UP FRONT

The race for cold fusion

How will the end of the

EUGENE F. MALLOVE Sc.D.

Some possibilities:

Scenario 1: The well-known "cold fusion" researchers place their crowning achievement on the witness table in the hearing room of the House Space, Science, and Technology Committee. Congressmen, senators, and invited media form a standing-room-only crowd. An audible gasp from the assembly, then applause, as the 100-watt incandescent light bulb attached to the small device turns on. Pandemonium erupts as cameras flash and reporters run to file their stories. As the self-powered demonstration unit begins its three-months of continuous operation, congressmen congratulate the cold fusion pioneers.

There are no wires attached to the water-fueled generator, and it occupies only a few cubic feet. Yet the 100-watt bulb glows non-stop for 100 days, as the advanced thermoelectric converters turn heat from the process into electricity.

On day one, technicians completely disassemble an identical, previously operated unit—just to show the world that there are no hidden chemical or electrical power supplies. No matter, because the unit powering the light bulb will be monitored round-the-clock for three months by television cameras feeding a bank of video recorders. Any physicist or chemist can easily figure that within such a small space no conceivable physical energy storage mechanism or source of chemical energy could come close to performing this feat—not by a long shot. The services of professional debunker, magician James Randi, are not needed. It is now obvious to the world that "cold fusion" power—whatever causes it, is real and working.

Scenario 2: The setting could be Minnesota, Massachusetts, or Pennsylvania in the winter of 1994–1995. Three modest, freshly-built cape-style homes stand side-by-side on an open field. They grace the top of a wind-swept hill with no trees. The houses have been specially built, in only five weeks just for this "ultimate demonstration." The homes differ in only one way: their heating systems. Home A is warmed by ordinary baseboard electrical resistance heaters. Home B has the world's highest efficiency oil-burning furnace, which supplies the hot-water heating system. Home C is something else! It has a baseboard hot water heating system (like Home B), but its heat source is not oil but a compact "cold fusion" boiler, which is smaller than Home B's oil burning furnace. Another difference: Home C requires no chimney flue for the effluent combustion gases. There aren't any.

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The homes are vacant through the five-month test period. Independent thermostatic controls regulate each of the three different heating systems and the rooms are kept continuously within one or two degrees C of a balmy 22°C. The doors are locked. Through the winter, the electrical meter on Home A monitors consumption of electricity by the heating system. The oil consumption by Home B is precisely measured by the meter on the oil delivery truck, which ceremoniously arrives every few weeks. There is no significant input electrical power to either Home B or Home C; a very small amount is used to power the water circulating pumps and the oil burner.

On March 23, 1995, the final results come in, though it was obvious from the beginning what was going to happen: A certain number of thousand kilowatt-hours of electrical energy were consumed by Home A and a certain number of hundreds of gallons of oil were used by Home B. Home C "consumed"—transformed would be the more accurate word—only water or a minute amount of hydrogen or heavy hydrogen gas (depending on which kind of cold fusion system was used). Once and for all, the stark reality and staggering implications of cold fusion power are made crystal-clear to the world.

Scenario 3: The converted Volkswagen "Bug" leaves the parking lot of the Princeton Plasma Physics Laboratory. It is April 1, 1996, but this is no stunt for April fools. The water-fueled automobile revs up its nearly silent, compact steam generator. Turbine-generated electricity begins to power the car's electric motor. The car rolls out of the parking lot, enroute to Albany street in Cambridge, Massachusetts—site of the other moth-balled tokamak hot fusion reactor. The wonder car is trailed by an entourage of diesel-powered buses packed with dignitaries and journalists. Cold fusion power made its debut in other small-scale demonstration tests back in 1994-95, but some "skeptics" needed more convincing, and this was all in good fun. Physicist Richard Petrasso of the MIT Plasma Fusion Center had told *Popular Science* back in 1993, "I guess I'll believe it when someone drives a [cold fusion powered] car

applications

beginning come?

from New Jersey." So someone did it, and he believed.

If you find yourself among the diminishing number of skeptics of "cold fusion," these scenarios may sound like pure fantasy. For serious cold fusion researchers, however, one or more of the above scenes conceivably could play out in the next year or two. Maybe the actual event that ends the confusion about the reality of cold fusion will be a bit different, but the effect will be the same. The world as we know it will end. The water-fuel age will have arrived full-blown. Just like the advent of electric power, the automobile, radio, television, the airplane, space travel, and the personal computer, fantastic changes will lie ahead—all will then agree.

For those who have taken care to look, laboratory experiments have already convincingly proved that the excess heat in "cold fusion" reactions is real, and very powerful. There is also a growing list of ways in which this excess heat can manifest itself. What is needed now to make the field explode far beyond the groups already working in it are cold fusion applications—demonstration tests or actual commercial products. Obviously, the scenarios above would all be very convincing demonstrations, and it would seem that commercial cold fusion products—heating systems, home electric power generators, and water-fueled cars, among them—could follow soon thereafter.

Right now in cold fusion research facilities around the world, many eyes are on The Prize, a cold fusion demonstration unit. Everyone in the field will profit from such a demonstration, no matter which company or laboratory does it. We know that Drs. Fleischmann and Pons at the IMRA laboratory near Nice, France, are working on one such demonstration unit—a continuous electrolytic boiling system with minimal input power, which recycles steam produced from heavy water. In Lancaster, Pennsylvania, Hydrocatalysis Power Corporation and Thermacore are known to be driving vigorously toward a home heating unit-sized device. We understand that these researchers have gone far beyond the original light-water electrolysis process that Dr. Randell Mills announced in May 1991.

In Italy, corporate sponsorship of the recently-announced spectacular gas-phase nickel-hydrogen development at the University of Siena could lead to a demonstration unit of some kind within the next few months. In Japan and in the U.S., a number of laboratories are beginning to pioneer the ceramic proton conductor excess heat process. One of these researchers has vowed to bring a demonstration unit to the Fifth International Conference on Cold Fusion, which will be held in Nice, France, in April 1995.

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In some sense, demonstration units already exist, but in forms that so differ from mainline "cold fusion," that they have only slowly been gaining acceptance in the cold fusion community. One is the ultrasonic "microfusion" device of Roger Stringham of E-Quest in California, on which we reported briefly last month. It appears to be able to create intense heat and a host of benign nuclear transformations. The other is the astonishing Hydrosonic™ Pump, which we explore in this issue. It seems to us that with more development, both these devices have the potential to become effective demonstration units.

One problem with demonstrations is that what constitutes an adequate one may depend on the eyes of the beholders. Remember that many people who saw the Wright brothers' flying machine from 1903 to 1908 were simply unable to grasp its significance. The history of technology is replete with such examples. It tells us that the closer a demonstration matches a practical commercial device, the more readily it will be accepted. So, good friends, get on with your work, and let's have powerful demonstrations long before April 1995. We are betting that 1994 will be the year that we get what we need. The race is on.

About the editor . . .

"Cold Fusion" Editor Dr. Eugene F. Mallove brings to the magazine broad experience in high technology engineering with Hughes Research Laboratories, TASC (The Analytical Science Corporation), Jaycor Systems Division, Northrop Precision Products Division, and MIT Lincoln Laboratory. Since 1991, Dr. Mallove has worked as a consultant to U.S. corporations conducting and planning R&D in cold fusion. He is the author of three science books for the general public, including the Pulitzer-nominated book on cold fusion, "Fire from Ice: Searching for the Truth Behind the Cold Fusion Furor" (John Wiley & Sons, 1991). He has taught science journalism at MIT and at Boston University; he was Chief Science Writer at the MIT News Office when cold fusion erupted. Prior to that, he was a top science writer and broadcaster with the Voice of America in Washington, DC, and also wrote science and technology articles for magazines and newspapers, including MIT *Technology Review* and *The Washington Post*. Dr. Mallove holds a Doctoral Degree (Sc.D.) in Environmental Health Sciences (Air Pollution Control Engineering) from Harvard University, and a Master of Science Degree (SM, 1970) and Bachelor of Science Degree (SB, 1969) in Aeronautical and Astronautical Engineering from the Massachusetts Institute of Technology.

technology revolutions, says that a publication in a new technology area serves three purposes: "It speeds up technical development by providing faster and better communications between the researchers and developers in the new field; it not only helps attract new people to the field, it enables them to get up to speed much faster than they could waiting for books to be published; and, probably of even greater importance, a publication makes it possible for entrepreneurs to provide products to help the new field grow. It makes a new industry develop faster."

There you have it, our mission: to accelerate the "cold fusion" revolution by disseminating the truth about scientific and technological developments in what will surely be one of the most significant technology upheavals in history. We will publish the latest discoveries and findings in a manner that can be understood by a broad spectrum of people. Our intended audience is not restricted to scientists and engineers, though we will certainly aim to provide these experts with timely and challenging material that will help them in their work. "Cold Fusion" will also explore the spectacular changes in store for civilization in the coming energy revolution—technological, as well as economic, social, and political.

We will also expose the strange politics of opposition to cold fusion, both past and present, which has so hamstrung research on the phenomenon. Part of that role will be to comment on how cold fusion is or is not being treated in the news media. We promise that our magazine will expose the numerous instances in which the media have ignored the facts, disparaged honest research, and stood science on its head.

Since the parallel is so striking, it is worth recalling what happened to two American inventors whose initial success occurred just over 90 years ago. On December 17, 1903, Wilbur and Orville Wright realized an age-old dream when they launched the world's first successful heavier-than-air flying machine. For five years, their millennial accomplishment went largely ignored by the scientific establishment and the major media, even though the brothers Wright made no secret of their invention. For years leading up to a dramatic demonstration at Fort Myer, Virginia, they tested their aircraft in full view of commuters on an interurban railroad near Dayton, Ohio. Yet for five years the Wrights were considered cranks by U.S. government bureaucrats who refused to take them seriously! So, in search of support the Wrights took their invention to France.

Formidable industries stand to lose if they are unable to adapt to the expected rapid development of cold fusion energy.

A few years ago, two other scientist-inventors, one American and one British, took another millennial invention to France: "cold fusion." Drs. Pons and Fleischmann are now working on cold fusion energy technology in the well-equipped Japanese-financed IMRA Europe S.A. laboratory near Nice, France. They left behind the scientific bigotry against their discovery that was unleashed in the U.S. The Japanese consortium of industrial giants has given them research funding. Meanwhile, in hundreds of other laboratories the world over, researchers explore an astonishing array of physical phenomena that stem from the original discovery of the cold fusion pioneers. It has been five years since the announcement in Utah, and the "Fort Myers of cold fusion" approaches—the demonstration of prototype technology.

Like flight, which we take for granted today, "cold fusion" will some day be taken for granted. But only five years into the Cold Fusion Age, as we launch *"Cold Fusion"* Magazine, we can hardly imagine anything nearly as exciting and pregnant with virtually infinite possibilities.

Our pages will offer much more than theories on the frontiers of science. In the exciting months to come, "Cold Fusion" will feature some of the most knowledgeable people in the world writing about what the cold fusion revolution is likely to mean for the world. How will cold fusion energy begin to replace the existing energy infrastructure? What will cold fusion automobiles be like, and the "cold fusion home"? What about the impact of water-fuel energy on agriculture, financial markets, geopolitics, and the environment? These will be a continuing focus of this magazine, in addition to detailed reports about the ongoing science, technology, and business of cold fusion. We expect that you will be thrilled with what future issues bring to you.

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