In Hot Water Over Cold Fusion

When Peter Hagelstein offered a theoretical explanation of cold fusion at this week's annual meeting of the American Society of Mechanical Engineers in San Francisco, he was apparently putting more on line than his reputation. According to a recent article in the *Boston Globe*, Hagelstein faces a tenure fight at the Massachusetts Institute of Technology where his willingness to theorize about the controversial cold fusion phenomenon has raised at least a few eyebrows.

"Peter has become somewhat of a controversial figure at MIT," says Ron Parker, a fellow member of MIT's Department of Electrical Engineering and Computer Science and director of the MIT plasma fusion center. "Some people have reacted negatively to the whole cold fusion episode."

Hagelstein, who was already well known for his brilliant work on x-ray lasers for the Strategic Defense Initiative, made headlines in April when MIT announced it had filed patent applications in connection with a series of papers he had written to explain cold fusion. It was only 3 weeks after the initial announcement of the cold fusion claims, and many scientists were still undecided about their validity. The highly publicized patent applications, combined with the solid reputation of both Hagelstein and MIT, gave extra respectability to cold fusion at a time when laboratory evidence was beginning to call it into question. The applications also seemed to indicate that Hagelstein had joined many other researchers in rushing to announce results before they had been peer-reviewed. "In the excitement of the moment," said one MIT colleague, "he did not announce his research in the normal academic fashion."

Ironically, although it was the publicity surrounding Hagelstein's work that irritated many of the MIT faculty rather than the fact that he was doing it, Hagelstein himself did little to encourage the publicity. He never held a press conference and spoke only grudgingly to the press, giving few details on his work.

Since April, Hagelstein has continued to work on his theory even though stock in the claims of cold fusion has dropped precipitously. His persistence in pursuing an explanation of a phenomenon whose very existence is in question has troubled many of his colleagues. Parker, who says he has "no problem" in principle with Hagelstein trying to find a theory for cold fusion, worries nonetheless that Hagelstein may not know when to quit. "I suppose deep down it does concern me, and maybe there's an issue of self-judgment and self-criticism that comes into question," he says.

Hagelstein, an associate professor, has been at MIT for 3 years since leaving Lawrence Livermore Laboratory because of reservations about doing weapons research, and he is up for tenure consideration in the spring. He has continued his work on x-ray lasers, and there seems to be no question that his scientific credentials merit tenure. The sole stumbling block appears to be his commitment to formulating a theory for cold fusion.

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At the San Francisco meeting, Hagelstein offered what he termed a "coherent fusion theory" based on a model that is "very close to semiclassical models used in laser physics." The premise behind his theory is that any fusion that takes place with the emission of a high-energy gamma ray—such as the fusing of two deuterium ions to form a helium ion—can also take place, at least in theory, with the extra energy carried off by many low-energy photons instead of a single gamma ray. This avoids the problem that no cold fusion experiment has seen gamma rays, but it has the drawback that any multi-photon reaction is extremely unlikely. However, Hagelstein says that if many fusion reactions take place simultaneously, the low-energy photons could be emitted coherently, which would increase the fusion rate substantially.

In the paper accompanying his talk, Hagelstein indicated that he had difficulty predicting reaction rates high enough to account for the claimed cold fusion effects. Further, he was cautious in his assessment of cold fusion, writing that it "has been met with extreme skepticism in the scientific community" and "has been exceptionally difficult to reproduce."

Richard Adler, a colleague of Hagelstein's in the electrical engineering department, says the whole episode should eventually prove to be a tempest in a test tube. "I don't believe there is any high-level concern [about Hagelstein's suitability]," he says.

■ **ROBERT POOL**

British Rabbits: Scholarship Down

The most intensively studied rabbits in Britain are facing the bulldozer. The University of East Anglia decided last week to press ahead with plans to build new student dorms and physiotherapy and occupational therapy centers on a site currently occupied by a huge rabbit warren. That's good news for the students but it's terrible news for animal behaviorists Diana Bell and Nicola Webb, who have built their academic careers on the secret life of the university's rabbits.

Bell and Webb have spent the past 7 years studying a colony of rabbits on an abandoned golf course just outside the School of Biology's back door. "They like the bunkers best," says Webb. In that time they've discovered what Webb calls the "alternative Easter Bunny." This, the genuine beast, fights almost nonstop, the males for access to females and the females for good breeding sites. Females dig out the nests of their rivals and kill young rabbits, and they murder juveniles who wander onto their territory. Even the young are not as sweet as one imagines: Webb describes "balls of fluff at 6 weeks old beating hell out of one another."

And just recently Bell and Webb have adopted DNA fingerprinting to prove what has long been suspected—that the dominant male and female leave more offspring than subordinates. Bell feels that there is still much to be learned. But the university has decreed that their work on these superstudied rabbits must end in February 1991 when their grant ends. The university has agreed to hold off the bulldozers until then.

Michael Benson, the university's information officer, says that in 1984 a letter to the Dean of Biology specifically warned: "Don't start any long-term projects on that land." The warning was repeated five times, Benson says. "Try as we might," counters Webb, "we can't find any letters or consultations until the end of 1987."

Benson says the university "recognizes the value of the research" and has offered a new colony to study, security fencing, and a research assistant to get the project up to speed, a package worth some £50,000. Bell says she has been looking for new colonies for years and that none nearby is suitable. "All we're asking for is three more years."

And the rabbits? "They're not Watership Down characters who simply pack their bags and move to pastures new," says Bell. She predicts they will either die in the removals or try to get back home, which will also be fatal.

■ **JEREMY CHERFAS**