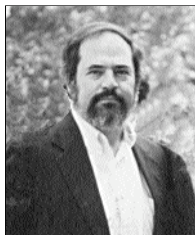


BREAKING THROUGH

The Boundaries of Cold Fusion

by Eugene F. Mallove, Sc.D.



Quote: “We do not know if Cold Fusion will be the answer to future energy needs, but we do know the existence of Cold Fusion phenomenon through

repeated observations by scientists throughout the world. It is time that this phenomenon be investigated so that we can reap whatever benefits accrue from additional scientific understanding. It is time for government funding organizations to invest in this research.”

So wrote Dr. Frank E. Gordon, Head, Navigation and Applied Sciences Department Space and Naval Warfare Systems Center, San Diego, in introducing a just released official U.S. Navy Report, TECHNICAL REPORT 1862, February 2002, *Thermal and Nuclear Aspects of the Pd/D₂O System, Volume 1: A Decade of Research at Navy Laboratories; Volume 2: Simulation of the Electrochemical Cell (ICARUS) Calorimetry*. (See p. 54 of this issue to learn more about the content of this report.)

Cold fusion pioneer Dr. Martin Fleischmann is one of the report's co-authors, a modest acknowledgement of the importance of his work by at least one official U.S. organization. But this is far short of the high-level apology that is due this scientist for the inexcusable malfeasance of the DOE “Cold Fusion Panel” in the 1989 trashing of his work. Across the pond in the U.K., by now Martin should have become Sir Martin Fleischmann. How unjust that his work is not honored even in his own land, while Mick Jagger of the Rolling Stones will soon be Knighted! (Please excuse me while I have my “nineteenth nervous breakdown.”)

Don't expect that the Navy report will move the U.S. government one millimeter closer toward re-evaluating cold fusion. In fact, one bigoted anti-cold fusion scientist within the U.S. government (Dr. Peter Zimmerman, for a time a “scientific advisor” to the U.S. State Department) after hearing about the report (*but without having read it*) exclaimed on an Internet forum (May 9): “It's my contention that somehow the crap in it [the Navy Report] did not go thru the formal NRL review process which is very, very rigorous. I want to know why the Navy issued it.” He promised immediate action to cause trouble within the bureaucracy. As has been happening for over thirteen years, no sooner does a positive development arise for cold fusion, but influential negativists go to work to make sure that no change is made in the government's disgraceful non-policy.

So the study of low-energy nuclear reactions (LENR, the more generic term for the plethora of cold fusion-related

discoveries) in the U.S. is bounded on one side by active obstruction by government agencies. This, in turn, has made it nearly impossible to raise R&D capital from the private sector for investigations that are considered foolish by officialdom.

The tight financial boundaries of cold fusion have made it an island kingdom with diminishing resources. I have just returned from the Ninth International Conference on Cold Fusion (ICCF9), which was held in Beijing (May 19-24) with official support by Chinese scientific organizations. As our initial report remarks (see p. 8), the human capital of cold fusion is aging and is not being renewed by a healthy influx of younger researchers. This is not surprising for a field that is so widely devalued; the career risks for becoming involved—even should some young researcher develop an interest—are just too great.

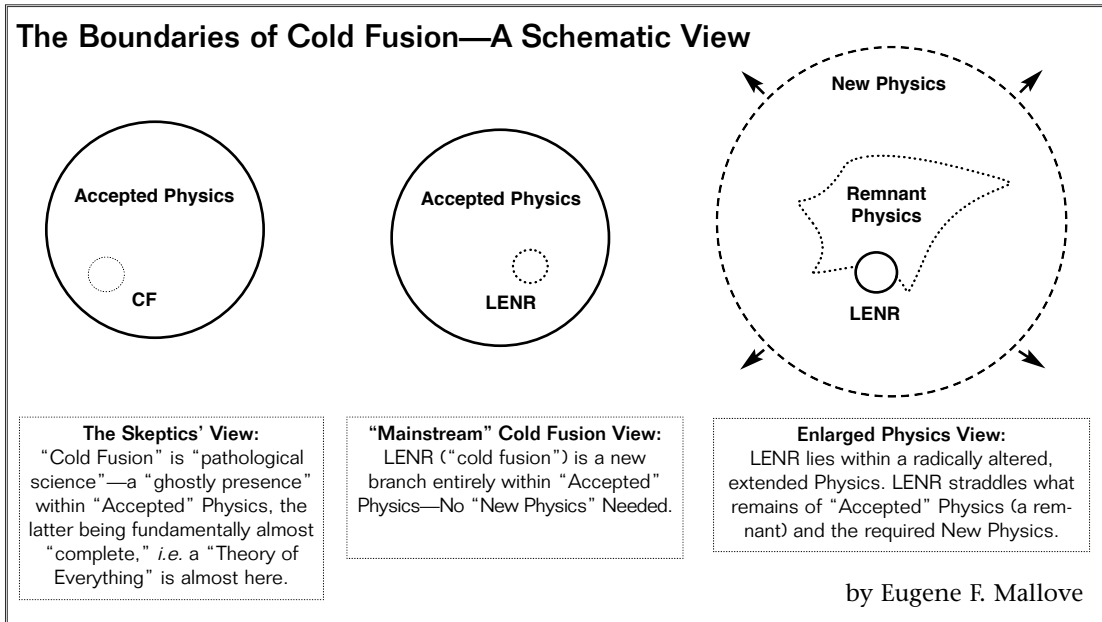
On the scientific front on the other hand, it not easy to find a field that has opened wide more of Nature's doors than cold fusion. As reports at ICCF9 and at many other recent LENR conferences suggest, “cold fusion” has become squarely the field of “modern alchemy.” The transmutation of heavy elements in these experiments has become the order of the day. Mitsubishi Heavy Industries sends its researchers to Beijing to report the repeatable, *on demand* transmutation of cesium to praseodymium and strontium to molybdenum (see p. 10)! This work will soon be published in the *Japanese Journal of Applied Physics*. This too will be ignored by mainstream physics, but what a spectacular achievement!

It has taken far too many cold fusion researchers much too long to realize that heavy element transmutation is integral to what they are studying. In the early 1990s cold fusion began to show strong symptoms of this alchemical direction. Yet it has taken *some* cold fusion researchers over a decade to finally acknowledge the reality of the low-energy nuclear transmutation of heavy elements.

This brings up the compelling scientific question: *What are the scientific boundaries of cold fusion?* We're no longer talking about the now obsolete question of 1989: Is it chemistry or physics? We now need to know where cold fusion fits *within* physics such that a profusion of alchemical results should be coming forth. Why is it so damned simple to create element changes in low-energy experiments? This just has to be a significant clue to the nature of cold fusion physics, but it may not lead to an answer that many in the field will appreciate.

A schematic of the possible locus of cold fusion within

The Boundaries of Cold Fusion—A Schematic View



other conceptual baggage that the thirteen-year-old isolated and in-grown scientific field has developed.

Indeed, the cold fusion field has grown to be very insular and self-contained. It has no idea of where it is located in time or space. It might even be said to be *lost* in time and space, realizing little if anything about surrounding fields of investigation that could lend it support. Many—make that *most*—cold fusion practitioners seem barely aware of other heretics

physics appears in the accompanying figure, which presents three broad perspectives. To the "skeptics," cold fusion still remains a troublesome residue of "pathological science." It sits within the pristine house of physics, spoiling an otherwise triumphal march to a glib "Theory of Everything." Next we encounter the "Mainstream" Cold Fusion viewpoint, which is probably held by over 98% of those directly involved in the field. Here the boundaries of cold fusion physics are completely confined within "Accepted" Physics, which for this community means quantum mechanics and relativity. In this view, only the chairs on the deck of the big ocean liner of physics need to be rearranged to accommodate the unexpected tourist—LENR. Creative cold fusion scientists must play the difficult game of fitting the experimental data with theories built of formalisms (the deck chairs) taken right out of reigning physics texts. This view gives the appearance of working more or less well, depending on the agility of the theorist.

Even some mainstream cold fusion theorists—notably Drs. Martin Fleischmann and Emilio Del Giudice (and the late Giuliano Preparata)—feel that the ocean liner of physics has lately been developing leaks in many of her lower decks. No, they do not believe the ship of physics is about to go down. But they do believe that some heavy patch-work is needed to save the ship and encompass not only LENR, but also what they consider to be otherwise unexplained phenomena throughout nature, including biological systems. Perhaps we should locate this Fleischmann-Preparata view somewhere between the second and third part of the schematic.

This third viewpoint, "Enlarged Physics," suggests that "Accepted" Physics needs radical surgery to remove dysfunctional dogmas and replace them with a New Physics that is yet soundly based on experiment—such as are being revealed in the LENR field itself. Obviously such a New Physics, while flying in the face of Accepted Physics theory, will have to be consistent with the data from Accepted Physics experiments. Such a view is Copernican in scope, and will necessarily meet with stiff resistance even by the "mainstream" cold fusioners. These will wish to rely on the useful but now tired nostrums of host metal lattice dynamics, nuclear active sites, surface catalytic activity, and such

at the gates of physics and what they have to offer. Or, if they are aware, they see no relationship between what they are doing in LENR and the work of those other heretics. They are also uncomfortable with these others, believing perhaps that "one deep heresy is enough."

I am speaking, for example, of the kind of heretical hydrogen research that is being carried out by Dr. Randell Mills and his colleagues at BlackLight Power (www.blacklightpower.com). Of course, Mills has made the situation more difficult by going out of his way to ignore and even disparage cold fusion research—as though his heresy of hydrino (shrunken hydrogen) physics (within his more encompassing "Classical Quantum Mechanics") is less heretical, or more soundly experimentally based than what cold fusion researchers have to offer!

But the ingredient most absent from the "mainstream" cold fusion view is that essence that must fill the "void" within and between atoms. That intolerable vacuum is now considered to be the space-time plenum in which matter and electromagnetic radiation reside. Oh, maybe a little "ZPE"—zero point energy—is admitted to the picture now and then by the mainstreamers, but nothing more than that from outside the textbooks.

It is not that it was unreasonable to begin with the assumption that textbook physics could explain cold fusion. It was and still is a worthwhile exercise. But it is unreasonable to exclude an *aether* (or ZPE) physics from cold fusion theorizing, when that aether could well be filling Nature's void and bringing about those relatively easy alchemical-like reactions. In the Mitsubishi experiment reported at ICCF9, for example, the mere passage of deuterium through a thin layer of either cesium or strontium led to the transmutation of either species. Yes, the element is in contact with a layer of palladium, but only at an interface (and perhaps that is where the bulk of the transmutation is occurring; this needs to be determined). I am also reminded of work reported years ago by Professor John Dash at Portland State University (Oregon) in which transmutation of elements on cathode surfaces seemed to be an ongoing process *after* the end of an experiment!

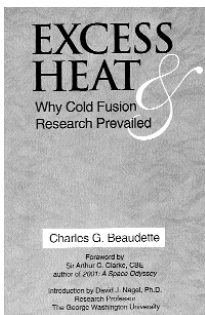
Whether a physically active aether as described in the experimentally and theoretically based form by Dr. Paulo

and Alexandra Correa (www.aetherometry.com), by Donald Hotson (whose reconstruction of physics post-Dirac appears in this and the previous issue of *Infinite Energy*), or by someone else, cold fusion researchers should think about the possibility that an Enlarged Physics could help them explain what have proved to be resistant mysteries. But giving serious thought to the supposedly banished *aether* may be uncomfortable for many reasons—the least of which is the intellectual and social problem of being involved with two heresies at once.

Finally, we come to the boundary of technological achievement: what new energy source will be first to enter the marketplace, and thus transform the boundary conditions for academic arguments in this area? Within the cold fusion arena, it appears that so-called “catalytic fusion” (pioneered by Dr. Les Case) and various thin-metal film technologies are leading contenders, but it must be said that progress has seemed painfully slow. Certainly it has been in light of my earlier anticipation that cold fusion would triumph in the mid-1990s.

It may be that LENR will have greater commercial applicability in radioactive waste remediation or in specialized rare element or isotope creation than in energy production. After all, if the on-rush of space energy physics (ZPE/aether) succeeds in getting robust engines to market, technologists may be loathe to spend resources to overcome the materials science issues that have always attended cold fusion excess energy phenomena. My advice to the cold fusion community is that it should reconsider the physics that bounds it. It will most likely find something just over the nearest hill or in the next valley that will help it out of its doldrums. And, as for competing power-generating devices, the cold fusioners should definitely be looking over their shoulders. ♦♦♦

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In Memoriam: Dr. John E. Chappell, Jr.

Dr. John Edgar Chappell, Jr. died Wednesday, June 5 in a San Luis Obispo, California hospital. John was a founder and the Director of the Natural Philosophy Alliance (NPA) since its origin in 1994. Its international membership has included more than 400 leading scientists who have engaged in scholarly discussions of alternative concepts and philosophies in physics at numerous conferences in the U.S. and abroad.

Dr. Chappell was pre-eminent among those seeking clarity in alternative concepts of contemporary physics, cosmology, and natural philosophy. Much of his life was devoted to promoting scholarly discussions and critiques of opposing viewpoints in those fields. Toward that end, he organized and chaired sessions in annual regional meetings of the American Association for Advancement of Science (AAAS), which attracted leading speakers and scientists from around the world. These comprised the largest group of such scholarly discussions ever held in the U.S., as recognized in *Galilean Electrodynamics*, Vol. 5, No. 6 (November/December 1994); *Apeiron*, Vol. 1, No. 20 (October 1994), and *Apeiron*, Vol. 2, No. 4 (October 1995).

John Edgar Chappell, Jr. was born November 16, 1933 to Dorothy Kober Chappell and John Edgar Chappell in Los Angeles, California. He graduated from Webb School, Claremont, California in 1950. He attended Harvard University, received an MA in history from the University of California, Berkeley, attended the University of Washington, Seattle, and received his Ph.D. from the University of Kansas in history (with an emphasis in the history of science) in 1968. Dr. Chappell taught at the University of Regina in Saskatchewan, Canada, Mankato State (Minnesota), and California State University, Chico. He was a research fellow at Harvard University in the 1970s.

In his role as NPA's director, Dr. Chappell organized and Chaired meetings, wrote a quarterly newsletter, and held a lively exchange among members and interested scholars worldwide. Between 1961 and 2002, he authored more than eighty-five scientific articles, chapters, and reviews in the areas of natural philosophy, physics, earth sciences, social sciences, and history. Some of his publications are those listed in the Directory-Bibliography of all NPA members and other scientists, which John prepared and distributed annually.

John is survived by his sister, Sarah Chappell Trulove of Lawrence, Kansas, a niece, Ann Trulove of Burbank, California, and a nephew, Lt. Col. Paul Chappell Trulove, Ph.D., of Annapolis, Maryland. Graveside services were held at Los Osos Memorial Park in San Luis Obispo, on June 25, 2002. Memorial contributions can be made to the Natural Philosophy Alliance, P.O. Box 14014, San Luis Obispo, CA 93406. E-mail contacts: trulove@ku.edu (Sarah Trulove); trulove@picture-editor.com (Ann Trulove).