FUSIONfacts

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NUCLEAR ENERGY 1923

"There is no likelyhood man can ever tap the power of the atom. The glib supposition of utilizing atomic energy when our coal has run out is a completely unscientific Utopian dream, a childish bug-a-boo. ...elements... have no energy to give up in the process of disintegration."

Robert Millikan, Nobel prize winner 1923 (theoretical physics)

A. EXPECTED FALLOUT FROM COLD FUSION RESEARCH

By Hal Fox

After over five years of cold nuclear fusion research, what have we learned? After more than 20 years of research on hot fusion, what have we learned?

First from hot fusion research we have learned a great deal about the control of hot gas plasmas in large magnetic-confined apparatus. We have learned about the difficulty of controlling the health-damaging effects of tritium ingestion. The most predominant lesson is that scientists, funded for years by large outpourings of tax dollars lose their objectivity and become lobbyists. Fueled by $500 million a year in government funds, hot fusioneers become stridently vocal in defending their single-minded approach and propagating their source of funds. Even in the face of thousands of articles from hundreds of scientists that provide alternative methods of energy production, the hot fusioneer is trapped in his belief that **his way is the only way.** Unfortunately, this single-vision view of energy science fails to conform to reality and this collective myopia can be credited with holding back new energy science for a decade.

The most important lesson learned from cold nuclear fusion is that science, despite generations of study, can still provide surprises. What teacher of science is there who would have thought, back in 1989, that nuclear reactions could be produced and controlled on or within a metal lattice? That new information is a big new science gift and has established the foundation for a new science of cold nuclear fusion.

The second important lesson is that new science is not limited to a single, isolated, discovery. The new science of cold nuclear fusion is excitingly rich in phenomena. Here are some of the surprising discoveries -- surprising even to Pons and Fleischmann who provided the first cold fusion discovery:

1. Nuclear reactions can take place on or within a palladium cathode in a heavy-water, lithium, electrochemical environment. (Other metal cathodes work, but less well.)

2. Nuclear reactions can take place on or near the surface of a nickel cathode in an electrolytic cell using a platinum anode and alkali-metal salts (especially carbonates.) Other cathode materials also are effective, including gold and tin.

3. Excess power, in the form of heat, can be produced in both light water and heavy water electrochemical cold fusion cells.

4. Various materials can promote or inhibit the nuclear reactions.

5. Excess power can be produced in gas plasma devices using palladium as a cathode and working in the glow-discharge pressure region.

6. Nuclei of some elements can be changed and new elements produced in several types of cold nuclear fusion devices.

7. Capillary fusion is possible and neutrons can be repeatedly produced.

8. Nuclear reactions can take place on or within a palladium cathode using molten salt electrolytic cells.

9. "Sparking" can produce both nuclear reactions and excess power.

10. Nuclear reaction rates in some cold fusion devices can be modified by the use of magnetic, electromagnetic, and sonic means.

11. Some proton-conducting materials support nuclear reactions or, at least, the production of excess heat.

12. Nickel (and perhaps other materials) can support anomalous heat generation at high temperatures and in the presence of hydrogen or deuterium.

13. A series of experiments has demonstrated that even microscopic life forms, under controlled conditions, can result in nuclear reactions.

RESEARCH RESULTS EXPECTED

The following are some of the predicted byproducts of cold nuclear fusion research:

1. The True Status of Matter will be better Understood.
Much more will be learned about the true status of matter by the continued research efforts in cold nuclear fusion. This additional understanding of the nature of matter and its inter-reactions is being obtained at a fraction of the cost of the proposed super collider.

2. Heat Production will be Commercialized.
Cold nuclear fusion devices and systems will be developed that will become the commercial sources of heat for home and industry. These devices will be non-polluting and less expensive to operate than current heat-producing devices.

3. Neutron and Tritium Generators will be Designed.
Some devices will be designed for the production of neutrons and for the production of tritium. Currently tritium is produced by highly expensive specially designed nuclear power plants where heavy water absorbs neutrons and produces tritium. [Note: Because tritium is an important ingredient in "hydrogen bombs", this ability will be a source of potential problems in the control of nuclear proliferation.]

4. Nuclear Transmutation will become Practical.
It is evident that most nuclear reactions produce elemental changes. Some of these nuclear reactions, particularly with the use of light-water cold fusion electrochemical cells, will be used to increase the supply of some scarce elements. This transmutation of nuclei is apparently the result of catalyzed proton capture (a new and unexpected development in nuclear physics.)

5. Some Nuclear Radioactivity will be Reduced.
The ability to control nuclear reactions by catalyzed proton capture will be used to reduce some radioactivity. The results of the Chernobyl nuclear power plant accident has poisoned thousands of acres of farms and villages and has caused the deterioration of the health of over 90% of the children in the Republic of Belarus. Chernobyl is about ten miles south of the southern border of Belarus and the wind was blowing over Belarus at the time of the 1986 accident. [Note: The author is inviting scientists to join in an effort to develop equipment that can handle radioactive soil and reduce its level of radioactivity. The goal is to rehabilitate thousands of acres of land in Belarus and Ukraine. Interested scientists may write to this publication.]

6. Science will enjoy a Healthy Paradigm Shift.
As the older hot fusioneers die off and the younger scientists are trained in the new discoveries of cold nuclear fusion, the older, outdated models of nuclear reactions will be replaced with new improved models. This model change (paradigm shift) will result in new and vigorous research into the control of nuclear reactions. These efforts will result in an explosive growth in nuclear chemistry that will be even more commercially important than the previous decades of advances in chemistry.

CONCLUSIONS

There is growing recognition of the new science of cold fusion (and of other enhanced energy systems). For example, Professor Josef Gruber, Chair of Statistics and Econometrics, University of Hagen, Germany, published and presented a Discussion Paper No. 214 [1]. In the paper entitled, "On Economic Effects of New Energy Technologies for Individuals and Society," Dr. Gruber makes the following hypotheses in his discussion of New Energy Technologies (NET):

1. There exist new energy supply devices.
2. The new energy devices exist today, as a rule, only in the form of small experimental units.
3. Japan is the first country in which NET receives considerable financial and psychological support.

Dr. Gruber recognizes two types of NET devices:

1. Based on magnetism, and
2. Based on water/hydrogen from a new type of electrolysis.

In his paper, Gruber answers the question: What should be done to develop NET rapidly and to apply it all over the earth? Here are the headlines of his answering paragraphs:

1. The most helpful [event] would be a scientific revolution: A change of the paradigm.
2. A wholesale shock would be the presentation of an NET device with an over-unity effect which works on a stand-alone basis and which is of a size required, for example, for supplying electricity and heat for home and offices (about 20 kW.)
3. People who bear great responsibility (e.g. government and scientific leaders) should not forget the term **commonweal.**
4. Nobel prizes in physics, in chemistry and in medicine for pioneers in the huge field of new sciences (including energy and biology) would probably be the most effective mind-openers.
5. In addition to the official Nobel prizes, **alternative** Nobel prizes like the Nobel peace prize should soon be established.

Dr. Gruber ends his 75-page paper with the following: **"The chances for improvements for all humankind on earth by means of NET are great. Let us live up to our responsibility for future generations now!"**

References

[1] Invited paper at the Symposium **"The New Energy"** of the Scandinavian Association of Vacuum Field Energy, Stockholm, September 3-4, 1994. The paper cites international sources of information including *Fusion Facts & New Energy News.*

B. THE SECOND RUSSIAN CONFERENCE ON COLD FUSION AND TRANSMUTATION OF NUCLEI

By A.B. Karabut

The Conference was held in Sotchi, 18-23 September 1994, at the holiday resort of Moscow State University. There were planned 40 papers, actually about 30 papers were presented. The Chairmen of the Conference, Academician A.N. Baraboshkin, could not take part in the session because of urgent matters, so the Conference went on under the Chairmanship of Yu.N. Bazhutov (NITc, FTP, Moscow), E.M. Sakharov (NIIYaF, MGU), and scientific secretary V.P. Koretskiy (NITc, FTP, Moscow). Academician Zelensky (Director of KhFTI, Kharkov) was a participant of the conference. Papers were presented at two sections - theoretical and experimental. The scientific level of works presented at this conference was essentially higher than that of the conference in Abrau-Dyurso (1993).

A wide class of possible cold fusion nuclear reactions were considered in the paper of V.B. Belyaev, "Cold Fusion without Mysticism" (United Inst. or Nuclear Researches, Dubna) where the energy difference between initial and final states are in the range from units up to tens keV. Interactions which take place are long-range ones. Particularly, hypothetical reaction of water molecule transition into Ne^{18} nuclear isomer was considered. Nuclear-excited Ne energy is about the same as H_2O energy. Some possible reaction of muon-catalysis are considered as well.

L.D. Sapogin (MADI, Moscow) in his paper, "Proposed Experimental Examination of Unified Quantum Theory," presented the basic principles of Unitary quantum theory. One of the main ideas of this theory is consideration of a particle as a wave packet and taking into account the interacting particles phases that leads to lowering of the Coulomb barrier.

Professor N.V. Samsonenko (Peoples' Friendship Univ., Moscow), presented the paper "Possible Influence of Electromagnetic and Weak Interaction Influence on the Process of Cold Fusion," which used theory with application of de Broil postulates of quantum mechanics. Assumption on the participation of relic neutrino with energy less than 10 keV in the CF reaction was discussed.

The theory based on the participation in CF reactions of the hypothetical heavy particle, erzion, which is not found for the present in experiments, was done in the report of Bazhutov, "Interpretation of Experiments on Cold Nuclear Fusion basd on Erzion Model."

The model of CF at Interaction of D^+ ions with crystal lattice of solid state was very consistently considered in the paper of

T.B. Chubb, "Wave Function Overlap and Nuclear Reaction in D^+ Ion Band State Matter."

The overview of some of the more interesting experimental works is presented below.

Earlier data of Yu.V. Savin and V.N. Serov (Russian Federal Nuclear Center, Arzamas-16) on CF were presented in their papers, "Analysis of the Results of Neutron Registration in Experiments on CNF" and "Analysis of the Results of Tritium Registration in Experiments on CNF." Neutron output with intensity up to 300/sec (signal/background ratio > 4δ) was measured during electrolysis of LiOD solution with titanium cathodes. Tritium was found in the cathode material. Tritium to neutron channels ratio was equal to 10^7. Neutron output (signal/background ratio > 3δ) was measured after saturation of Pd powder by deuterium and thermal cycling. Neutron output in experiments with titanium was observed only for particularly oxidized titanium.

The paper of V.A. Khokhlov (Inst. High-Temp. Electrochem., Ekaterinburg) was devoted to the measurement of heat effects on Pd-anode in melted salts containing H and D ("Thermal Effects on Pd Anode Saturated with Deuterium or Hydrogen in Electrolytical Process in Molten Salts").

The results showing 1000% of excess heat were presented in A.L. Samgin's (IVTECh, Ekaterinburg) paper, "Electrolysis of Solid Deuteron-Conductive Ceramics Based on $SrCeO_3$ in a Deuterium Atmosphere," on experiments with solid deuterium-containing electrolyte $SrCeO_3$ with proton conductivity.

The results of element and isotope analyses by various procedures for determination of great number of element impurities content which are lighter than Pd presenting in Pd-cathode material after experiments in the glow discharge was presented by I.B. Savvatimova, Ya.R. Kucherov, and A.B. Karabut in the paper "Registration of Nuclear Products in the Cathode Materials After Glow Discharge Experiments" (SIA LUTCH, Podolsk). It was shown that about 80% of impurities are placed at the surface layer of 1 micron thickness. The amount of registered impurities could not be explained by diffusion processes. It was shown that cathodes from such materials as Pd, Nb, Mo, etc. after experiment in a glow discharge have radioactivity (presumably beta-activity) with magnitude up to 10^6 events/cm^2/sec, which is especially intensive at the first hours and continue up to 2 months.

A.B. Karabut, Ya.R. Kucherov, I.B. Savvatimova, and S.A. Kolomeichenko ("Gamma-Spectroscopy and Electrical Charge Measurements in Experiments with Glow Discharge") reported experimental results registering excess gamma-radiation after experiments in a glow discharge. Excess gamma-radiation with energy in the 100-1000 keV range and activity up to 10^3 events/sec was observed for Pd, Zr, Nb in gases D, H and inert gases Ar, and Xe. High-voltage pulses generation were registered up to hundreds kV and nano-seconds duration. It was assumed that phenomenon of excitation of energy nuclei levels (formation of metastable isomers) of cathode material took place.

A.G. Lipson (Inst. Phys. Chem., Moscow) presented in his paper, "Amplification Neutron Flux by Passing Through KD_2PO_4 Monocrystal During the Phase Conversion Process," was observed in the results of experiments on repolarization of segnetoelectric KD_2PO_4 ("Generation of Gamma-Radiation in Monocrystals KD_2PO_4 by Segnetoelectric Phase Conversion.") In one series of experiments, amplification of neutron flow from outer source Cf-252 was observed. In another series, gamma-radiation was registered in the range of 4 MeV and 7 MeV. The possibility of d-d reaction occurring with formation of unstable isomer ^{4}He (20 MeV) and gamma-radiation with energy about 4 MeV was considered.

The paper "Observation of Neutron Emission in the Process of Repolarization of Deuterated Signeto-Electrics," of V.D. Dugar-Zabon (Peoples' Friendship Univ., Moscow) was devoted to the registering of neutron emission in experiments on repolarization of preliminary deuterated segneto-electrics. Neutrons were registered at field intensity of 70 kV/cm, signal to background ratio was more than 3δ.

A. Spallone (Frascati, Italy) presented data on obtaining of up to 75% excess heat and D/Pd ratio up to about 1 during electrolysis with pulsed power supply ("Gaining High Degree of Saturation in D/Pd Systems under High Pulsating Current in Electrolysis and Measurement of Heat Generation.")

R. Notoya (Sapporo, Japan) reported the results of work on obtaining of heat, gamma-radiation, and isotopes ("Cold Fusion by Electrolysis in Alkaline Metal Solution on Porous Ni Electrodes.")

The work of V.A. Romodanov (SIA LUTCH, Podolsk) devoted to the registering of tritium in cathodes of high-current of plasma focus installation during discharge in deuterium ("Determination of Effectiveness of Nuclear Reactions in Condensed Media on the Basis of Z-Pinch.")

Also taking part in the sessions were Robert E. Smith, President of OAKTON Int. Corp. (Virginia, USA) and Oleg Finodeev, the representative of ENECO Inc. (Utah, USA).

2ND RUSSIAN CONFERENCE ON COLD FUSION AND TRANSMUTATION: PRESENTERS

THEORY AND REVIEWS OF EXPERIMENTS

V.B. Belyaev (Dubna Combined Inst. of Nuc. Research), "Cold Nuclear Fusion without Mysticism."

L.G. Sapogin (Moscow Automobile & Road Inst.), "Proposed Experimental Examination of the Unified Quantum Theory."

K.A. Kaliev (KEI, Ekaterinburg), "Statistics of Reproducibility of Nuclear Reactions in Tungsten Bronzes." (not present)

V.D. Rusov (Odessa St. Univ.), "Neutrons and Active Centers of Fusion of Nuclei in Hydriding Materials."

A.L. Samgin (Inst. High Temp. Electrochem., Ekaterinburg), "Electrolysis of Solid Deuterium Conducting Ceramics Based on $SrCeO_3$ in a Deuterium Atmosphere."

V.A. Khokhlov (Inst. High Temp. Electrochem., Ekaterinburg), "Thermal Effects on Pd Anode Saturated with Deuterium or Hydrogen in Electrolytical Process in Molten Salts."

I.B. Savvatimova (LUCH, Science & Technology group, Podolsk), "Registration of Nuclear Products in the Cathode Materials After Glow Discharge Experiments."

A.B. Karabut (LUCH, Podolsk), "Gamma-Spectroscopy and Electrical Charge Measurements in Experiments with Glow Discharge."

THEORY

T.A. Chubb (U.S.A.), "Wave Function Overlap and Nuclear Reaction in D^+ Ion Band State Matter."

N.V. Samsonenko (Peoples Friendship Univ., Moscow), "Possible Influence of Electromagnetic and Weak Interactions on the Processes of Nuclear Fusion."

V.A. Romodanov (LUCH, Podolsk), "The Conditions for Achieving Energy Balance for Nuclear Reactions in Condensed Matter."

Y.N. Bazutov (Erzion Scientific Research Ctr., Moscow), "Interpretation of Experiments in CNF Based on Erzion Model."

EXPERIMENTAL INVESTIGATIONS

J. Kasagi (Japan), "Irradiation of Anomalous Protons and Alpha-Particles in Reactions D^+ TiD at the Energy of 130 keV."

Y.N. Bazutov (Erzion Sci. Res. Ctr., Moscow), "Registration of High-Energy Gamma Radiation in the Process of Electrolysis."

V.A. Romodanov (LUCH, Podolsk), "Determination of Effectiveness of Nuclear Reactions in Condensed Media on the Basis of Z-Pinch."

A.G. Lipson (Inst. Phys. Chem., Moscow), "Amplification Neutron Flux by Passing Through KD_2PO_4 Monocrystal During the Phase Conversion Process."

A.G. Lipson (Inst. Phys. Chem., Moscow), "Generation of Gamma-Radiation in Monocrystals KD_2PO_4 in Signeto-electric Phase Conversion."

THEORY

O.A. Petri (Moscow Univ., Chem. Dept.), "Review of Experimental Works in CNF."

Y.A. Istomin (KEI, Grozny), "On the Question of a Dineutron Model of CNF."

A.A. Krivoshein (Tech. Res. & Devel., Obninsk), "Tunnel Effect in Cold Nuclear Fusion."

V.A. Shadrin (Polytech. Univ., Tomsk), "Cold Nuclear Fusion within the Frame of Auto-oscillation Quantum Mechanics."

V.I. Visotski (St. Univ., Kiev), "Coherent Collective Phenomena in CNF."

V.A. Romodanov (LUCH, Podolsk), "Presentation of Theoretical Models of G.S. Soloviev and V.S. Lisitsa."

E.P. Gromovoy (Acad. Original Ideas, Odessa), "On the Question of Nucleic Transmutations."

G.I. Shipov ("Vent" Technical Ctr., Moscow), "Torsion Concepts in the Problem of CNF."

EXPERIMENTAL INVESTIGATIONS

R. Notoya (Japan), "Cold Nuclear Fusion in Electrolysis of Solutions of Ions of Alkali Metals on Porous Ni Electrode."

G.V. Fedorovich (Rus. Acad. Sci., Moscow), "The Peculiarities of Neutron Registration in the Process of Repolarization of Deuterated Signeto-Electric Samples with Electric Field."

V.D. Dugar-Zabon (Peoples Friendship Univ., Moscow), "Observation of Neutron Emission in the Process of Repolarization of Deuterated Signeto-Electrics."

Y.V. Savin (Res. Inst. of Experimental Phys., Arzamas), "Analysis of the Results of Neutron Registration in Experiments on CNF."

V.I. Serov (Res. Inst. of Experimental Phys., Arzamas), "Analysis of the Results of Tritium Registration in Experiments on CNF.

A. Spallone (Frascati, Italy), "Gaining High Degree of Saturation in D/Pd Systems under High Pulsating Current in Electrolysis and Measurement of Heat Generation."

I.P. Chernov (Polytechnic Univ., Tomsk), "Cold Nuclear Fusion in the Process of Niobium and Stainless Steel Saturation with Deuterium."

B.N. Shvilkin (Moscow Univ., Dept. Phys., Moscow), "Microplasma Phenomena in Pd Cathodes."

A.S. Kornilova (Moscow Univ., Dept. Phys., Moscow), "Mössbauer Investigations of ^{57}Co Pd in the Process of Deuterizing."

P.O. Revokatov (Moscow Univ., Dept. Phys., Moscow), "Method of Tritium Registration in CNF."

V.P. Koretsky (Erzion Sci. Res. Ctr., Moscow), "Layout and Protocol of the Experiment on Neutralization of Radioactive Waste Based on Erzion Model of CNF."

A.E. Fabrikant (Acad. Original Ideas, Odessa), "On Some Results of Investigations of Low Temperature Transmutations of Nuclei."

P.I. Golubnichi (Univ. Mech. Engr., Lugansk), "Cavitation and CNF."

C. NEWS FROM THE U.S.

CALIFORNIA - SCIENTIFIC HERESIES

Peter A. Sturrock (Stanford Univ., Stanford, CA), "The Role of Heresies in Scientific Research," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 430.

AUTHOR'S ABSTRACT

Many topics of interest to SSE members have been referred to as examples of "pseudoscience," "pathological science," or the "paranormal." These terms have not proved particularly helpful in promoting a rational and constructive discussion between the various parties involved in their study. We explore the possibility that it might be more realistic and more constructive to regard these complex topics as "heresies."

It is proposed that a heresy can be understood as being a proposition, directed at a profession or other organization, that is both a challenge to understanding and a challenge to power. Hence, a heresy has essentially both an intellectual content and a political content.

We examine these ideas in relation to some topics of historical interest, such as the heliocentric theory and continental drift, and to some topics of current interest, such as the redshift controversy, cold fusion, parapsychology, and the UFO controversy.

CALIFORNIA - ORIGIN FOR INERTIA OF MATTER

Bernhard Haisch (*Journal of Scientific Exploration*, Stanford, CA), "Zero-Point Field Origin for the Inertia of Matter and Mach's Principle," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 426.

AUTHOR'S ABSTRACT

The concept of inertia was originally proposed by Galileo as a fundamental property of matter. In the Principia, Newton defined inertia as a resistance to acceleration, and quantified this into $\mathbf{F} = m\mathbf{a}$. This equation of motion quantifies the inertia of any physical object and equates it with its mass. In the 19th century, Ernst Mach proposed that inertia of any given object was somehow linked to the presence of all other matter in the Universe. Einstein tried unsuccessfully to quantify Mach's Principle into General Relativity. Since then inertia has continued to be considered an innate, and indeed archetypal, property of matter. In the article *Inertia as a Zero-Point Field Lorentz Force* (Haisch, Rueda and Puthoff, *Phys. Rev. A*, 49, 678-694, 1994; see also *Science*, 263, 612-613, 1994; *Scientific American*, 270, No. 5, 30-31, 1994) we report on the discovery of a previously overlooked Lorentz force arising in accelerated reference frames as a result of the interaction of matter with the zero-point field (ZPF). We interpret this as an electromagnetic resistance giving rise to the property of inertia. If this proves to be true, there may be significant implications for our understanding of the nature and origin of matter in relation to the ZPF. Attempts to link consciousness to quantum processes may also need to be reexamined given the growing success of stochastic electrodynamics (classical physics plus a random, fluctuating ZPF) in accounting for certain quantum phenomena. On the other hand, possible connections between the ZPF of modern physics and esoteric concepts of light may be worth exploring.

COLORADO - COLD FUSION CELL DESIGN

H.E. "Chip" Ransford, III and S.J. Pike (Nova Res. Group, Inc., Denver, CO), "Apparatus for Safely Extending Cold Fusion Investigations to High Temperature, Pressure and Input Power Regimes," (final abstract signigicantly changed from preprint material reviewed in *Fusion Facts* Jan. 94), Proceedings: Fourth International Conference on Cold Fusion, July 1994, Hawaii, vol 2, 6 pages, 1 fig, 5 refs.

AUTHORS' ABSTRACT

To assure continued and expanding funding in an increasingly cost-conscious, results-oriented world economy, "cold fusion" needs solid proof of commercial feasibility. Excess heat calculations are of little use in convincing nonscientific skeptics. Heat alone, at low temperatures, does not have the "medium of exchange" value of electrical power. Proof of

commercial viability has three critical dimensions which must meet certain minimums:

· The temperature must reach 175 to 200°C - high enough to allow reasonably efficient (in the range of 15-20%) conversion to mechanical/electrical power.

· The system power levels must reach at least 5 to 10 kw of thermal output to demonstrate conversion to self power plus provide useful electrical energy for other functions.

· The system must operate continuously for weeks to months with short lag times to start up or shut down.

To date, world wide, most cold fusion investigations have been attempts to confirm and expand understanding of the Fleischmann-Pons Effect (FPE) at its basic levels. This research to corroborate FPE - with notable exceptions - has three common characteristics:

· Most FPE experiments have been conducted at or near ambient conditions of temperature and pressure, many in open cells.

· The experiments have been small in scale with minimal standardization of design.

· These experiments produced small thermal outputs and low excess energy ratios.

Despite the many technical (and other) obstacles in this field, the research now has clearly revealed these empirical facts:

· Nuclear reactions can indeed occur in electrolytic systems;

· The energy released in these reactions occurs primarily as heat;

· The major byproducts in Palladium-deuterium systems is ordinary helium.

· Excess energy ratios exceeding 10:1 are possible;

· The energy density can exceed three kilowatts per cubic centimeter;

· The reaction rate increases nonlinearly with increasing temperature.

These results hint at the potential power yields from cold fusion. They also show that safety precautions developed for electrochemical research can no longer be considered sufficient for FPE studies. The various accidents and events arising form open cells have led Fleischmann, Pons and others to issue warnings emphasizing the danger of closed systems.

However, if cold fusion is to ever reach its potential, closing and pressurizing the research cells is necessary. This calls for a much greater ability to contain and control cold fusion events. Safety must be the highest priority in the laboratory and thus, in the design and construction of experimental equipment. Good design must allow for radioactive products, high pressures and high temperatures, coolant circulation and the ability to easily maintain experimental protocols.

MARYLAND - ANALYTICAL CHEMISTRY

Michael Epstein (National Capital Area Skeptics, 8006 Valley Street, Silver Spring, MD 20910), "The Critical Role of Analytical Chemistry in the Investigation of Anomalies," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 429.

AUTHOR'S ABSTRACT

Analytical chemistry is the science of materials characterization for chemical composition. Since the verification of an anomalous event often relies on the characterization of materials remaining after the event, the analytical chemist can play a vital role in providing conclusive evidence. However, the limitations and controls needed on the analytical chemistry measurement are often underestimated by those who are not familiar with measurement science. Analytical chemistry has been best characterized as the one discipline in which you can do one hundred things right and one thing wrong, and still come out with the wrong answer.

This presentation will critically review several examples of how analytical chemistry and spectroscopy have been used (or misused) in an attempt to verify anomalies. Examples will include attempts at verifications of religious miracles (Shroud of Turin, Blood of Januarius, Image of Our Lady of Guadeloupe); the Allison Magnetic-Optic method; Polywater; and UFO related cattle mutilations. We will then discuss the development of a protocol to examine the evidence for biotransmutation, the claim that biological systems can perform nuclear transformations in which nuclides are transmuted into those of a different element.

MASSACHUSETTS - CAPILLARY FUSION

Peter Graneau (Center for Electromagnetics Research, Northeastern Univ., Boston, MA), "Capillary Fusion," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the

13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 428.

AUTHOR'S ABSTRACT

Capillary fusion is a process in which molecules of lithium-heavy-ammonia solution were accelerated to collide with sufficient energy to produce nuclear fusion reactions. The process was investigated in Germany from 1965-75. The occurrence of capillary fusion reactions has never been disputed. It yielded up to 105 neutrons per capacitor discharge through an 8 cm long, 1 mm diameter liquid filament enclosed in glass. The amplitude of the current pulse was only 1000 A and it certainly could not have involved thermonuclear reactions.

The 1000 A liquid plasma arc might have resulted in a temperature of 10,000 degrees K which could not be called "cold fusion." The German investigators recognized that the same electrodynamic forces which were responsible for solid state wire explosions also promoted capillary fusion. Neutron emission coincided with the disruption of the liquid filament into "plasma beads." This disruption of wires and liquid filaments has been explained with the Ampere electrodynamics. Early this century, the old Newtonian electrodynamics was dropped from textbooks, not because it disagreed with experiment, but for its incompatibility with special relativity.

Theoretical considerations have shown that the Ampere forces not only disrupt the plasma column, but they then compress the individual heads to produce fusion collisions. The Ampere forces scale such that if the 8 cm long capillary filament was reduced in size to 800 A and 10 A diameter, a one micro-ampere current would produce the same deuteron collision energy as that arising in the large filament. This opens the possibility that cold fusion in palladium cathodes may actually be capillary fusion.

A new series of capillary fusion experiments are in progress in Canada.

MASSACHUSETTS - NEUTRON TRANSFER

Peter L. Hagelstein and Sumanth Kaushik (Massachusetts Inst. of Tech., Research Lab. of Electronics, Cambridge, MA), "Neutron Transfer Reactions," (final abstract significantly changed fron preprint material reviewed in *Fusion Facts* Dec. 93), Proceedings: Fourth International Conference on Cold Fusion, July 1994, Hawaii, vol 1, 30 pages, 45 refs, 2 tables.

AUTHORS' ABSTRACT

A new model is proposed to treat configuration mixing between bound and continuum neutron states in a lattice; the Hamiltonian for this model is of the form of the Anderson Hamiltonian. In condensed matter physics, the Anderson model describes (among numerous other effects) electron hopping in semiconductors; the neutron model presented here predicts neutron hopping in lattices containing a mixture of isotopes. This result is new.

The Anderson model treats the mixing between localized states embedded in a continuum. In the neutron model, the localized states are energetically far removed from the continuum; consequently, the neutron model treats a much simpler mathematical problem.

Brillouin-Wigner theory is applied to a restricted Fock space version of the model containing states with 0 and 1 neutrons free. This leads to perturbative results that describe the effects of continuum neutron mixing to lowest order. The resonant scattering of virtual neutrons is predicted to lead to neutron delocalization, as long as the interaction perturbs either the linear momentum or total angular momentum of the nucleons.

Delocalized neutrons can be captured, with the reaction energy going into gammas and other incoherent decay products: such reactions are predicted by this model. Delocalized neutrons can be captured accompanied by energy exchange with the lattice. Formulas describing this type of reaction are derived and the resulting rates estimated.

MICHIGAN - MODES OF SCIENTIFIC CHANGE

Marcello Truzzi (Eastern Michigan Univ., Ypsilanti, MI), "Pseudoscience, Pathology, or Protoscience? Some Descriptive and Scientific Prescriptive Reflections on Scientism and Scientific Change," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 432.

AUTHOR'S ABSTRACT

The terms "pseudoscience" and "pathological science" are examined for their uses by both journalistic critics of anomaly claims and various philosophers and historians of science. These are considered in the light of current deviance theory in sociology, especially labeling theory. Though one can properly speak of real instances of pseudoscience, the label is often premature, mal-descriptive and ultimately dysfunctional for science. Consideration is given to the alternative term "protoscience" and its functional advantages.

We turn next to the adjudication of problems confronting protoscientific anomaly claims. Consideration is given to the differing problems encountered by cryptoscientific and parascientific claims and their respective strategies for acceptance. Attention is given to both the manifest and latent rules operating for scientific acceptance and rejection of anomaly claims. These include the presentation of and defenses against arguments in the areas of data, theory, and application. Examining the adjudication process in science (especially the question of weight of the burden of proof and what constitutes the "extraordinary evidence" expected to support "extraordinary claims") reveals that it places many anomaly claimants in a no-win (or Catch 22) situation. It is argued that much of this bias stems from a form of Scientism counterproductive for progressive science. Recommendations are then made for correction of the currently dysfunctional process.

MINNESOTA - A DISOBEDIENT SCIENCE

David Moon (Minneapolis, MN), "A Cold Fusion Theory: Mechanisms of a Disobedient Science," courtesy of author, 29 mms pages, 28 refs.

AUTHOR'S ABSTRACT

In this new theory, chaotic cold fusion data are strangely tied to orderly behavior of deuterons concentrated in active volumes of the metal lattice. Of course, a lattice site will become active when certain conditions are met. These may be summarized as (a.) a special condition of matter (SCM) - a chemically assisted nuclear reaction - as described by Storms [1], and (b.) surface dynamics (SURFDYN) given by Glück [2], which stresses the role of surface catalysis.

Peter Gluck, in his SURFDYN hypothesis, has observed that, "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", and that "Experimental data suggest that nuclear reactions take place in active sites on the surface of the lattice, that they are stimulated by dynamic factors..." [2].

Some of these dynamic factors that stimulate the new effects are (a.) local concentration of deuterons, (b.) mobility [2] of the "plasmoidal deuterons" [3], (c.) temperature, electrical or other input into the cell, and (d.) the presence of stimulation effects such as magnetic fields and radio frequencies [4], as well as microwave application [5,6]. Nonequilibrium states are created.

The consequence of these dynamic factors in the concentrated active volume is to allow the nonequilibrium state to bring about a collective, coherent oscillation of trains of deuterons against metal - atom barriers, such as a grain boundary. If the natural vibrations are in the microwave range, bathing the electrode or target metal with a resonant microwave frequency should enhance the reactions, which occur when trains of invading deuterons interact with the metal atoms in certain ways.

In fact, the effects should be greatest when the degree of coherency is greatest. Coherent microwave frequencies of the deuterated lattice that internally absorb fusion energy perhaps could be pumped up, in a maser-like fashion, resulting in a burst of microwave photons emitted from the cathode.

AUTHOR'S CONCLUSION

An attempt has been made to present a comprehensive theory of cold fusion--at least a working hypothesis if not a complete theory, which may not be possible from a single model, nor necessary. As Peter Glück stated, "The keyword... is cooperation: both international cooperation and cooperation of the theories, which have to be considered complimentary and not contradictory."

References:

[1] E. Storms, "Chemically-Assisted Nuclear Reactions," "*Cold Fusion*" Magazine, E.F. Mallove, editor, vol 1, no 3, July/August 1994, pp. 4253.

[2] P. Gluck (Inst. of Isotopic and Mol. Tech., Cluj-Napoca, Romania), "The SURFDYN Concept: An Attempt to Solve (or Rename) The Puzzles of Cold Nuclear Fusion," *Fusion Technology*, G.H. Miley, editor, vol 24, August 1993, pp 122-126.

[3] E.H. Lewis (Chicago, IL), "Plasmoids and Cold Fusion," *Cold Fusion Times*, M. Swartz, editor, vol 2, no 1, p 4.

[4] D. Letts, reviewed by C. White, *21st Century Science and Technology*, Carol White, editor, vol 7, no 1, Spr. 1994, p 75.

[5] D. Moon, "An Elementary Model of Deuteron Behavior," *Fusion Facts*, H. Fox, editor, vol 4, no 12, June 1993, pp 11-14.

[6] E. Storms, "Warming Up To Cold Fusion," *Technology Review*, MIT, S.J. Marcus, editor, May/June 1994, pp 19-29.

[Complete paper available from author: David Moon, 4020 East 52nd Street, # 104, Minneapolis, MN 55417]

NEW HAMPSHIRE - HEAT (& LIGHT) AFTER DEATH

Eugene F. Mallove (past Editor, "Cold Fusion" Mag., Peterborough, NH), "Cold Fusion: Heat (and Light) After Death," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 424.

AUTHOR'S ABSTRACT

The hundreds of obituaries for "cold fusion" were all dead wrong. Those still being written, even as scientific research into and technological development of this spectacular energy source accelerates, are among the most pathetic. Three book-length histories have been published against cold fusion - each aimed at terminating a new field of science, which has had four major international conferences with the next two already scheduled. The world's foremost scientific publications, *Nature* and *Science*, brutally attacked (and later ignored) cold fusion; both were catastrophically wrong. Their votes were irrelevant.

Japan has engaged major industrial support for cold fusion - its "New Hydrogen Energy" program. The "Cold Fusion Underground" in the U.S. has left the trenches and is emerging with a vengeance. Recently, a cascade of positive media coverage has appeared.

Yet the physical mechanism to explain "cold fusion" remains to be agreed upon by those in the field; a dozen or so major theories have been advanced. There is no longer any doubt that energy of a technologically useful level can be extracted in a host of processes and systems involving isotopes of hydrogen in contact with metals. Nor is there any doubt that nuclear reactions of heretofore unknown character can occur "in the cold" - near room temperature; their products have been confirmed. A staggering paradigm shift is emerging that admits what Dr. Edmund Storms of Los Alamos National Laboratory calls "chemically assisted nuclear reactions."

How will scientific institutions and processes be affected by this new reality - the ultimate establishment comeuppance? One can only speculate - with awe and trepidation. That will be the subject of this brief report, following a review of the history, science, and technology of "cold fusion."

OREGON - UNIFIED FIELD, GRAVITY REDUCED

Courtesy of the Author

Frederick E. Alzofon, "The Unity of Nature and the Search for a Unified Field Theory," *Physics Essays*, vol 6, no 4, pp 599-608, 24 refs.

AUTHOR'S ABSTRACT

This paper exploits the observed transformability of radiation into matter and its converse to develop a theory that is unified in the sense that radiation and matter appear as difference aspects of the same field: the matter-radiation field. The paper is based upon and discussed from a classical viewpoint, emphasizing conceptual aspects, rather than the theory's formal structure, which has been detailed elsewhere [see following abstract]. It is shown that, by incorporating an observed property of radiation into the basis of the theory -- fluctuations in the intensity of the radiation comprising a light signal in a vacuum -- the Lorentz group of rotations can be extended to include translations of space-time, of vanishing average magnitude. Moreover, a fundamental, nonvanishing average alteration in the metric of space-time (a quadratic expression), analogous to the case for Brownian motion is induced. The corresponding alteration in the equations of motion for the field gives rise to equations of motion of Bose-Einstein and Fermi-Dirac matter-radiation fields. The resultant theory has the following properties: the electromagnetic (i.e., Maxwell) field and the gravitational field appear as special cases of the matter-radiation field, along with a continuous gradation of these into forces which may be identified with nuclear forces on a sufficiently small scale. Inertial mass, gravitational mass, and radiation appear as different aspects of the matter-radiation field. The theory includes, as special cases, Newtonian mechanics, relativistic mechanics of a mass particle, and quantum mechanics. The probability field introduced in quantum mechanics is replaced by a matter-radiation field, which is an integral part of the theory rather than grafted into particle mechanics. In this way the sharp division between particle and field is eliminated; the zero-point infinite energy of quantum mechanics of fields is eliminated and given a new interpretation; the uncertainly principle is reinterpreted; the infinite energy is eliminated of, for example, static, electric, magnetic, and gravitational field potentials, as the separation of test body and source tends to zero. A simple model of the origin of the gravitational force can be based on the theory, along with the suggestion **of a direct manner of altering this force by use of present technology.** Other implications of the theory can be listed, among them a resolution of the apparent paradox between local realism and quantum mechanics as formulated in the Bell-type inequalities.

AUTHOR'S CONCLUSION

...It is evident that this essay hardly scratches the surface of the many promising consequences of the theory proposed, both for experiment and in further development of the theory itself. The experimental investigation of gravity alteration, for example, has opened many avenues of research which have yet to be fully explored in theory, experiment, and technology. Other researches will no doubt suggest themselves to the reader.

OREGON - ANTI-GRAVITY

Courtesy of the Author

Frederick E. Alzofon, "Anti-Gravity with Present Technology: Implementation and Theoretical Foundation," in Proceedings of *AIAA/SAE/ASME 17th Joint Propulsion Conference*,, July 27-29, 1981, Colorado Springs, Colorado, 33 pages, 36 refs.

AUTHOR'S ABSTRACT

This paper proposes a semi-empirical model of the processes leading to the gravitational field based on accepted features of subatomic processes. Through an analogy with methods of cryogenics, a method of decreasing (or increasing) the gravitational force on a vehicle, using presently-known technology, is suggested. Various ways of utilizing this effect in vehicle propulsion are described. A unified field theory is then detailed which provides a more formal foundation for the gravitational field model first introduced. In distinction to the general theory of relativity, it features physical processes which generate the gravitational field.

EDITOR'S COMMENTS

In a discussion with the author, it was learned that the author has achieved significant experimental results in applying his theory to experimental verification. At the present time, special experimental equipment is being obtained to further advance his experimental work. Dr. Alzofon, who previously worked for Boeing Aerospace, has now retired and has devoted himself to the splendid goal of reducing, hopefully to near zero, the effect of gravity near the earth's surface. His current experimental data is encouraging. We expect to hear more from Dr. Alzofon on this important theoretical and practical development. If this is an area of special interest for you, please write or call *Fusion Facts*.

TEXAS - CONVERTING VACUUM ENERGY

H.E. Puthoff (Inst. for Advanced Studies at Austin, TX), "On the Feasibility of Converting Vacuum Electromagnetic Energy to Useful Form," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstracts from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 425.

AUTHOR'S ABSTRACT

Quantum theory tells us that empty space is not truly empty, but rather contains an enormous amount of untapped electromagnetic energy known as the zero-point energy, or ZPE. (The adjective "zero-point" signifies that such energy exists even at a temperature of absolute zero where no thermal effects remain.) Such energy can be traced to radiation from the fluctuating quantum motion of charged particles distributed throughout the universe. Well-known physical consequences of the ubiquitous background ZPE include the perturbation of atomic spectral lines known as the Lamb shift, the van der Waals forces of chemical attraction at absolute zero, and the Casimir force, a unique attractive quantum force between closely-spaced metal or dielectric plates.

The energy associated with the ZPE is known to be essentially inexhaustible and ubiquitous, so the question arises as to whether the ZPE can be "mined" for practical use, that is, extracted to perform useful work. Although it might be natural to assume that any attempt to extract energy from the background ZPE might violate energy conservation laws, or at least thermodynamic constraints (as in misguided attempts to extract energy from the surrounding heat bath under equilibrium conditions), a careful analysis shows that this is not the case, and that energy and heat can, in principle, be extracted without the violation of fundamental precepts. (See D.C. Cole and H.E. Puthoff, *Phys. Rev. E*, 48, 1562, 1994.)

With regard to laboratory experimentation, the candidate mechanism for energy extraction is the Casimir effect mentioned above. This attractive force can be shown to derive from an imbalance in radiation pressure from the background ZPE due to the boundary conditions established by the plates. Proof-of-principle for Casimir energy extraction is demonstrated by the collapse of the plates together, which results in the conversion of vacuum potential energy into heat. Experimentation in our laboratory is directed toward a plasma version of this process hypothesized to involve a Casimir pinch effect. Calorimetry and other measurements of possible excess heat (energy) generation in this process will be discussed.

TEXAS - ULTRA LOW NUCLEAR CHANGES

John O'M. Bockris (Distinguished Professor of Chem., Texas A&M Univ., College Station, TX), "Ultra Low Nuclear Changes in Metals at Texas A&M," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 429.

AUTHOR'S ABSTRACT

This paper reviews the evidence that it is possible to carry out nuclear reactions in the cold within solid state confinement. The reactions which are considered involve the synthesis of tritium from deuterium at room temperatures; possible changes in metals of higher atomic weight including precious metals; and the nuclear conversion of carbon to iron.

Some brief account will be given of the "explosions" at Texas A&M University associated with the reactions of part of the faculty to this work.

TEXAS - SCIENTIFIC METHOD RENEWED

John P. MacLean (MacLean Engineering Innovations, Stafford, TX), "A New Renaissance in the Scientific Method," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 431.

AUTHOR'S ABSTRACT

The author's 35 years as a user, observer and director of scientific progress have revealed many barriers that inhibit progress both in industry and in scientific research. The first step in overcoming these deficiencies is to understand the mentalities that result in these barriers.

We examine the process today, its successes and failures, and the need for paradigm shifters. Barriers to progress from the funding processes are examined.

Three facets of the "Not Invented Here" attitude are examined: information from outside a discipline, results that do not mesh with conventional wisdom, and Thomas Gold's "Herd Instinct."

Prejudice against progress from some sources is rampant. Vilification of information coming from unconventional, or metaphysical sources is discussed.

Anecdotal data is nearly totally ignored. The illogic of this position is considered, and examples briefly discussed.

Negative feedback is a significant barrier to progress. The Peer Review Process and "Quality" programs are examined. Self- and public-centered fear inhibits progress. Examples in both areas are considered.

The "All or Nothing" syndrome and the mentalities that it generates result in much nonproductive, antagonistic dialogue that inhibits the free flow of creative juices.

Personal egos and self-centered mentalities inhibit communication and block synergistic effects.

Some "Quality Initiatives" successful in industry are desperately needed in scientific research. A blending of spiritual and physical information is needed instead of present mutual antagonism.
[Presentation sponsored by Roger Nelson]

UTAH - TRITIUM AND HIGH LOADING

Fritz G. Will (Dept. of Chem. and Fuels Engineering Univ. of Utah, Salt Lake City), Krystyna Cedzynska (Inst. of General Food Chem. Tech. Univ. of Lodz, Poland), Denton C. Linton (Dept. of Phys. Univ. of Utah, Salt Lake City), "Tritium Generation in Palladium Cathodes with High Deuterium Loading," (final abstract significantly changed from preprint material review in *Fusion Facts* Feb. 94), Proceedings: Fourth International Conference on Cold Fusion, July 1994, Hawaii, vol 1, 10 pages, 5 figs,12 refs.

AUTHORS' ABSTRACT

Tritium up to fifty times background has been observed upon electrolyzing 1N D_2SO_4 in four out of four cells when using Pd cathodes "of a certain type". No tritium was detected in four control cells, containing H_2SO_4 in H_2O, employing Pd cathodes cut from the same wire spool. Tritium amounts were from 7 x 10^{10} to 2.1 x 10^{11} atoms, corresponding to average generation rates from 1 x 10^5 to 4 x 10^5 atoms/sec/g Pd. In all cases, D/Pd and H/Pd loadings of 1 ± 0.05 were attained. A cyclic loading/unloading regime rather than the usual continuous constant current regime was applied to attain these high loadings. Tritium analysis was performed in Pd, electrolyte and the gas head space of the sealed cells. Maximum tritium concentrations of 8.9 x 10^{10} atoms/g Pd, 180 times the detection limit, were found in the D-loaded Pd cathodes, none in the H-loaded Pd. Also, no tritium within detection limit was found in 150 unused Pd pieces. Of these, 13 were cut randomly from the same wire spool as the four D-loaded Pd cathodes. The probability that the tritium in the latter was due to random spot contamination is computed as 1 in 2,380. It is concluded that the tritium was generated by nuclear reactions in the Pd. However, no tritium was detected in four D-loaded Pd cathodes of a different type in spite of attaining loading D/Pd = 1. Different metallurgical history and impurity contents may play an important role.

VIRGINIA - TWO KINDS OF KNOWLEDGE

Henry H. Bauer (Professor of Chem. & Science Studies, Virginia Polytechnic Inst. & State Univ., Blacksburg, VA), "Two Kinds of Knowledge," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 430.

The character of scientific knowledge and its degree of reliability have long been argued over. Philosophers of science have looked for ways of demarcating scientific knowledge from non-scientific knowledge. Anomalies -knowledge claims

that don't fit with other things that are known -- have been a central issue. For Thomas Kuhn, the accumulation of inescapable anomalies prepares the way for scientific breakthroughs. In this Society we address, at least implicitly, the question: What does it take to convert an anomalous claim into accepted scientific knowledge?

I'm going to suggest that it's useful to think about human knowledge -- scientific knowledge included -- as an admixture of two ideal types: "map-like" knowledge and "story-like" knowledge. I will illustrate how the notion can illuminate such issues as how education differs from indoctrination; what the differences are between the natural and the social sciences, and between the various natural sciences; and how such analysis may help in resolving debates.

C. NEWS FROM ABROAD

CANADA - QUANTUM MECHANICS

S. Jeffers and J. Sloan (Dept. of Phys. & Astronomy, York Univ., North York, Ontario, Canada), "Information, Knowledge and Quantum Mechanics," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 436.

AUTHORS' ABSTRACT

The original accounts of the double slit experiment invoked the Heisenberg Uncertainty Relations to assert the impossibility of simultaneously observing interference fringes with 100% contrast and determining, with absolute certainty, through which slit the radiation actually passed. Recent two-beam interference experiments have been carried out in which, in principle, path information may be obtained without introducing any uncontrollable disturbance in the interfering beams in the sense implied by the Uncertainty Relations. However, any attempt to extract this information from the experimental apparatus does, in fact, result in the reduction of the contrast of the interference fringes. This remarkable fact is consistent with the principle that the quantum mechanical wave function represents completely what can be known about a quantum mechanical system.

It follows that, if it were possible by any means, including ostensibly anomalous means, to extract accurate path information from a two-beam interference experiment, then this would be manifest in a reduction of the contrast of the interference fringes. Measures of contrast of interference fringes may thus serve as a direct indication of whether accurate path information is being abstracted from a given experimental situation by either conventional means or ostensibly anomalous means. A simple two-beam optical interferometer has been built which employs a He-Ne laser to illuminate a double slit. Detection of the interference fringes is made using a linear photodiode array. The whole experiment is controlled by a micro-computer. Preliminary calibrations show that high contrast fringes (contrast = 95%) can be recorded with high accuracy (1 part in 1000) and with temporal resolution of 3 seconds.

Experiments involving human operators are planned in which the operator will attempt to abstract information concerning the flow of radiation in the interferometer. This experiment should serve as a sensitive indication of anomalous phenomena and of the accounts given of such phenomena which invoke quantum mechanics.

ITALY - INCONSISTENCY IN THEORY

Emilio Del Giudice (Istituto Nazionale Fisica Nucleare, Sezione Milano, Milan, Italy), "Inconsistency of the Conventional Theory of Water and Liquids," *Journal of Scientific Exploration*, vol 8, no 3, 1994, (abstract from the 13th annual meeting of the Society for Scientific Exploration, Austin, TX, June 9-11, 1994), pp 436.

AUTHOR'S ABSTRACT

Water and liquids are usually described as ensembles of molecules kept together by purely electrostatic forces. However, these forces are compelled to have an extremely short range, since atoms are electrically neutral and can act upon other atoms only at distances where nuclei and electrons are "perceived" as separated. As a consequence, the conventional view implies that at comparable density and temperature the microscopic structure should be the same. A suitable test model could be the liquid near the critical point (where liquid and vapor have the same density). A recent experiment on water has also shown that, under these extreme conditions, liquid and vapor are microscopically different. Thus, the conventional theory of liquids is brought into question. Molecular dynamics seems to be effected by the macroscopic thermodynamic state. The way out of this paradox involves the existence of long range electrodynamic interactions able to organize atomic systems on large scales. A purely atomic description of condensed matter appears untenable.

JAPAN - STABILIZATION OF H_2

Riichi Sasamori, Yoshihiro Okaue, Toshiyuki Isobe, Yoshihisa Matusda (Dept. Chem., Fac. Sci., Kyushu Univ., Fukuoka, Japan), "Stabilization of Atomic Hydrogen in Both Solution

and Crystal at Room Temperature," *Science*, vol 265, no 5179, pp 1691-1693, 9 refs, 4 figs.

AUTHORS' ABSTRACT

Atomic hydrogen has been stably encapsulated in both solution and crystal at room temperature. Upon gamma-ray irradiation of $[(CH_3)_3Si]_8Si_8O_{20}$, which is the trimethylsilylated derivative of the silicate anion with a double four-ring (D4R) cage, electron spin resonance (ESR) spectra revealed that a single hydrogen atom is encapsulated in the center of the D4R cage and is stable for periods of many months. Attack by chemically reactive species such as oxygen was prevented by the D4R cage, but the ESR signal of the hydrogen atom was sensitive to the magnetic interaction caused by the presence of the O_2 molecule near the cage.

JAPAN - COLD FUSION MODEL

Hideo Kozima (Shizuoka Univ., Dept. Phys., Shizuoka), "Trapped Neutron Catalyzed Model for Cold Fusion," to be published in Cold Fusion Source Book.

AUTHOR'S ABSTRACT

Accepting various experimental results of the Cold Fusion phenomenon as real and assuming existence of a common cause for the complex and perplexing events, we propose a model for Cold Fusion based on the premise of the existence of a lot of ambient neutrons with thermal or cold energies. The neutron is trapped in the material having appropriate properties; with submacroscopic structure to reflect neutron by total and Bragg mechanisms; with nucleus which can emit and absorb neutron by recoilless mechanism (neutron Mössbauer effect). If there exists in the material a lot of protons or deuterons, the trapped neutron could fuse with the proton or deuteron and the fusion products could induce secondary collision and fusion reactions to effect the Cold Fusion phenomenon. The condition making the model work effectively depends on the stochastic process in the sample as the Cold Fusion phenomenon shows poor reproducibility or irreproducibility.

GERMANY - WIDE ECONOMIC EFFECTS

Josef Gruber (Chair of Statistics and Economics, Dept. Econ., Univ. Hagen), "On Economic Effects of New Energy Technologies for Individuals and Society," presented at the Symposium on New Energy, of the Scandinavian Association of Vacuum Field Energy, Stockholm, 3-4 September 1994, 73 mms pages, 49 refs, 4 appendices.

AUTHOR'S INTRODUCTION

From all the information about new energy which I have collected during the last 12 months, I infer the following basic hypotheses for my lecture:

1. There exist new energy supply devices (generators, motors, energy converters, machines) which operate with a so-called over-unity effect: The ratio

$$\frac{\text{useful energy output}}{\text{useful energy input}}$$

is larger than 1.0, if only those forms of useful energy are taken into account which are known in classical physics.

Such new tools use energy from a "new" source, which is unknown in classical physics and which is indepletable (unlimited for all practical purposes). In the recent physical and engineering literature, it is known as vacuum field energy (VFE), zero point energy, space energy or free energy. The corresponding technology for large-scale applications, we call new energy technology (NET).

2. These new energy devices exist today, as a rule, in the form of small experimental units. For some of these devices (or more exactly: for parts or components of such devices) patents have been granted. To develop the corresponding new energy technology (i.e. devices for large-scale applications and for widespread use), a considerable research and development effort is, as a rule, required. This effort also separates the successful new energy supply devices from others which do not hold what has been promised. There is at least one large successful new device with an overunity effect working on a stand-alone basis.

3. Japan is the first country in which NET receives considerable financial and psychological **support.** Nobody should therefore be surprised, if Japanese firms would soon (maybe in a few months, maybe in a few years) offer worldwide powerful NET.

On the basis of these hypotheses, we shall investigate the effects of introducing NET on individual consumers and producers and on society as a whole (including the environment). In other words: We shall make an investigation of the .if ... then ..."-type: If the basic hypotheses are true. what are the consequences for ...?

RUSSIA - CONCEPTUAL MODELS

N.I. Bakumtsev (Volgodonsk, Russia, Stock Society "Atommach", Regional Center, "Atommachenergetics"),

"Development of Conceptual Models of Demonstration Installations of Cold Nuclear Fusion."

The Regional Center "Atommachenergetics" is engaged in solving scientific and technological questions in "Cold Nuclear Fusion" and transmutation. The goal of Stock Society "Atommach" is to market scientifically complicated technologies to be introduced into society. With regard to this goal, demonstration models of "Cold Nuclear Fusion" and transmutation systems have definite commercial value. In this connection, we require projects from investigators that can be coupled with a measurement system and to determine optimal regimes and quantative measures of by-products. In this connection, "Cold Nuclear Fusion" and transmutation is defined as the field of generating matter rather than the alternative of producing energy, however application to energy production is recognized as possible in the future.

The following works are being carried out under the sponsorship of "Atommachenergetics":

1) Sytin and Associates; an installation for low temperature synthesis of heavy chemical elements has been constructed.

2) A modified systems installation for generation of Higg's Bosons has been constructed to be used for the physical investigation of nuclei.

3) Demidova's installation for quantum synthesis of matter has been constructed. This installation is supposed to be used for cluster synthesis of matter from a tiny sample. For the time being, the conditions that can be realized in this installation result in spontaneous (uncontrolled) production of matter. The clusters generated in the process of spontaneous synthesis on the initial sample of silicon minerals contain mixtures of elements available in the atmosphere of the laboratory. It is worth noting that in darkness no process takes place. In order to provide a controllable synthesis, apart from treating the sample with light, it is necessary to apply a sound component and to provide automatic application of both light and sound components in the process of irradiating the sample.

In order to create a commercial system there remains a question of safety to be solved because the samples begin radiating and create a thermal magnetic field for the range of several meters radius. These fields are bioactive and may be dangerous for users and must be screened. The biological effect of the field resembles the effect of Veinik's chronal field and hence the only method to get rid of this harmful influence is to keep the installation dismantled while researching for appropriate screening material and technologies.

4) Technical project of Koldamasov's commercial demonstration installation has been developed for hydrodynamic cold nuclear fusion process.

The author developed the parameters of the process of fusion in plasma created in a stream of extremely high purity water under the conditions of stream compression resulting in cavitation plasma generation (accompanies the phenomenon of electron superconductivity).

5) Investigations have also been conducted in the fields of gas plasma fusion and laser initiation of "Cold Nuclear Fusion," searching for "torsion" configuration in "torsion" "Cold Nuclear Fusion." These investigations are now in the phase of theoretical development.

[There are some interesting new items reported in this paper. We are contacting the writer for further information. Ed.]

RUSSIA - Z-PINCH AND TRITIUM

V.A. Romodanov, V.I. Savin (SPA LUTCH, Podolsk, Moscow reg.), V.A. Alekseev, V.I. Vasil'ev, Yu.F. Ryzhkov, S.V. Rylov, V.M. Strunnikov (TRINITI, Troitsk, Moscow reg.), Ya. B. Skuratnik (SRPCI, Moscow), "The Definition of Effectiveness of Nuclear Reactions in Condensed Media on the Basis of Z-pinch," pre-print from the authors.

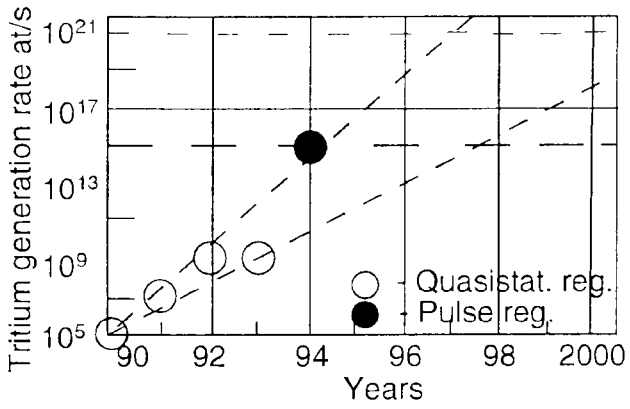
AUTHORS' ABSTRACT

In previous works we presented the recommendation of the main parameters for the plasma low-energy interaction with condensed media. These parameters can be used to promote the achievement of measured energy for the nuclear reactions in condensed media (NRCM).

It was shown, that one of the essential parameters which influences NRCM effectiveness is current density. This allows one to obtain sufficient prospects for further research on the plasma devices using various discharges, self-compressed, types of pinches. In this work the results of research are presented on the effectiveness of NRCM on tritium generation for devices which make use of Z-pinch. It is primarily indended for thermonuclear research.

We obtained a sufficiently high effectiveness of NRCM in devices based on Z-pinch and have achieved tritium generation at rates up to 10^{15} atoms/sec. It is shown that, in principle, the possibility to reach the energy balance in NRCM with tritium generation (see Fig. 1). In accordance with prognosis, the real balance can be achieved in the 1996-97 time period.

We discuss the effectiveness of different targets in comparing with the prophecy of [previous] work. It is possible to achieve the mechanisms of nuclear reactions and perspective to develop NRCM using the basic system of a plasma-target.



RUSSIA - PROTON SUPERCONDUCTIVITY

A. Krivoshein and D. Kamaev ("TNP" (Technology Research & Development, Ltd.), Obninsk, Kaluga region), " Cold Fusion and Proton Superconductivity," courtesy of authors.

AUTHORS' ABSTRACT

In our last paper, we discussed the regular increase of full interaction cross-section according to the I/V law in case of cold fusion (where V is the kinetic energy of nucleon). Now we are considering this possibility for hydrogen.

It is universally known that some chemical elements posses different physical properties under low temperatures only (superfluidity, superconductivity). There are models describing well these phenomena. Hydrogen and its isotopes do not belong to the elements possessing such properties, but the only parameter which prevents it from having such effects is strong interaction in its molecule (according to the existing models). It is common knowledge that there is the phenomenon of ordered motion of hydrogen in solids under the action of electric forces, which is called mass transport.

The recent research of hydrogen behavior in metals and developments in creation of new superconducting materials lead to several new suppositions.

RUSSIA - DEUTERON CONDUCTORS

A.L. Samgin, V.S. Andreev, S.A. Tsvetkov, A.V. Cherepanov (High-Temp. Electrochem. Inst., Urals Branch Russ. Acad. Sci., Ekaterinburg), "Electrolysis of Solid Deuteron Conducting Electrolytes in Deuterium Atmosphere: Microsecond Structure Analysis of Neutron Pulses by Means of Two-Ring Detector," to be published in Cold Fusion Resource Book.

AUTHORS' ABSTRACT

The results of this paper are the continuation of investigations presented at the 4th International Conference on Cold Fusion. The authors proposed as main object the quest of corellation between optimal conditions of electrolysis of solid deuteron conducting electrolytes, composition, sample preparation technique and generation of neutron radiation. The basic experiments were conducted with ceramic sandwich-like structures on the base of strontium cerate specially synthesized.

Investigations of neutron radiation were conducted on the new registration system, produced for resolving problems in Cold Fusion. It was based on method prepared in the Joint Institute for Nuclear Research (Dubna).

E. ARTICLES FROM OUR READERS

PLASMA SHAPING REVEALS NEW ATOMIC TRANSFORMATION TECHNIQUE AND COLD FUSION AT CHEMICAL-MOLECULAR ENERGY LEVELS

By Ronald K. Kovac, Boulder, CO

To establish reader interest, the author announces the following conclusion of this paper: ^{4}He (commonly accepted ashes of cold fusion) was obtained at 3.75% concentration of the parent gas, nitrogen. Even more profound: The "MISSING LINK" element, ^{5}Li was apparently created in the same apparatus. Standard literature proclaims that there is no element of atomic weight 5. The cold fusion process that gave these results uses only plasma of N_2 and magnetic shaping. The plasma tube has no constrictions or capillary fusion facility. The plasma tube has only two needle-point stainless electrodes, no platinum, nickel or palladium cathodes. The ^{5}Li was obtained at 2.5% level of the parent gas N_2. The late physics Nobel Laureate Julian Schwinger of UCLA predicted the creation of ^{5}Li from cold fusion [in his paper "Cold Fusion: A Brief History of Mine"].

The creation of this "never-before-found" element is offered by the author as strong support for the notion that cold fusion, ultra sub-atomic particles, gravity, electricity, and magnetism are each only a consequence of space moving in special interrelated geometric formations. If glass, rarified nitrogen and electricity can cause cold fusion (^{4}He "ashes") and transmute or create the new missing element ^{5}Li, then only

geometry of motion of space is involved. [In other words, matter is created from energy.]

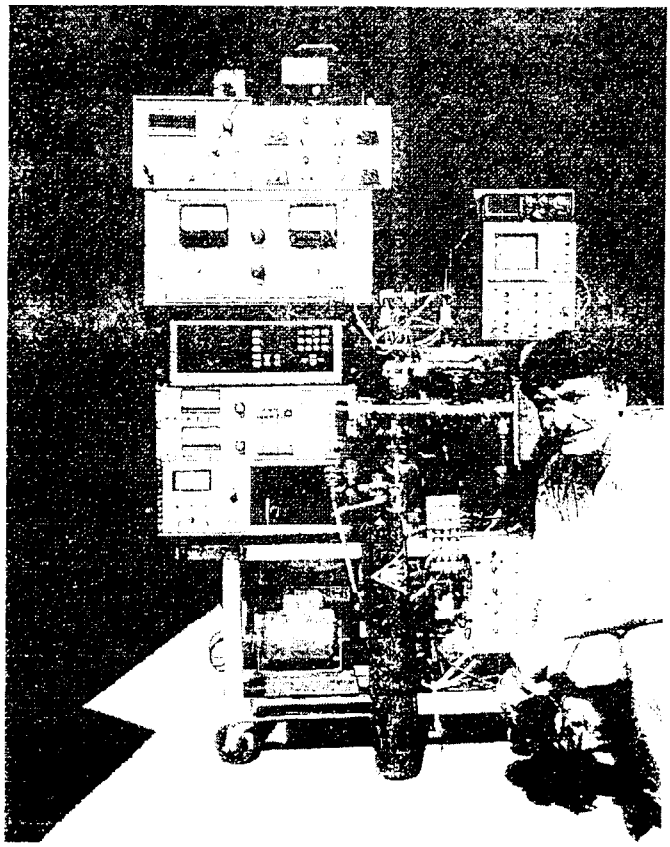
The history began with the Fleischmann-Pons type cell. The construction and components of this cell inspire fusion thinking because of the heavy water (D_2O) and exotic metal elements, but later work indicates almost any materials can be used to cause "cold fusion." Randell Mills and Stephen Kneizys noticed you do not need heavy water, ordinary water would do with the addition of potassium salts. Dutch Shell discovered you don't need water or palladium, and that stainless steel and regular hydrogen would even work in a spark chamber arrangement.

Here we see a clue that maybe this effect is much broader in scope than a simple nuclear explanation. After all, the more information we get, the more classic fusion seems to fail as an explanation. Perhaps our perception of classical fusion theory is too narrow in scope. Maybe this was a consequence of the fact that our test instruments were based on detecting fast moving particles more than particles at rest. (Geiger counters, scintillation counters, etc., require the particle to move through the medium of the detector, leaving a trail of ionization. Likewise, with cloud chambers, bubble chambers, etc.) Ww could speculate about the particles that might be very low velocity, kind of floating around, not causing any disturbance, but available for molecular or atomic interaction? ...

On cold fusion, what we need is a [special detector] that can "smell" slow moving particles. In this way we can get the whole picture. Not just special cases. GOOD NEWS: We have recently obtained one! It is a machine like a bookkeeper with a third eye! It is called a Quadrapole Mass Spectrometer ...aka... a residual gas analyzer or RGA. Fortunately, a person is only limited by their creative ability. In this manner I was able to pull in favors, extort people, recycle parts, and otherwise behave in such a manner until I had created the mechanical atrocity pictured here. In spite of its appearance and the age of some of its components, the Mass Spec. or RGA works well.

In addition, two types of emission spectrometers were employed. The first was a Varian 175 atomic absorption spectrophotometer (with custom parts added to facilitate its use as an emission spec.). The second is an energy inventory device for 360 lambda to 800 lambda wavelength. The second might lead to photovoltaic interfacing information. Transmutation indication was evident from early experiments with Toby Grotz and Dr. Tim Binder using these devices.

[Kovac will reconfirm the results as soon as he has additional experimental time. Ed.]



ECONOMIC PROBLEMS IN BELARUS

By Hal Fox

THE JAPAN OF EASTERN EUROPE

Belarus, like Japan, has few natural resources except for rivers, lakes, land, and forests. It greatest natural resource is its highly-literate, highly-educated people. Like Japan, Belarus must either learn to export or become an island kingdom dominated by Russia or some other power. It is my intense desire that Belarus become a center of industry, culture, and finance. The reason for this concern is the enormous damage done to Belarus and its people by the world's largest peacetime, man-made disaster: the Chernobyl nuclear disaster. As a lifetime student of a free-market economy and as a new energy devotee, I offered the following suggestions to members of the Belarussian government ministers. [Partial contents of a letter to Belarus plus new comments on energy.]

OWNERSHIP OF REAL PROPERTY

Most major countries in the world have provided for the most fundamental right of a capitalistic society, the ownership and enjoyment of real property (land, homes, and factories). One of the most important opportunities of a capitalistic state is the ability to tax real property. If land is sold, it can still be taxed.

Raw land can be taxed but developed land can be taxed at higher rates. If there is a reasonable tax rate (not confiscatory) then the government can enjoy an excellent return on its real property.

The real property tax base can be the basic sustenance of a government -- the government's primary source of revenue. **Therefore, it is strongly recommended that the government of Belarus take immediate steps to sell much of its real property.**

It is also suggested that Belarus sell off radiation contaminated lands. It is suggested that it is required of any business enterprise or real estate developers to buy an equal number of hectares of radiation-contaminated land for every hectare of good land that is purchased. By doing this you will build up a collective desire on the part of many owners to **clean up their land to increase its value.** One of the recent by-products of the development of the new science of "new hydrogen energy" (also called cold nuclear fusion) is the ability to modify atomic nuclei by the addition of a proton. I am personally organizing a group of scientists who desire to help clean up the radiation poisoning of your land. It would be highly desirable for the land to be owned by private organizations so that they can be sold on the idea of improving the value of their land by having our group reduce the radiation levels on that land.

PRIVATIZATION OF FACTORIES

Try this intellectual exercise with your friends. Ask them what industries or functions of society that government can operate with better results than can be achieved by private ownership. Suggestions will be made that "delivering the mail," "building and maintaining the highways", "operating the railroads", and "managing the protection of the country by armies" are some of the functions that government can do better than private enterprise. **I have yet to find any business or enterprise that a government can run better than private enterprise under a free-market economy and with fair and just laws.**

If free enterprise can do a better job than the government, then it is logical to privatize all industry. The government can then tax those enterprises. If the tax rates are established so as to attract business, then the growth of the national economy is assured. In addition, the tax revenues can be sufficient to handle all government expenses and thereby stabilize the country's monetary system.

The only restriction that should be placed on the purchaser of a former government-owned business or services is that a specified product will be manufactured or that a specific service will be performed. **However, the government must not try to tell such a business what to charge for its product or service.** The free market must be allowed to determine the value of the product or service being offered. This rule should apply as much to agricultural products (food and fiber) as to any manufactured products.

FINANCIAL INSTITUTIONS

One of the greatest obstacles to growth is the lack of capital. Therefore, there must be a favorable climate established to attract capital. At the heart of this growth are properly established financial institutions operating under just laws and regulations. Banks, credit unions, stock brokerage houses, a well-regulated stock exchange (Poland has established a good system), and insurance companies can all contribute markedly to the financial strength of a nation. The United States has a good stock exchange system except for the commodity market. Bermuda, Switzerland, and Liechtenstein have much better banking systems that the U.S. or Europe.

Belarus could become the financial capital of eastern Europe with the correct combination of just laws and regulations. One of the urgent needs is legislation to permit the establishment of a modern stock exchange. There is an intense interest among many U.S. investors in the expected rapid growth of the consumer market in all countries within the Commonwealth of Independent States (CIS). The CIS is one of the world's largest consumer markets that is characterized by highly-educated people who have a strong demand for additional consumer products. A rapid growth in this consumer market is expected but there must be established methods by which capital investment can be made "liquid" by being able to buy and sell shares (stocks) in a properly regulated free-market (a modern stock exchange.)

The opportunity to "buy" and "sell", at any time, provides the investment manager with the opportunity to transfer investments from less desirable companies to companies that may show better management or better performance. This function is part of the role of a well-regulated, modern stock exchange. I have been told that investment funds of $50 million to $100 million could be very quickly available, as soon as there was a properly-operating stock market in operation in the Republic of Belarus.

THE PROBLEM OF INFLATION

One of my studies has been to better understand the sources of and the remedies for inflation. Prior to the election of President Reagan, inflation was high in the U.S. Interest rates and the rate of inflation were in the range of 15 to 20 percent per year (some interest rates were even higher). I was concerned that the inflation would not be able to be brought

under control. By stringent financial means, the Reagan administration was able to control inflation. People had to suffer to bring inflation under control. However, the suffering was not as great as that caused by high inflation.

Before the end of World War II (the Great Patriotic War), England's currency was backed by real monetary wealth. All over the world, "payable in sterling" was the promise of the use of real money; money backed by real wealth in silver and gold. Soon after the end of World War II, the English government decided to "go off" the gold-silver standard and the pound sterling rapidly inflated. The end result was that the world's greatest commercial nation became little more than an island off the coast of Europe.

The American dollar has become the world's favorite currency. This choice has been made more on the basis of the history of America as being a "rich country" than on the real value of the dollar. Over the period of the last fifty years, the value of the dollar has gradually decreased in value to about one-tenth of its former "real" value. However, as compared to the inflation suffered in the CIS nations, this value of the dollar is relatively stable.

Inflation is Conceptually Easy to Control

Anyone knows that when a government spends more money (to pay its obligations) than it receives (from various forms of duties and taxes), then the money that is printed becomes less valuable. It is obvious that inflation is controlled when the government balances its income and expenditures.

The Delicate Balance of Taxes

Government income can, conceptually, be increased by increasing taxes. However, over many decades of study, it has been shown that when any government has total taxes larger than 30 percent of its gross national product (the sum of the value all goods and services), then free enterprise is discouraged and the tax-paying entities no longer increase (but rather may leave the country).

In the United States, there is a peculiar policy of having double taxation paid on some types of income. For example, when a corporation makes profits, it pays taxes on those profits. Then, when a corporation pays dividends (on which income tax has already been paid), that person receiving those dividends is made to pay taxes again on that income. This double taxation has prevented many companies from expanding in the United States. They have gone off-shore to other countries where such double taxation is not imposed. **Please, Republic of Belarus, do not make the same mistake that the U.S. has made.**

Means to Control Inflation

Inflation is, of course, a destroyer of any retirement benefits that are being held in bank or credit union savings accounts. In nearly all of the CIS countries, the savings of many older people have been essentially destroyed by inflation. Now these same people, who had modest wealth, are reduced to poverty conditions and become an increasing burden on the state.

Inflation can be controlled by the following methods:

By increasing government income:

1. Sell real estate (lands and farms). This will bring in money at the time of sale and will bring additional funds in the form of taxes every year thereafter. Also, the buyer cannot take the land out of the country.

2. Privatize and sell (preferably at auction) government-owned businesses both industrial and agricultural. The buyer will not only pay taxes for each employee retained, but will also pay taxes on profits.

3. Make it easy for new businesses to be formed and operate with the Republic of Belarus. Especially, make it easy for private banks, credit unions, and insurance companies to be established. However, ensure that there are sufficient regulations to protect the depositors of funds or buyers of insurance. Charge incorporation taxes, sufficiently high to cover the costs of government services provided for such institutions.

4. Ensure that all laws passed for the benefit of a specific industry or group is coupled with sources of revenue that will pay for such services. For example, consumption taxes on liquor and tobacco should be high enough to pay for the ultimate health services that will be required by the liquor and tobacco users due to the higher rates of disease among heavy drinkers and smokers.

By Decreasing Government Expenditures

1. The fastest method of decreasing government expenditures is to privatize all government industry, utilities, and services (including health and hospital services).

2. By decreasing and/or eliminating all special payments to special interest groups. Such items as food subsidies could be eliminated. Less harm will be done to those on fixed incomes than the inflation that destroys the value of all savings.

3. Ensure that all government services are supplied at the best price possible without subsidies. For example, Belarus must pay world market prices for oil and gas to provide heat and

electricity. These utilities should be operated efficiently but should not be subsidized. Subsidized energy can result in wasteful uses of energy.

4. Privatize the phone system and establish a small tax on each month's bill. This utility will then be operated profitably, the users will pay for the services. New services will be instituted as the system improves (more faxes, more computer services, more consumer services) with an increase in government revenues.

5. Legislation should be changed so that the payments made to the unemployed are considerably less than the minimum wage that such a person could earn if gainfully employed. Otherwise, there is little incentive for such an unemployed person to become productively employed. In America, we have yet to learn that lesson of basic economics. For example, we have raised the minimum wage to such a high level that companies will buy labor-saving equipment rather than hire additional workers. Companies that used to employ many teen-aged persons, no longer do so because the cost is too high. The end result is government-arranged unemployment.

6. In summary, every government employee that becomes supported by a privatized company reduces government expenditures and, in addition, provides tax revenues to the government equal to about one-half of that employee's wages.

7. Gradually privatize the institutes that are involved in research and development. In these cases, it will be great wisdom to allow businesses to deduct contributions to research and development from their income taxes. Currently, the U.S. is losing out to other countries by its lack of emphasis on research and development and its taxation policies that do not allow sufficient funding of research and development. For the U.S., this bad policy is harmful but not immediately self-destroying. For the Republic of Belarus, any policy that detracts from the future growth and development of the manufacture and sales of new products can be most harmful. However, it should be recognized that almost no breakthroughs in new technologies come from large government-operated laboratories. The breakthroughs come from the competition of small laboratories. However, the small improvements that gradually make new technology more commercially profitable often come from the larger R&D laboratories with their more extensive equipment and libraries.

BELARUS: THE CENTER OF THE EUROPEAN-ASIAN WORLDS

One of the advantages of Belarus is its location. It is the main route between Warsaw and Moscow. In general, it is the main route between Europe, the CIS, and even much of Asia. Belarus would be well-advised to ensure that the planned Warsaw-Moscow highway goes through Minsk. Belarus would be well advised to increase the use of its modern airport facility and attract airlines from Europe and the U.S. to establish new air routes to Minsk. (In my nine trips to Minsk, I have noted that when a large aircraft from the U.S. lands in Moscow, an estimated one million dollars is being brought into the country.) I personally regret that I overfly Minsk on my way from New York to Moscow so that I can then fly back to Minsk.

ENHANCING TOURISTS TRAFFIC TO BELARUS

Belarus is one of the few nations in the world that requires American citizens to physically mail their passports to the embassy in Washington, D.C. or to the consulate in New York in order to receive visas. **This policy is greatly disliked by Americans. We do not like to have our passports entrusted to the mail!**

Your neighboring country Poland, has greatly accelerated its tourist industry by adopting the European standard of **not requiring visas for those who travel on U.S.A. passports.** This policy especially encourages travel to Poland by businessmen who are traveling to Europe on business. The policy also greatly encourages travel agencies to suggest travel to Poland for their clients.

Those Belarussian employees in Washington, D.C. who relish the idea of charging from $30 to $60 for every visa may oppose the idea of not requiring visas for holders of U.S. passports. However, the great increase in the amount of travel to your country would far offset the small amount of funds lost for visas. Belarus would be considered as a part of Europe, in the eyes of the travel agencies and for those of us who desire to do business in Belarus. **Remember that for every person who avoids traveling to Belarus, your country loses an estimated $2,000 to $4,000 in dollar income for each trip. For businessmen, the amount lost is much higher.**

It may be a surprise to your leaders, but many American citizens desire to travel to the CIS countries and learn more about your country and your people. We rejoice in the knowledge that we are no longer "cold-war enemies." My fellow citizens of the U.S., when they travel to Belarus, will find, as I have found, that the Belarussian people are intelligent, well educated, determined to make their new free-market economy work, and are pleasant, friendly, and hospitable.

In Utah, we have greatly increased the amount of tourists that come to our state. (The state of Utah is just a little smaller in size than the Republic of Belarus.) We have increased our

tourism by having established a "Utah Travel Council" and the state has provided them with an advertising budget. Similar action could be adopted by Belarus so that travel would be encouraged to your country. The greatest attraction you have is the Chernobyl disaster, if properly used.

Americans, in general, are generous when it comes to helping others. The story of the greatest peace-time man-made disaster in the history of the world is not being told to the world. If this story were to be properly presented, and if Belarus would reduce the irritants to the traveler (visas, in particular), you would be able to strongly influence the charitable contributions to help recover from the Chernobyl disaster.

When I learned that less than ten percent of the children of the entire Republic of Belarus were less than normally healthy, due to radiation illness of varying degrees, I decided that I would help do something about it. Therefore, we have set up a "not-for-profit" company under the laws of the state of Utah which we named "Children of Chernobyl". Our approach is not to cry out for charity but to offer to sell gifts that have been made, in large part, by the Children of Chernobyl (anyone in Belarus or Ukraine who was 21 or younger in 1986). Our organization will not ask for "something for nothing" but will offer reasonably-priced gifts to be purchased with the profits to go toward helping the "Children of Chernobyl" with health care, education, and, eventually (if possible) with the restoration of the now abandoned farms and villages.

The essence of getting help for your country is not to expect charity. The essence of getting lots of help **lies in the way the story is told to the people of the United States.** In the early spring of each year, Park City, Utah (the home of the U.S. Olympic Ski Team) becomes the center of an interna tional film festival. Belarus should plan to have a film produced by a Belarussian group that has already won a Paris film medal for telling the story of the children of Chernobyl. Belarus should plan to have the proposed new film entered in the next Park City film festival. The objective of the film would be to tell the real on-going story of Chernobyl with the facts that there can be, and probably will be, additional nuclear power plant disasters. If successful, and with your help to ease the way for tourist visas, this film could be extremely helpful in attracting a greatly increased number of tourists to your country.

FINAL NOTE

This letter is written with only the best of intentions. If anything I have suggested can help your country live up to its tremendous potential, I will be grateful for having shared my thoughts with you.

ADDED FOR *FUSION FACTS* READERS

THE ENERGY PROBLEMS IN BELARUS

The Republic of Belarus produces almost no natural fossil fuels. Except for some forest wood and peat or brown coal, Belarus is almost devoid of natural resources for fuel. This fact plus the results from the misguided design and operation of nuclear power plants and the resultant disaster are the reasons that the Republic of Belarus is my number one choice for the development and installation of enhanced energy systems. **There is no country on earth that is more in need of an enhanced energy source.**

A MESSAGE TO COLD NUCLEAR FUSION DEVELOPERS

Those of you who are working on the development and commercialization of new energy systems should strongly consider placing such energy systems in the Republic of Belarus. Currently, this republic is being pressurized by international sellers to install new nuclear power facilities in Belarus. After the example of the Chernobyl nuclear power plant disaster, there are few persons in Belarus, except those that would be financially rewarded for their participation, who want to see nuclear fission power plants in their country.

A new consortium of foreign and Belarussian companies have established **KOMETA, Ltd.**, as a manufacturer of electric vehicles. Kometa (comet, in English) will begin by building electric wheelchairs for the 400,000 handicapped Belarussian persons who need more mobility. Later, Kometa plans to manufacture other electric vehicles including a small passenger automobile. This company has acquired new drive motor technology developed in Belarus and has combined this technology with new battery technology. In addition, Kometa is planning on building a factory to produce polyurethane foam tires for its electric vehicles.

One of the strategies developed by Kometa is for the manufacture and installation of "on-board battery chargers" (ONBAC) for its electric vehicles. **Therefore, as soon as you scientists, engineers, and inventors have technology that can be demonstrated as a possible power source for the ONBAC, please contact Kometa.**

Kometa is beginning its manufacturing operation with a combination of capital equipment and cash valued at $3 million. Kometa plans to obtain further funds by contracting for the repayment of loans from a 10 percent royalty on all power tools and vehicles produced. Kometa's business plan projects sufficient earnings to return a two- to three-times multiple to its investors within a three-year period.

Further information can be obtained about the Kometa, Ltd. joint venture by writing c/o P.O. Box 58639, Salt Lake City, UT 84158. **This is not an offer to sell securities but is newsworthy information provided to inform developers about the existence and plans of this new venture.**

***Fusion Facts* is interested in reporting on other business ventures that are planning on the commercialization and manufacturing of new energy systems.** Please send us any information about such business ventures.

F. LETTERS TO THE EDITOR

LETTER FROM EUGENE MALLOVE

On E-Quest Helium Results

Several authoritative sources -- some inside and some outside the company -- have described to me the status of the E-Quest ultrasonic-activation cold fusion experiments. I am sure a technical paper is going to be submitted very soon.

Summary of information:

1. E-Quest now has verified helium production in excess heat-producing experiments that range from 50 watts excess to 500 watts excess. Experiments are done in their heavy water circulation system. Typically Pd is used in these experiments, though Ti works too, but gives a somewhat different response. They do not get excess heat in ordinary water or with stainless steel targets. The excess heat-producing runs to generate helium ranged from 3 hours to 72 hours duration.

2. Helium measurements have now been successfully made with gas samples from the E-Quest experiments -- samples were measured at the US Bureau of Mines (Amarillo, Texas), at SRI International, and most recently at Rockwell (the latter lab is known to be used for helium measurements by investigators in the hot fusion program).

3. Ten (10) runs have been analyzed for helium. ALL gave positive helium results. Earlier runs tended to be in the 50-60 ppm of helium-4 range. At least one sample measured at Rockwell recently was a remarkable 552 ppm (NO decimal point error: Yes, five-hundred fifty-two ppm) The error range: plus or minus 1 ppm. E-Quest believes this latter result accounts for nearly all of the excess heat evidenced in that run. This sample, as in other recent testing, was collected in 50cc *stainless steel* bottles. All the sample was obviously not needed for the testing, so archived gas remains for future testing. That 552 ppm sample was collected in a test of the E-Quest device at Los Alamos National Laboratory. At LANL, checks were made for gammas, neutrons, and tritium. None of the latter were found.

4. The cover gas used in all cases was analytical grade argon *not* D_2. Helium-4 content of the argon was measured and found to be less than 0.4 ppm. Remember, atmospheric He^4 concentration is less than 6ppm.

5. Among the most amazing claimed findings however, was the highly significant enhancement of the measured helium-3/helium-4 ratio, which is normally on the order of 10E-6. The helium-3 measurement at Rockwell showed this ratio to be enhanced to around 10E-3 -- about 1000-fold increase. Such a finding would virtually rule out any possibility of the helium-4 being from "contamination" - as preposterous as that favorite skeptic's theory would seem anyway at this point. Sixty ppm is 10 times natural background helium-4, but 552 ppm is on the order of 100 times background.

6. Evidence was obtained for plenty of helium in the Pd metal too.

7. The mass-spec peaks defining helium-4 and D_2 -- or possible "di-deuterino" gas-- are said to be very well separated. So this IS helium-4.

8. Multiple measurements were made at Rockwell on each of several gas samples and background gas samples submitted.

That's all for now. I'll pass along anything else I hear about this excellent advance.

Eugene F. Mallove

LETTER FROM ORIN HATCH

In a letter to the attendees of a meeting in his office concerning the problems related to technology transfer and other issues involving government regulation of research and business, Senator Orin Hatch (R-UT), said the following:

"Fred Jaeger of ENECO, who holds a nonexclusive license from the University of Utah to develop the cold fusion technology, and Hal Fox, President of the Fusion Information Center and editor of *New Energy News*, both protested the tendency of federal agencies to turn their backs on increasing numbers of cold fusion experiments that can be replicated. I intend to petition the Energy Department to convene a second scientific peer review panel in 1995. In my judgement, this action is needed to assess the extent to which the scientific principle is sufficiently established as to allow prospective commercialization."

G. MEETINGS & MISCELLANEOUS

THE NATURAL HOUSE CATALOG

Following the success of The Natural House Book which is a "bestseller" in North America, David Pearson is preparing The Natural House Catalog - a compendium of ecologically-sound and healthy home products and services. This major new catalog will be published and distributed by Simon & Schuster in 1995. The Catalog will be in two parts - Part One will contain a series of feature articles attractively illustrated in color to guide readers on how to select and use "green" and healthy products and services, and Part Two will be comprehensive listings plus advertisements for the products and services. **A free 20 word listing is offered to companies who deal in these products and services.** For information on this and advertising, write to Lyn Hemming, Project Coordinator, Gaia Books Ltd, 20 High Street, Stroud, Glouchestershire GL5 1AS England.

SOCIETY FOR SCIENTIFIC EXPLORATION

The *Journal of Scientific Exploration* is a quarterly publication of the Society for Scientific Exploration, ERL 306, Stanford University, Stanford, CA, 94305-4055, USA. The *Journal of Scientific Exploration* is a source of information, discussion and commentary on topics covering the entire spectrum of anomalous phenomena in an unbiased and rational manner. The goal of *JSE* is neither to advocate the reality of anomalous phenomena, nor to debunk. Rather *JSE* is a forum for research and debate by scholars. It is a peer-reviewed scientific journal with articles typically written by established researchers in mainstream fields such as astronomy, physics, chemistry, biology, psychology, sociology, medicine, etc. It has offered topics ranging from anomalies in mainstream science to parapsychology, UFO's and other phenomena at the borders of science with first-hand, understandably written information. The goal of the journal is to make available professional high quality reports, reviews and commentary for use by researchers, teachers, students and the general public.

NEW ENERGY CONFERENCE

The Belarussian Academy of Sciences, located in Minsk, is sponsoring a CONFERENCE OF ENERGY CONSERVATION AND NEW TYPES OF ENERGY.

The conference will be held at the Academy of Sciences on November 7 to 11, 1994. The fee for the conference is $100.

Note: Our Editor, Hal Fox, will be presenting a paper on "New Types of Energy for the Near Future" at the plenary session of the conference. We will have a complete report on the conference in our November or December issue of *Fusion Facts.*

NEW ENERGY NEWS

This science periodical is published monthly by the Institute for New Energy as a free service to its members. It brings an overview of all fields of energy and enhanced energy research, providing information on discoveries, publication, patents, and conferences. Yearly subscription rate to corporations, libraries, and universities is $60, and individual membership fees for INE are $35.

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