influenced by coupling to collective inelastic excitations and to complex transfer channels. It is often useful to think of the fusion as being due to a distribution of barriers, some of which are lowered and some raised by the coupling. This idea is introduced in the case of fusion of deformed nuclei where the different eigenchannel barriers have a clear physical interpretation in terms of different nuclear orientations, and sufficiently accurate data enable one directly to extract quadrupole and hexadecapole deformation parameters. For neutron transfer reactions the different barriers correspond to varying degrees of neutron neck between target and projectile. Important dynamical effects occur if reaction Q-values are large, when the pure necking or antinecking configurations may dominate. For target and projectile combinations on the β -stability line, the Q-values quickly become negative for sequential transfer reactions, inhibiting the transfer process. However, the use of exotic beams could open up the possibility of multiple (sequential) neutron transfers which are essentially adiabatic or have positive Q. Some possible evidence for large isotopic effects in the stable n-rich systems $^{44}\text{Ca} + ^{44}\text{Ca}$ and $^{40}\text{Ca} + ^{48}\text{Ca}$ is presented.

GERMANY - POLARIZED FUSION

Chemical Abstracts, JJune 14, 1993

Paetz G. Schieck (Inst. Kernphys., U. of Cologne, Germany), "The D + D Fusion Reactions at Very Low Energies," *Acta Phys. Pol., B*, 1993, vol B24, no 2, pp 345-375.

AUTHOR'S ABSTRACT

The D + D fusion reactions are among the oldest nuclear reactions studied. Due to their complex nature the reaction mechanism is still under intensive investigation. Polarization observables play an important role. Applications such as possible neutron-lean "polarized fusion" lead to new theoretical and experimental efforts to study these reactions at very low energies (e.g. 28 keV).

GERMANY - PROTON REACTIONS

Chemical Abstracts, July 12, 1993

Klaus Suemmerer (Ges. Schwerionenforsch., Darmstadt, Germany), "Production Rates of Unstable Nuclei in Nuclear Reactions," *Int. Workshop Phys. Tech. Second Nucl. Beams*, 1992, pp 273-288, 23 refs.

AUTHOR'S ABSTRACT

Nuclear reaction mechanisms are reviewed which are interesting for the production of intense radioactive nuclear beams. Different mechanisms are compared in terms of production rates, i.e., the product of luminosity and production cross section. The review emphasizes the usefulness of semi-empirical parametrizations for the calculation of production cross sections and attempts to check in which areas these parametrizations are valid. If one considers only production rates, it is clear that thermal-neutron-induced fission produces the highest intensities of radioactive species, however, in a limited range of nuclear mass and charge. Proton- (or light-ion) induced target-spallation and -fission gives access to the broadest range of radioactive isotopes with high production rates. Projectile-fragmentation suffers from the lower beam intensities of heavy-ions, particularly at the high energies where synchrotrons are required. High-current injectors can make this approach competitive, however, in regions far from stability.

INDIA - FUSION MECHANISM

D. Das and M.K.S. Ray (Bhabha Atomic Research Centre, Bombay, India), "Fusion in Condensed Matter - A Likely

Scenario," *Fusion Technology*, vol 24, no 1, 1993, pp 115-121, 45 refs, 1 fig.

AUTHORS' ABSTRACT

A large body of experimental observations has evolved with particular reference to deuterated palladium, a mechanism of fusion unique to condensed matter. The mechanism brings to focus the relevance of the electronic structure of the host lattice, indicating the features that are desired. Direct interaction of electronegative elements such as oxygen (as happens in electrolysis experiments) creates, through modification of the electronic structure, situations under which heavy electrons are manifested. In cases where an oxide interface is present, an analogous situation is created at the onset of an insulator-metal transition caused by the induced migration of deuterons through the layer. Screened by the heavy fermions, deuterons in such situations undergo transition to a more stable quasi-molecular state, $(D^-D^+)2e^-$, with substantially reduced nuclear separation. Through quantum mechanical tunneling, fusion takes place in such a cluster with a yield of $10^{-1.5}s^{-1}$, a value consistent with observed excess heat production and near-surface occurrence of the phenomenon.

AUTHORS' CONCLUSIONS

Founded on a large body of experimental observations, the scenarios of coalescence presented here offer a unique explanation of the phenomenon in the sense that they all involve the active participation of heavy fermions in the process. So far as the Ni/K₂CO₃ (aqueous) system is concerned, the mechanism involved is no different. A narrower d-band, higher DOS (density of states) (1.6 times that of PdD) close to E_F , greater sensitivity for incorporated cations, and higher affinity of nickel and NiH to oxygen, in fact, make the system more conductive. This groundwork brings to focus some of the governing factors and can form the very basis for tailoring systems. Nevertheless, greater understanding of the channels of coalescence that are possibly governed by the value of m_d is a prerequisite for realization of the full potential of the phenomenon of fusion in condensed matter.

INDIA - D-D FUSION

S.N. Vaidya (Bhabha Atomic Research Centre, Chemistry Div., Bombay, India), "Comments on the Model for Coherent Deuteron-deuteron Fusion in Crystalline Pd-D Lattice," *Fusion Technology*, vol 24, no 1, 1993, pp 112-114, 19 refs, 2 figs.

AUTHOR'S ABSTRACT

The enhancement of the deuteron-deuteron fusion rate is estimated for a coherent interaction mechanism under realistic experimental conditions. The extension of this mechanism to (n,γ) reactions is outlined.

AUTHOR'S INTRODUCTION

The possibility of coherent nuclear interaction between itinerant deuterons and lattice deuterons in crystalline Pd-D was discussed previously. In another paper we considered, as an extension of this work, the (n,γ) reactions between propagating neutrons and the nuclei on a crystalline lattice for production of intense gamma rays. The purpose of this technical note is to bring out the limitations on the enhancement of the deuteron-deuteron (d-d) fusion rate under realistic conditions and to discuss some additional aspects of the (n,γ) reactions. The transmission resonance condition for deuterons is restated to point out the oversight made in an earlier technical note. (R.T. Bush, *Fusion Technol.*, vol 19, 1991, p 313.

It is generally believed that in cold fusion experiments, enhancement of the d-d fusion rate is due to the conduction electron screening and to certain coherence effects in the Pd-D lattice. Here, we enumerate coherence mechanisms involving the Pd-D lattice and describe the principal features of the mechanism we proposed.

Schwinger considered phonon-induced screening of d-d interactions, and Hagelstein proposed a two-step mechanism involving electron capture by a deuteron followed by the capture of the resulting virtual neutron by a deuteron or lithium atom. Turner and Bush derived the condition for transmission resonance of deuterons through a one-dimensional lattice and suggested transmission resonance as the enhancement mechanism. However, in their work, the implications of phase coherence were not fully considered, and the wave function of interacting deuterons was not derived.

JAPAN - FUSION IN DENSE PLASMAS

Setsuo Ichimaru (Dept. Phys., U. of Tokyo, Japan), "Nuclear Fusion in Dense Plasmas," *Reviews of Modern Physics*, vol 65, no 2, 1993, pp 255-299, 2½ pages of unnumbered references, 17 figs, 13 tables.

AUTHOR'S ABSTRACT

The review begins by grouping the fundamental nuclear reactions into two classifications, namely, the usual binary

processes and few-particle processes. In the few-particle processes, the possibility of electron-screened cold fusion is remarked. The special features of dense plasmas rest in the enhancement of reaction rates over these fundamental processes due to *internuclear many-particle processes*. The many-particle processes arise from a modification of the short-range correlations between reacting nuclei and are the effects related closely to differences between Coulombic chemical potentials before and after the nuclear reactions. Quantum statistical-mechanical formulation of the enhancement factors is presented. Thermodynamic functions for various realizations of dense plasmas, pertinent directly to the reaction-rate theories through the screening properties and free energies, are summarized. These analyses are then applied to the estimation of nuclear reaction rates in specific examples of dense plasmas, namely, the Sun, brown dwarfs, giant planets, white-dwarf progenitors of supernovae, and helium burning on the degenerate stars, as well as in those dense laboratory plasmas that are found in the inertial confinement fusion experiments, in metal hydrides such as PdD and TiD₂, in cluster-impact fusion experiments, and in ultrahigh-pressure liquid metals. The essential similarity between the nuclear fusion reactions in supernovae and those projected in the ultrahigh-pressure liquid metals is particularly emphasized.

Contents include:

I. Introduction; II. Elements of Nuclear Reactions, (including few-particle processes--screened cold fusion); III. Enhancement by Many-particle Processes; IV. Correlation Functions and Enhancement Factors; V. Rates of Nuclear Fusion Reactions (including metal hydrides--PdD and TiD₂); VI. Epilogue; 2 Appendices. [This is a well-documented review of fusion in dense materials. --Ed.]

JAPAN - ACOUSTIC EMISSIONS

Kazuhisa Azumi, Shukuryoh Ishiguro, Tadahiko Mizuno and Masahiro Seo (Hokkaido Univ., Sapporo, Japan), "Acoustic Emission from a Palladium Electrode During Hydrogen Charging and its Release in a LiOH Electrolyte," *J. Electroanalytical Chem.*, vol 347, 1993, pp 111-121.

AUTHORS' ABSTRACT

Acoustic emission (AE) from a palladium electrode dipped in a 0.1 M LiOH electrolyte was measured during electrochemical hydrogen charging and its release. Large AE signals were observed for a few minutes in the first stage of the hydrogen charging in contrast with the small random AE signals caused by the evolution of hydrogen and oxygen gas. These signals appear to reflect the deformation of the Pd lattice by hydrogen charging. Various types of periodic AE

signals were also observed during hydrogen charging and hydrogen release after charging for long periods. It is believed that these phenomena are associated with the hydrogen-transfer mechanism through defects existing in the palladium.

AUTHORS' CONCLUSIONS

Hydrogen was charged into a palladium electrode by cathodic polarization, and acoustic emission from the palladium was measured during the charging and the subsequent hydrogen release. The following conclusions were drawn.

(1) When palladium was anodically polarized, AE signals corresponding to the evolution of oxygen gas were observed. When palladium was cathodically polarized, the number of AE events was small at first because the hydrogen atoms were absorbed by the palladium, and then increased due to decrease of hydrogen absorption. The AE signals corresponding to gas evolution appeared randomly, and the number of AE events depended on the gas evolution current.

(2) A burst of AE was observed during charging, i.e., a large number of AE signals continued for a few minutes. This phenomenon may be related to deformation of the lattice or cracking in palladium caused by hydrogen charging.

(3) A few AE signals of the periodic type were observed during hydrogen charging by cathodic polarization and its release at open circuit after a long period of charging. These phenomena appear to be associated with a hydrogen-transfer mechanism through defects existing in the palladium.

(4) The spectra of AE reflect its origin such as gas evolution and lattice deformation or crack generation. However, identification is difficult because the spectra also depend on the shape of the specimen, the method used to attach the AE sensor and the history of hydrogen charging.

JAPAN - DEUTERON BREAKUP

Chemical Abstracts, Jul 12, 1993

Toshinori Takemiya (Dep. Phys., Kumamoto Univ., Japan), "Deuteron Breakup Reaction Induced by Low Energy Neutron," *Prog. Theor. Phys.*, vol 89, no 4, 1993, pp 869-880.

AUTHOR'S ABSTRACT

The *T* matrix of a general deuteron breakup reaction induced by a low energy neutron is derived from the solution of the

Faddeev equation with a realistic two-body local potential. The T matrix is represented as the sum of a final state interaction and a quasi-free scattering term. The energy spectrum of the protons from the reaction $D(n,p)2n$ at an incident neutron energy of 14.1 MeV were investigated by using the Argonne v_{14} and Paris potentials. It is verified that the theoretical final state interaction peak at the forward laboratory angle 4.0° depends on the scattering length a_{nn} of the two-body interaction. In general, the energy spectrum of the protons from the reaction $D(n,p)2n$ is represented as the sum of the final spin single state and the final spin triplet states of the interacting neutron pair.

NORWAY - BEHAVIOR OF PALLADIUM

Chemical Abstracts, June 14, 1993

M.M. Jaksic, B. Johansen, R. Tunold (Norway. Inst. Technol., Univ. Trondheim, Norway), "Electrochemical Behavior of Palladium in Acidic and Alkaline Solutions of Heavy and Regular Water," *Int. J. Hydrogen Energy*, vol 18, no 2, 1993, pp 111-124.

AUTHORS' ABSTRACT

The behavior of Pd as an electrode for H(D) and O evolution in both alkaline and acidic, heavy and regular water solutions was investigated primarily by cyclic voltammetry. The main features, such as adsorption and underpotential deposition of H(D), as well as the specific multilayer (monolayer α -phase succeeded by multi-layer β -phase) oxide growth preceding H and O evolution, respectively, with characteristic desorption peaks, were more or less marked in both electrolytes. Some distinctly different behaviors were observed, however, revealing that heavy and regular water behave almost as different solvent ambients.

The H evolution reaction (H.E.R.) in heavy water occurs at substantially more negative potentials, while O evolution becomes shifted to considerably more positive potential values. The latter effect enables one to record on voltammograms the multilayer oxide (β -phase) growth in alkaline heavy water, as distinctly indicated by corresponding continuously growing characteristic potentiodynamic waves scanned with cyclization. H(D) absorption was clearly marked by the continuously growing charge capacity of the diffusional desorption peak, which exceeds 1:1 H(D)/Pd atom coverage on the exposed Pd surface and is related to the corresponding adsorption wave for its underpotential deposition. In addition, the H oxidation peak immediately following its desorption (in particular from acidic heavy water) was also distinctly scanned on voltammograms. Oxide formation usually starts at more anodic potentials together with D oxidation and, specifically in acidic media, proceeds vigorously with higher and

continuously growing rates, while the evolving O thereby arising is shifted to more positive potential values. These features reveal that, owing to distinctly different steric factors, heavy water, in particular in acidic media, behaves as a stronger oxidizing agent than does regular water. Some discernible properties of the interplay between H and O on Pd electrodes in both electrolytes along the potential axis were clearly marked and pointed out.

ROMANIA - SURFDYN CONCEPT

Peter Glück (Inst. of Isotopic and Molecular Technology, Cluj-Napoca, Romania), "The Surfodyn Concept: An Attempt to Solve (or rename) the Puzzles of Cold Nuclear Fusion," *Fusion Technology*, vol 24, no 2, pp 122-126, 44 refs.

AUTHOR'S ABSTRACT

The lack of reproducibility of the cold fusion experiments, aggravated by the great diversity and inconsistency of the positive results, implies that these nuclear phenomena are hypersensitive, i.e., correlated to a "chaotic" factor. All the factors considered so far, such as structure, transformations, or defects of the crystal lattice; bubbles of deuterium; dendrites, etc., are insufficiently chaotic to explain the known facts. Experimental data suggest that nuclear reactions take place in active sites on the surface of the lattice, that they are stimulated by dynamics factors, and that they represent an extreme form of heterogeneous catalysis. The desired chaotic factor is the surface dynamics of some metallic deuterides (hydrides). This hypothesis, called the SURFDYN concept, is compatible with all published data, explains the peculiarities of cold fusion, and must be supported by an adequate theory describing the nature and mechanisms of the different nuclear processes.

AUTHOR'S DISCUSSION

A new concept regarding cold fusion is presented that uses both the information given by the positive experimental results and the consequences of the most reproducible feature of the field: lack of reproducibility. For the sake of brevity, it is called the SURFDYN concept. Cold fusion is considered as an extreme form of heterogeneous catalysis, of which the exact nature, size, and dynamics of the active sites are open questions for both scientific domains.

A very rapid and massive information influx from the field of catalysis science and technology can contribute to the solutions of the puzzles of cold fusion. This can be rewarding indeed, given the possibility of fundamental discoveries when working in conditions close to the very limits of the catalytic processes.

The SURFDYN concept is only a part of a cold fusion theory; it has to be complemented with reactions, mechanism, two- and multibody fusion, quantum and electrical field effects, etc., in order to comprehend the other riddles of these nuclear processes.

The SURFDYN concept is fusion on the lattice, not in the lattice. This is a problem because many cold fusion scientists are mental prisoners of the lattice. If the lattice is not the location of the nuclear reactions, what is its role? How is the Coulomb barrier penetrated? What about energy transfer? An objective analysis will show that by moving the problem from inside the lattice to the surface, few valuable theoretical certainties are lost. On the contrary, the surface models of cold fusion can be resuscitated and brought to perfection. New thinking will necessarily be based instead on mobility, fluxes, and acceleration or combined with compression, fields, and screening. Multibody fusion is more easily conceivable on the surface than inside the lattice.

Perhaps later, the maximum performance of different systems can be calculated by using the SURFDYN theory. Strange events, such as cells out of control or electrochemical devices generating heat when electrolysis is stopped, can be better understood. If confirmed, these runaway cells raise serious doubts about the role of electrochemical compression. The lattice is a reservoir of deuterium providing enough raw material for the dynamic process that takes place even after the electrolysis is stopped or D₂O and LiOD is replaced by H₂O and LiOH, as in the case of the experiments at Oak Ridge National Laboratory that have been considered as an argument in favor of a bulk process.

Experiments performed with thin and ultrathin metal films must be continued on a much larger scale, and comparative studies of the surface dynamics of palladium, titanium, nickel, and alloys are needed to report their efficiency.

The technological implications of the SURFDYN concept, laying the foundation of a reliable cold fusion technology, are obvious. The perspective is optimistic, given that chaotic factor is known and will be tamed. By analogy to the catalytic processes used in huge factories, cold fusion will be an important source of energy.

RUSSIAN - NEGATIVE ELECTRON TEMPERATURE SOURCE

Courtesy of Samuel P. Faile

Yu. D. Kalafati and D.V. Posvyanskii (Inst. Radio Eng. and Electronics, Rus. Acad. Sci., Moscow, Russia), "Possibility of Observing a Negative Electron Temperature in Semiconductor Structures," *JETP Letters (to Journal Pis'ma*

v Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki) vol 57, no 10, pp 676-679, 1 fig, 8 refs.

AUTHORS' ABSTRACT

The relaxation of nonequilibrium charge carriers in one miniband in a superlattice in a magnetic field is analyzed. The nonequilibrium carriers can be described by means of the electron temperature. A condition under which this temperature is negative is found.

RUSSIA - COHERENT EFFECTS SOURCE

Chemical Abstracts, July 12, 1993

A.A. Shirokov, Yu. L. Pivovarov (Tomsk Politekh. Inst., Russia), "Coherent Effects in the Coulomb Excitation of Nuclei Passing Through Crystals," *Izv. Akad. Nauk, Ser. Fiz.* 1993, vol 57, no 1, pp 148-151, in Russian.

AUTHORS' ABSTRACT

Computer modeling was used to confirm the presence of a coherent effect in the Coulomb excitation of nuclei (e.g. ¹⁹F) passing through a crystal (e.g. Si). The developed modeling method allows one to easily predict the probability value expected in the experiment of excitation of a nucleus (E1-transition, excitation energy of 110 keV) during channeling in different crystals. The obtained data on the electromagnetic excitation cross sections of relativistic nuclei in amorphous and crystalline targets and the evaluation of the effect of coherent electromagnetic excitation in crystals attests to the possibility of carrying out experiments on the electromagnetic interaction of nuclei at the energy of the LVE OIYaI synchrotron (nuclotron).

E. ARTICLES FROM OUR READERS

A NEW WORLD OF DISCOVERY

By Hal Fox

On June 24, 1993 the members of the U.S. House of representatives voted 280 to 150 against a proposed expenditure of \$620 million to fund the Superconducting Super Collider (SSC). In a similar manner, Congress has strongly decreased the expenditures for a Space Station to be built and placed into orbit by NASA. In addition, the huge expenditures proposed for the continuation of research and development of hot fusion is coming under increased scrutiny by Congress.

In a recent letter to Don Kelly, Vice-President Al Gore cites the policy of the Clinton administration to redirect some of the projects in the **726 government research laboratories** toward research and development that has commercial potential (instead of mainly military potential.)

It is a fact that few major breakthroughs come from large government or large corporate laboratories. It seems that the institutionalizing of research fails to promote innovation. While there is considerable progress made in the development or improvement of existing products, there are seldom new breakthroughs nor new science developed from large institutions. The aircraft was built and flown by a couple of men from a bicycle shop. The personal computer was started in a garage. The first experimental work on cold fusion began in a garage.

In contrast, when new science is discovered, it is more often discouraged, criticized, or attacked by the professional scientists who should be expected to welcome new science and new discoveries. Confident in their own learning, some scientists are overly quick to deny new discoveries. Cold fusion has just suffered from four years of such treatment. Nevertheless, cold fusion is now approaching commercialization. Dr. Stanley Pons recently announced that they are working on a commercial demonstration prototype reactor which is expected to produce about 10 kilowatts of energy.

In addition to cold fusion, new energy discoveries are being developed and commercialized. These new discoveries will lead to a much better understanding of matter, energy, and perhaps, the control of gravity. Less than \$50 million has been spent on cold fusion in the United States. **However, the new insights that have been made into the understanding of nuclear reactions in or on the surfaces of metal lattices is changing the world.** Meanwhile, about \$1.5 billion has been spent on a superconducting super collider in the possible search for a better understanding of matter. A small fraction of this amount, spent on researching some of the new science discovered in cold fusion experiments, would have a much greater payoff in scientific development than the \$11 billion scheduled to be spent on the SSC which is not scheduled for completion until 2002.

Consider what great developments could be made if we would reduce the number of government research laboratories to less than 100 and use the enormous savings to provide tax benefits to individuals and small companies who would increase their research and development activities.

AN HISTORICAL REVIEW OF THE RORY JOHNSON COLD FUSION MOTOR

By Gerald Orlowski

This documented event is recorded to inform the science community that the real reason the U.S. Government is not issuing patents on cold fusion is that they are well aware of Johnson's 525 H.P. Cold Fusion motor and what this kind of energy release would do to the gas tax structure.

Around the end of December, 1978, the Greyhound Corporation at 120 W. Clarendon, Phoenix, Arizona, (my employer) had me fly to the Armour plant in Chicago. While there, the news media gave information on the showing of a new Magnatron motor, 525 horsepower, which needed no fuel or plug-in electricity. The Armour plant was not too distant from the showroom in Elgin, Illinois, so I drove there to see this new motor. I only saw it running through a show room window, along with hundreds of other people. My feelings were 'skeptical' at best. Curiosity prompted me to cross the street to speak with the owner of the gas station located there. He explained how Mr. Johnson had been driving his 1974 Buick Electra for years, with a motor that made no noise, and also that Johnson never stopped for gas.

Arriving back at the Greyhound Towers, I relayed this information to my supervisor. He requested that I call Magnatron for more data on the motor, but not to spend any real time on this 'side-trip.' I called Magnatron and spoke with Rory Johnson, stating I was calling from Greyhound for information on his new motor. Johnson said that on the drawing board was a 1400 H.P. motor made to fit into buses the size Greyhound uses. I relayed this information to Frank Barber, Legal Counselor at Greyhound. Mr. Barber stated it would not cause any legal problem if I sent an update to Mr. Johnson if company stationary was not used. I then sent a letter (concerning Greyhound's desire to purchase a

Megatron motor from him) on April 22, 1979 to Mr. Rory Johnson.

A few months passed without a reply from Magnatron, so I again called. The secretary told me that Mr. Johnson was in court in litigation regarding his motor. In this time period, I received a letter from Magnatron, written by Minnesota State Senator Marion Manning to Senator Dave Durenberger in Washington on Johnson's behalf, asking why a judge had closed down Johnson's business. Information relayed to me by phone was that Mr. Johnson was "mad as hell about Washington politics" in that for some time he had tried to get government funding by having Mr. Herbert L. Hill, council-man of the City of Elgin, contact Washington. Johnson relayed these same feelings to the Daily Courier News printed on December 22, 1979 (copy of article enclosed with letter).

A few years later, while working on Armour contracts to construct food processing machines, a call came to Armour regarding the Magnatron motor. It was from Michael Marzicola who stated that Johnson had passed away, and he was now in charge of the motor project under a new company called Magnatron International Corporation. He wanted to know if there was a way whereby I could work with him to start up one of the four remaining Johnson motors. I believe he chose me because of the possibility that Greyhound might still be interested in having a motor for driving one of their buses. I requested that he document all activity that had transpired at Magnatron, send it to me and I would share the information with Frank Barber [legal counsel]. Mr. Marzicola sent me a letter (detailing the harassment by the Attorney General in Illinois, the false promises by a New York company that lured Johnson to relocate in California where the New York company reneged on their promises, stranding Johnson there without capital, Johnson's subsequent death and his son's taking over the company and allying with Mr. Mazicola and reincorporating in California), which I acknowledged in November of 1981.

I flew to Magnatron in California, and had an agreement signed whereby I would receive the dealership for Phoenix Metropolitan area to install Magnatron motors in cars and buses (including Greyhound buses located at the Phoenix headquarters). On January 11, 1982, I sent a proposal to Frank Barber for the bus company, outlining the dollar savings to Greyhound if they

installed Magnatron motors. I then started work on the Johnson Motor. [Orlowski enclosed copies of pictures of himself with the motor components along with other information. Ed.]

The job of starting the motor proved to be a difficult task. A former employee of Magnatron actually involved in the motor assembly work stated that whenever a motor needed to be started Johnson would wheel the motor on a cart into a very private work room. About half an hour later, he would wheel the running motor out. NO ONE, not even Johnson's family, ever saw how the motor was started.

So, where would we start? We hand rotated the armature (with the top open at about 30 r.p.m.'s) which contained the generator winding, the driver winding, and 8 large coils of copper wire - magnet coils - that served the purpose of large electrolytic capacitors. As we hand rotated this armature, an event happened that I never saw in my 15 years of electric motor repair and design work. (I had owned an electric motor repair company.) We shut off the overhead lights to watch our own private fireworks display. The inside of the motor was being made bright enough to see by the very numerous static sparks that were jumping between the inner surface of the aluminum housing, the 172 permanent magnets, and the moving windings. This activity would tend to prove that when a light wave travels, it too is surrounded by magnetism. This was one of the [Johnson] motors that needed brush and commutator repair work. There were three 52 bar commutators, one above the other, one for each winding - magnetic coils, generator coils, and driver windings.

The answer as to what might have been causing this 'energy display' would probably be found by looking at the [Johnson] fuel cell and its particular function. Inside the fuel cell, a unit about the size of a 6 oz. coffee cup, was a dark diffraction prism about two and one-half inches long. Circuited to Johnson's motor were two wires that resembled spark plug wires. It appeared that a spark flashed through the diffraction prism becoming a focused pinpoint of light energy directed onto a minute drop of Deuterium with Gallium. Johnson stated that the energy released from the 3/8 inch copper tube was CONVERTED into electricity. The key word here is 'converted' in that the copper tube rested directly on the inside surface of the aluminum housing.

The energy that exited the tube probably did not manifest as spark because no safety insulation was visible. Whatever the energy was (Johnson mentioned an element such as Tritium) it became useful magnetic power as the generator winding grabbed it and sent this new magnetic charge into 8 large copper wire coils called magnet coils. The strength of these new compressed energy particles were caused to take on their maximum potential when being released on ATTRACT - within these given objects. This activity would tend to prove that Johnson's motor worked on the principle of attract-attract which utilizes the magnetic field to its greatest advantage. The commutator connections showed that the control brushes caused this energy to be circuited to the driver windings which responded to their half of the magnets (86 driver magnets), not too much unlike a standard D.C. motor magnet pulse pattern.

Whatever happened with this old motor it would not take a rocket scientist to know that the total housing, this includes the steel laminated core of the armature, all must have had a residual charge of this energy. It was not radioactive in that Johnson placed his meter outside the motor and the unit emitted less particles than a standard color television set. Marzicola stated he saw the meter reading as the motor was under full power.

Mr. Marzicola and I were lifting one of the magnetic coils out for repair (we saw a broken wire on the coil) and somehow a massive spark jumped out of the coil to a ground wire. There was no shop electricity nearby. We were cognizant of potential danger after that. How could so much energy be stored for such a long time? This event prompted Mr. Marzicola to recall an incident which Johnson had shared with him, on how during the early testing of his fuel cell Johnson had released too much energy into the motor causing the entire motor to INSTANTLY go up in smoke.

A disturbing event happened at this time. The shop was broken into. Someone, during the night, dumped Johnson's secret papers onto the washroom floor (a room without windows). Our best guess was that they were copying Johnson's papers, which included the fuel cell drawings, motor part's manufacturers, investor lists, etc. Our focus, after that incident, was difficult to maintain. The major success action [goal] that we never realized was to actually start one of the motors.

I left California and returned home. But I often wonder about various things. What did Johnson do in his secret work room? Let's speculate just for intellectual conversation. What if after Johnson pulled a vacuum to his motor (seals on the motor tend to prove it had a vacuum interior)? What if he then added a certain kind of gas to act as a catalyst - for example Helium? Another thing, what if the electric terminals circuited to the outside of the motor were actually to be connected to the driver winding brushes (no wires were on these terminals inside the motor). Could it be that if he had driven the output shaft with another motor, say at 1800 r.p.m., then the driver winding, being given outside D.C. power, could have caused the motor to accelerate up to 8,000 r.p.m.? The fuel cell on its own had no way to start the motor; it came into action only after the motor was caused to be spun. So what actually happens as the motor is rotated? What if, when this unit was driven at the start-up phase, it then generated a magnetic pulse within that comes from a parallel source outside the earth's atmosphere - which is the beginning of attract-attract?

In order to understand Johnson's electric motor connections between the three different windings, it is necessary to state that these conductors have positive and negative particles which simply exchange them in such a manner as to create a new particle flow. (If you think in terms of 'electric flow' as I did for many months, then the connections make no sense at all.) This [viewpoint] would allow for an opening of the mind whereby we would know that when a molecular structure breaks down there is a transfer of energy to the greatest part which is the attracting force.

My last contact with Marzicola was about five years later. Did the U.S. government confiscate this invention (patents included) for its own use as part of the secrecy order project? Make no mistake about it, the U.S. government has full knowledge as to the real value of cold fusion, which is the reason patents are not being issued on this cold fusion invention. They know (this includes the National Science Foundation) that the moment the focus on cold fusion switches from searching for heat to identifying released magnetic energy, then the "cat is out of the bag." American inventors are in a real bind in that to file a patent overseas (on any invention) each country we heard from stated that FIRST we needed 'proof of value by showing a patent issued in our own country.'

Was Johnson proving to the world that magnetism is a constant, and that he simply was recycling a stabilized magnetic/electro energy (not electro/magnetic)? This word switching could give science the mental freedom to investigate the core structure of the electron.

EDITOR'S NOTE

As part of his "due diligence", Orlowski has researched the patent literature for magnetically-driven devices. Here is a copy of his findings:

U.S. PATENTS ISSUED FOR MAGNETICALLY DRIVEN DEVICES

Patent No.	Inventor	Date
439,102	Bradley	10/1890
1,349,100	Reynolds	8/1920
1,724,446	Worthington	8/1929
1,835,721	Powell, A.	12/1931
1,859,643	Worthington	5/1932
1,859,764	Bougon, G.	5/1932
1,963,213	Pysa, J.W.	6/1934
2,124,672	Pershing	7/1938
2,279,690	Lindsey	4/1942
2,281,081	Sheldon	4/1942
2,378,668	Vickers	6/1945
2,408,080	Lloyd	9/1946
2,500,730	Yonkers	3/1950
2,669,687	Tastes	2/1954
2,769,106	Pembowski	10/1956
2,824,272	Delaporte	2/1958
2,845,554	Schwab	7/1958
3,025,445	Welch	3/1962
3,089,425	Spraguc (sic)	5/1963
3,173,042	Foder	3/1965
3,175,111	Orr	3/1965
3,185,877	Sears	5/1965
3,205,384	Sears	9/1965
3,270,228	Richi	8/1966
3,328,656	Dotson	6/1967
3,374,376	Kromrey, R.	3/1968
3,469,130	Jines, et al.	9/1969
3,513,340	Appleton	5/1970
3,609,425	Sheridan	9/1971
3,636,391	Horner, et al.	1/1972
3,704,653	Tracy, et al.	11/1973
3,736,450	Emaldi	5/1973
3,773,439	Sheridan	11/1973
3,811,058	Kiniski	5/1974
3,879,622	Ecklin	4/1974
3,890,548	Gray, Edwin	6/1975
3,899,703	Kinnison	8/1975
3,944,865	Jewitt	3/1976
3,947,533	Davis, A.R.	3/1976
3,992,132	Putt	11/1976

4,074,153	Baker, et al.	2/1978
4,082,969	Kelly	4/1978
4,100,431	Johnson	4/1979
4,151,431	Johnson	4/1979
4,179,633	Keely	12/1979

Please note that the Patent Office stopped issuing patents on free energy devices starting after "Newman's Impossible Motor" was displayed on television (around February 10, 1984). His operating permanent magnet driven motor caused viewers to state, "This new energy **discovery** amazes experts." Newman never received a patent. {Sources: Arizona State Patent Library & *Free Energy Press*, Robbinsdale, MN.}

EDITOR'S COMMENTS

Gerald J. Orlowski submitted numerous letters and documents in support of the events that he reports in his article. *Fusion Facts* commends him on his diligence in obtaining and replicating documents. There are many stories of excess energy devices with mostly anecdotal information. Such stories may be interesting but are difficult to judge. Orlowski makes a convincing chronicle of one man's struggles to develop and market a new energy system. In addition, Orlowski is skilled in the design, operation, and repair of electric/magnetic motors. Further, he has kept up a consistent effort to get this technology evaluated, funded, and developed. This is the type of effort that is of interest to the staff of *Fusion Facts*. We thank Orlowski for his information. We hope to be able to report further on the Magnatron Motor. In the meantime, we invite our readers to contact *Fusion Facts* for further information or to correspond with Orlowski.

F. LETTERS FROM READERS

LETTER FROM HAROLD ASPDEN

July 6, 1993

...Let me explain my own position, because I have spent enough of my life advancing into new physics without now trying to revamp what I have found acceptable. I am currently writing about my own research interests with a view to publishing the work in two parts. The generic title will be Energy Science, but the component books will be entitled "Physics without Einstein" and "Regenerative Energy Technology," respectively.

The earlier edition of "Physics without Einstein" was published in 1969 and it is all about why Einstein was wrong and how there is an aether full of energy from which matter, such as protons and deuterons, can be created. The latter accounts for my interest in 'cold fusion,' because that 1969 theory recognized that deuterons do not contain neutrons [1] and, further, it contained electrodynamic formulations which give account of anomalous forces and energy situations in heavy ion plasma discharges.

With all this 'free energy' interest and the 'cold fusion' activity, you can see why I am keen on updating that work and producing a second edition of 'Physics without Einstein.' If academically-minded readers wish to look up one of my papers on this subject to understand 'complex permeability,' I refer them to *Journal of Applied Physics*, vol 23, pages 523-528, 1952.

/s/ Harold Aspden

[1] H. Aspden, "The No-neutron Deuteron," *Fusion Facts*, vol 1, no 9, pp 1-6, 6 refs.

EXCERPT FROM A LETTER FROM ARTHUR C. CLARKE

written to Mr. Tom Dalyell, Minister of Parliament,
House of Commons, London.

...I enclose a copy of an address I gave to the Pacific Area Staff Officers recently (including the C-in-C, U.S. Pacific Fleet, and for the first time, Russian officers!) I have since given a similar address by videophone to a New York symposium, and to one arranged here by *The Economist*.

This whole affair [cold fusion] is becoming a major scientific scandal, which may have done irreparable damage to the U.S. and U.K. economies. Fortunately, Congress is now getting its act together... I hope it is not too late for the U.K. to do the same.

Although it is still possible that this phenomenon (whatever it is) cannot be scaled up for commercial use, at least three groups, including most importantly the Toyota one [Pons & Fleischmann], believe they will have demonstration units in the 10-20 Kw range by the end of the year. Even this could be revolutionary, as it

would mean the end of the electric grid and the petrol-powered automobile. ...

Arthur C. Clarke
in Sri Lanka

AN ANSWER TO PETER GRANEAU FROM FRANK CLOSE

[We recieved this letter three times during July, once on a computer bulletin board, once from Frank Close and then a copy of it from Peter Graneau, asking us to publish it. Mr Close wants to make sure that this "propaganda sheet," as he refered to *Fusion Facts* on the bulletin board, lets everyone know unequivocally that he is not in any way believing in or endorsing the existence of cold fusion. --Ed.]

An Open Letter from Frank Close

The June edition of *Fusion Facts* contains a letter from Peter Graneau about a lecture that I gave in London recently. The report attributes to me statements that I did not make, and then uses these incorrect statements in order to further support cold fusion and to discredit my own work. I look for an immediate and prominent correction of this "report."

1. "There is nothing to be discovered, according to [Frank Close], that is not already implied in our textbooks."

I did not make any such statement, nor do I hold such a ludicrous opinion.

2. "FC ...reported to the meeting that [FP] had now reliably produced a few watts of excess power..."

I did not make any such statement endorsing FP's claims. Is "now" a typo for "not?" [It's not an *FF* typo. -Ed.]

3. "Today Close no longer disputes the generation of excess heat in cold fusion cells..."

This is a complete invention and I dissociate myself from it entirely.

I am well known as a "skeptic" to readers of your "fact" sheet. Such a statement attributed to me may carry quite wrong signals to those readers who are assessing the viability of fusion power production processes and/or investment. The credibility of your news-sheet, and my integrity as an internationally known scientist who has spoken and written widely on this subject, requires that you make it clear that the quote, item 3, is a complete misrepresentation of my position.

"but he adamantly argues that this must be chemical..."

I said that in my opinion FP's claims of excess power from open cells may be due to them underestimating the systematic errors in these particular devices. I stressed, as in Too Hot To Handle, that it is for the electro-chemical community to decide on this. I showed that the sum total of their claims either equates with no phenomenon or with a "chemical" (electron or "atomic" as distinct from nuclear) source.

"...He gave no indication of what is being 'burned' in the fusion cells"

You should direct the above statement to Fleischmann and Pons, not to me. It is they that claim kilowatts of power for length periods, not I. {Detection should not be a problem if there really is a lot of energy produced.} It is now a year since I challenged Martin Fleischmann on this question at the British Association and after "nine" years of work there is still nothing worthwhile from him to support a nuclear origin for his power claims.

4. "Frank Close said he had never heard of capillary fusion nor had he seen our recent papers on this subject in Phys. Lett. A. This brought the debate to a quick conclusion."

Mr. Graneau is naturally proud of his published papers on filament fusion. However, my talk was concerned with *Fleischmann and Pons* claims to have produced watts (and more) of power from nuclear fusion. Mr. Graneau's two papers (Phys Lett A165,1(1992) and A174,421(1993)) have NO references to any papers by Fleischmann and Pons and had nothing whatever to do with the main theme of my talk. I asked Mr. Graneau if he was claiming capillary fusion to be a macroscopic power producing process; he was not.

As concerns your closing innuendo about my standing in science, which appears to be based on Mr. Graneau's garbled and inaccurate report of my talk, I recommend that you study the literature. The article does not do justice to your claim to represent Fusion "Facts" (sic).

/s/ F. Close

EDITOR'S COMMENTS

Fusion Facts does its best to report facts. However, we do indulge in editorial comments. We printed the letter from Peter Graneau and represented it as such. We did suggest that Frank Close was, apparently, not up to date on cold fusion literature. We are always pleased to publish any corrections to our "facts." Thank you, Dr. Close, for writing. We hope to personally meet you at the future Hawaiian Cold Fusion Conference or at the one scheduled for May 1994 in Minsk. Hal Fox, Ed.

LETTER FROM LAURENCE HECHT

Dear Hal,

Readers of *Fusion Facts* would be interested in the following historic information:

In 1871, the leading German physicist Wilhelm Weber showed that it was a consequence of his **Law of Electrical Force** that the phenomenon we describe today as the **Coulomb barrier** is overcome when the distance (r) of the two electrical particles is such that

$$r < \frac{2}{cc} \cdot \frac{e-e'}{ee'} \cdot ee', \quad \text{where } e, e' \quad (1)$$

are the masses of the two charged particles; e, e' are their charges; and c is $\sqrt{2}$ times the speed of electromagnetic radiation. At distances less than r , for static charges (relative velocities zero), repulsion will turn to attraction or vice versa. (See Page 5 of Wilhelm Weber, "Electrodynamic Measurements -- Sixth Memoir, relating specially to the Principle of the Conservation of Energy," *The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science*, Jan 1872, pp 1-21 & 119-149.)

Weber's **Law of Electrical Force**, which he formulated in 1846 was:

$$\frac{ee'}{rr} \left(1 - \frac{1}{cc} \cdot \frac{dr^2}{dt^2} + \frac{2r}{cc} \cdot \frac{ddr}{dt^2} \right) \quad (2)$$

However, he considered the **Law of Electrical Potential**, which is simpler, to be more fundamental:

$$V = \frac{ee'}{r} \left(\frac{1}{cc} \cdot \frac{dr^2}{dt^2} - 1 \right) \quad (3)$$

In both equations one sees a relativistic statement involving the terms equivalent to v^2/c^2 , and for force, an acceleration term as well. Many wrongly suppose that no one knew until Maxwell that the constant, c , corresponded to the velocity of light. Actually, in 1856, Weber and his associate Kohlrausch had determined the value for the constant of c in the electrical force law as 4.4×10^{10} cm per second. (The constant in the Weber relativistic electrical force law is square root of 2 larger than the velocity of light.) This led to the recognition of a fundamental relationship between the velocity of propagation of light and the propagation of the electromagnetic potential.

In 1857, Kirchoff published this fact and from that point on the relationship of the speed of light and the speed of propagation of electrical potential was an open fact. Actually, the Weber-Kohlrausch experiment was a working out of Gauss's ideas on the fundamental units of measure, and there is much reason to suppose that the likelihood of the identity was already clear to Gauss much earlier. Gauss and Weber began their collaboration in 1831, leading to the invention of the electromagnetic telegraph, the first model of which was installed between the physics office and the astronomical observatory at Gottingen University in 1834.

It may surprise the reader to learn that by no later than 1871 (the date of the publication of the Sixth Memoir in German), Weber had recognized the probable existence of the electron and of a positively charged particle of different mass. It is even more surprising to discover in the later pages of the Sixth Memoir that Weber had already calculated the circumstances under which oscillations of the positively and negatively-charged entities could lead to a stable rotational condition, which

he called a **state of aggregation**, though today we use the term **hydrogen atom**. Similarly, the time of oscillation of two similar particles, which he referred to as an **electrical atomic pair**, was shown to be consistent with the frequency of the oscillation of light.

Interestingly, if we substitute the values now known for the electrical charge and mass of the electron into Weber's expression (1), for the case of two similarly-charged particles, we arrive at:

$$r < \frac{2e^2}{mc^2} < 5.636 \times 10^{-13} \text{ cm.}$$

that is, the diameter of the classical electron. The gaussian units must be used, where $e = 4.8025 \times 10^{-10}$ esu.

The entire technical discussion by Weber deserves the closest study by anyone willing to have a fresh look at some basic assumptions. One word of warning, however, this was a time of intense political (and scientific) rivalry between Germany and England. Therefore, you will want to carefully consider Maxwell's characterization of the work of Gauss-Weber-Riemann in Maxwell's mistaken notion of their use of **action at a distance** theory. In fact all four of these scientists accepted the notion of an ether. The approach of the Gottingen school was far more complex and interesting, with the concepts of the **retarded potential** and the **topological studies** than the more simplistic notions of propagation which Maxwell propounded.

The reader should be warned against any simple-minded attempt to take Weber's equations and "plug them in" to a modern formulation, making use of the advances in measurements made since then. Alas, it takes much more work than that. The truth is, the method of Gauss and his students was far more advanced than any applied today. The two-part series, "The Scientific Method of Bernhard Riemann," *21st Century Science & Technology*, Winter 1991 and Spring 1992, is a very useful discussion.

Sincerely, /s/ Laurence Hecht.
Associate Editor
21st Century Science and Technology

[We appreciate this insight into the history of the development of the current misconceptions in science. Harold Aspden has remarked that the 20th century denial of an aether has prevented us from using space energy as a source of power and we have polluted our planet. We urge our more mathematically inclined readers to carefully review the Gauss-Weber-Riemann writings and determine where their approach would lead us. We are very thankful for the Aspdens, Basses, Graneaus, Hagelsteins, Kucherovs, and Marinovs of the world who refuse to accept standard scientific dogma. These are they who will help usher in a better understanding of the new energy devices that have been found and that are being found and/or improved. Ed.]

LETTER FROM M. SRINIVASAN

Subject: Possible "evidence" for the occurrence of nuclear reactions in biological systems - subject of biological (nuclear) transmutations.

Dear Friends,

During the last year my attention was drawn to some very interesting work carried out in France during the early 1960's by Louis Kervran, Baranger and others. Their systematic and exhaustive work has been summarized by Kervran in his book titled "Biological Transmutations" published in 1962. Subsequently in 1964 he came out with a third book entitled "Low Energy Nuclear Transmutations" which is in French and is currently being translated into English at BARC. Recently I came across a very nice popular summary of these ideas in a Penguin paperback book entitled "The Secret Life of Plants." [1] I have great pleasure in enclosing herewith the relevant chapter titled "Alchemists in the Garden" from this book which elegantly brings out the underlying concepts.

If indeed nuclear reactions are taking place right in front of us in plants and animals then much of our thinking on these subjects needs to be substantially revised. The "evidence" presented by Kervran and others, although cannot be taken as direct "proof" of occurrence of nuclear reactions, can be categorized as "very compelling" evidence. One of the simple experiments suggested in Kervran's book is the measurement of the change in elemental composition of the ash of plants germinating from seeds, grown only in ultra pure

distilled water. This simple experiment is being carried out by some enthusiastic people in BARC and preliminary evidence indeed seems to confirm the observations of Kervran and others. We believe that the outcome of further investigations related to biological transmutation has a direct bearing on the possible mechanism of cold fusion which is now a hot topic of study, notwithstanding the cold water thrown on the same by many established physicists!

I would highly recommend the interested reader to go through Kervran's original book (available in BARC Library.)

With best wishes, M. Srinivasan

[1] Also still available from Penguin Books. --Ed.

G. MEETINGS AND MISCELLANEOUS

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

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

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

CALL FOR PAPERS

Those wishing to present papers should submit two copies of an abstract containing the title of the

presentation, contact author, affiliation(s), etc. to S.Crouch-Baker, SRI International, 333 Ravenswood Ave., Menlo Park, CA 94025. Mark these submissions "ICCF-4 Abstract." Two-page abstracts are due by Sept. 10, 1993. Author notification by Oct. 10, 1993.

Abstracts should be no more than two pages including figures and tables; 10-point type, single-spaced. A bound volume of abstracts will be produced for distribution to attendees at the conference, so abstract submittal in magnetic form is encouraged. (Mac users: Word 4.0 +, sys. 7; PC users: Word 4.0+ is preferred, but will accept other w.p. programs or ASCII.) Be SURE to include two hard copies.

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

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

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

RUSSIAN CONFERENCE ON COLD FUSION

Yury N. Bazhutov and Valery P. Koretsky, Vice-Chairman and Coordinator respectively, of the Russian Conference on Cold Fusion (RCCF) wrote about their conference, which is going to take place in Abrau-Durso (on the shore of the Black Sea near Novorossisk) from September 28 - October 2, 1993.

The program of the Conference include the following subjects:

1. Experimental researches of Cold Fusion with the different scientific methods and instruments,
2. Cold Fusion theoretical models,
3. Cold Fusion applied technologies and devices.

A registration fee of \$400 covers the conference proceedings, breakfasts, luncheons, dinners, room rate and travel from Moscow to Abrau-Durso and back. They will meet attendees in Moscow on the 24 or 25 of September.

Contact them at Ap. 182, 8 Verhnija Maslovka Street, "Erzion" Center, 125083 Moscow, Russia;
Phone (095)-939-38-97 or (095)-212-04-90;
Fax (095)-292-65-11 Box 6935 Erzion.

INTERNATIONAL FORUM ON NEW SCIENCE October 13-17, 1993 CALL FOR PAPERS

The International Association for New Science, the sponsors of the conference, purpose to bring together scientists, professionals and lay people to promote research in the areas of New Science as well as education. New Science includes topics and phenomena which cannot be explained by traditional science and yet may have the potential for significant benefit to the health and conditions for humanity and the planet Earth.

Scholarly papers are invited on any topic related to New Science. These papers should include one or more of the following: theories, hypotheses, research designs, research results and analyses. Abstracts of not more than 400 words must be sent as soon as possible to the address below. Consideration of abstracts cannot be assured if received after September 1. Authors will be notified as soon as possible if the paper is accepted for presentation.

Please send for registration information to the International Forum on New Science, 1304 S. College Avenue, Fort Collins, CO 80524.

CALL FOR PAPERS - RUSSIAN & ENGLISH

A bilingual international conference on new energy systems (emphasis on cold fusion) is scheduled for May 1994. This notice is an advanced call for papers. The organizers of the conference include several noted academicians from the CIS (Commonwealth of Independent States). The conference will be held in Minsk, the capital city of the Republic of Belarus and

the location of the internationally recognized A.V. Luikov Heat and Mass Transfer Institute of the Academy of Sciences of Belarus. The proceedings will be printed in both English and Russian.

Fusion Facts has agreed to handle the organizing of the English-language proceedings. Hal Fox, Editor-in-Chief of *Fusion Facts* has agreed to be a co-chairman of the conference. One of the major objectives of the conference is to display working devices and systems. It is believed that the May, 1994 date will allow for the culmination of several efforts being made to demonstrate the commercial potential for new energy systems.

Abstracts of proposed English language papers should be sent to Hal Fox, P.O. Box 58639, Salt Lake City, Utah 84158-8639. Theory papers should be based on published experimental data. Papers that describe all pertinent details for the replication of the production of excess heat are solicited. Engineering design papers that provide current technical information on heat transfer, thermal-to-electric conversion, and other important engineering design considerations for the commercialization of enhanced energy systems are expected to be prepared in conjunction with groups providing actual working devices or reactors.

Space is expected to be available for commercial/scientific exhibits. Exhibits showing actual working reactors, or with high-quality motion pictures of such working reactors are solicited. Cost details will be completed in the near future.

For further information call Hal Fox at (801) 583-6232 in the U.S. Russian contacts will be published in the September issue of *Fusion Facts*.

--Advertisement--

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the condition that components vapor pressures don't differ more than 100 times,

3. Some of the intermetallic compounds,
4. UFP of oxides and other compound types.

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3. In the form of suspensions (in oils, glycerin, etc.)
4. In the form of powder, inserted into parathion matrix.

Technological conditions for production of UFP shown in the Table have been elaborated for apparatus operating in the Institute of Energy Problems of Chemical Physics. If you are interested in applications of UFP in your work, we can offer you the following types of assistance (listed in order of complexity increase):

1. Production of UFP, listed in available table.
2. Production of UFP, not listed in table, it brings to elaboration of technological conditions of apparatus used.
3. Assistance in creation of apparatus for UFP production and subsequent technical service. The productivity of the apparatus depends on metal type and average particle size needed and variation within the range 1-100 g/hour.

If you wish us to produce some amount for you, please write for tables of available UFP and further information. Mark Goldes, Magnetic Power Inc., P.O. Box 880, Sebastopol, California, (707) 829-7754, Fax (707) 829-1002.

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