Cold Fusion: Wanted Dead and Alive

With equal zeal, believers defended and doubters condemned cold fusion last week, a year after University of Utah chemist B. Stanley Pons and British electrochemist Martin Fleischmann ignited a global research firestorm – now greatly diminished – by publicly claiming they had found a simple, room-temperature means for unleashing potentially vast amounts of fusion energy.

At the First Annual Conference on Cold Fusion, held in Salt Lake City, Pons and about 40 other persistent cold-fusion researchers described their latest findings to an audience made up largely of supporters. They reported measuring either unexplained excesses of heat or equally surprising observations of tritium, neutrons or other potential fusion products, and discussed some experimental conditions that seem to encourage, halt or prevent these effects. Physicist Julian Schwinger of the University of California, Los Angeles, and others proposed exotic mechanisms that might account for some of these results. A number of conferees suggested that two or more novel physical mechanisms might explain the often-contradictory results.

At a "private" press conference that excluded most reporters, Pons said he and Fleischmann have consistently measured more energy coming out of their experiments than they used to run them. SCIENCE NEWS obtained a tape recording of that meeting.

"Our position is exactly as it was last spring," Fleischmann added during the closed session. The controversy began March 23, 1989, when the two chemists claimed to have devised electrochemical cells, used to break heavy-water molecules into atoms, that produced so much heat energy that only nuclear reactions – such as the fusion of the water's deuterium atoms inside a cell's palladium electrode – could be responsible (SN: 4/1/89). Most physicists dismiss this interpretation, citing the reported absence of expected fusion products.

"What was originally believed to be simple experiments that could be readily reproduced in other laboratories turned out to be complex phenomena that defied confirmation in many laboratories and which cannot be explained on the basis of classical nuclear physics," Fritz G. Will, head of the state-funded National Cold Fusion Institute in Salt Lake City, told the 200 or so conferees. None of the estimated 400 cold-fusion researchers worldwide has come up with a "formula" that would enable any competent scientist to assemble experiments producing excess heat or nuclear products. But enough have reported suggestive results that "we can put aside the question of whether the phenomenon is real," contends Edmund K. Storms of Los Alamos (N.M.) National Laboratory.

Several vocal critics, including MIT physicist Richard Petrasso, expressed their skepticism throughout the conference. Many of their questions, grounded in conventional physics, focused on the gaping inability of the measured amounts of neutrons, tritium and other reported nuclear reaction products to account for the excess heat reported by at least 16 laboratories. Other criticisms centered on experimental pitfalls that could have misled the roughly 20 labs reporting tritium in their experiments or the handful detecting hints of neutrons.

And the scientific blows weren't confined to Salt Lake City. That same week, cold-fusion defenders sustained a one-two-three punch in the form of two scathing commentaries and a report of negative experimental results in the March 29 NATURE.

In the report, physicist Michael H. Salamon of the University of Utah and his colleagues chronicled a five-week period in which they monitored Pons and Fleischmann's electrolytic cells nearly continuously with radiation detectors and found no signs of fusion.

An accompanying editorial proposes an epitaph for the cold-fusion search, likening it to the alchemists' quest for the philosophers' stone – a mythical means of transmuting baser materials into gold. A separate commentary systematically rails against the corpus of cold-fusion reports as unsubstantiated or flawed and worthy even of mockery.

Pons, Fleischmann and other believers acknowledge conventional physics and cold fusion don't mix. Still, says proponent Charles D. Scott of Oak Ridge (Tenn.) National Laboratory, "it's unequivocal that people have been able to produce excess power and energy . . . and that people have seen tritium."

"If experimental results don't match theory, then the *theory* must change," Michael C.H. McKubre of SRI International in Palo Alto, Calif., told a cheering audience. And therein lies the heart of the controversy. The believers are willing to change existing theory; the doubters aren't. In the absence of definitive confirmation or condemnation, the reality or illusion of cold fusion remains primarily a state of mind. – *I. Amato*

Drug reduces paralysis after spinal injury

An anti-inflammatory drug, commonly prescribed for a variety of allergic and arthritic conditions, can significantly reduce the degree of paralysis from spinal injury if given in huge doses within hours after injury, researchers report.

The inexpensive drug, methylprednisolone, is the first to show a clear benefit for spinal injury victims, says lead investigator Michael B. Bracken of Yale University School of Medicine. Moreover, he says, the 10-center study provides the first direct evidence that the loss of sensation and function accompanying these injuries stems not so much from the initial trauma but rather from a cascade of biochemical events in the hours following the accident.

The study assessed long-term neurological recovery, up to six months after injury, in 487 patients. It compared the usefulness of methylprednisolone – given at 10 to 100 times the standard doses – with that of a placebo and of the drug naloxone, which previously had shown some promise against injury-induced paralysis. Only methylprednisolone provided any benefit in the new study.

Although benefits varied among patients, timely use of the drug could mean the difference between a lifetime in a wheelchair and being able to walk with leg braces, says Yale's Mary Jo Shepard, who coordinated the study. The NEW ENGLAND JOURNAL OF MEDICINE, which will publish the results next month, allowed early announcement of the findings at a press conference in order to speed word of the positive results to physicians.

Patients must receive intravenous methylprednisolone for 24 hours, starting no later than eight hours after injury – a finding that leads some physicians to suggest authorizing emergency medical personnel to begin the treatment. The drug's mechanism of action remains unknown, but the Yale researchers hypothesize that it helps maintain blood flow to oxygen-craving nerve cells during the hours after injury, when tissue swelling can choke local blood vessels. It may also interrupt a nerve-killing chain reaction triggered by the release of toxic chemicals from neighboring cells after injury.

Each year, more than 10,000 people in the United States suffer some degree of paralysis due to acute spinal cord damage. Most are men under age 30 involved in automobile accidents. Specialized care for these injuries costs the federal government more than $4 billion per year, according to the National Institute of Neurological Disorders and Stroke.

– *R. Weiss*