

Cold fusion work in France is intensifying

by Emmanuel Grenier

The 1992 year-end issue of the widely read weekly *L'Express* carried a three-page article, "Cold Fusion Surfaces Again," just one of many indications that cold fusion is far from dead in France.

Some people will remember that the French Riviera has been the host for the past two years to Martin Fleischmann and Stanley Pons, who were made virtual political refugees from the science world after their discovery of cold fusion. Soon after the announcement of their breakthrough in the United States on March 23, 1989, the media and scientific establishment launched a witchhunt against them, making it impossible for the two chemical engineers to further their work. Fortunately, the Japanese laboratory Technova, headed by Minoru Toyoda, whose family is behind the Toyota industrial giant, offered its facilities at Sophia Antipolis to the two cold fusion scientists, where they can work with the most advanced equipment and a team of scientists to help them. Pons made his decision quickly, and moved to Sophia Antipolis, near Nice, with his wife and two children. Fleischmann joined him somewhat later.

Quietly, they continued their effort to replicate their initial experiment of heavy water electrolysis with a palladium cathode. They also designed an extraordinarily precise heat measuring system, in order to chase down any artifact which would have falsely indicated production of excess energy (i.e., more energy produced as heat than energy supplied from electricity). In July 1991, they presented their results to the Second International Conference on Cold Fusion in Como, Italy. Today they are working with a team of 12 scientists and technicians, but they plan to raise this number to 25 as early as next year. "We have made tremendous progress since 1989," Fleischmann told *L'Express*. "With the correct palladium, our experiment is nearly 100% reproducible. And today, we are getting an excess heat of 4 kilowatts per cubic centimeter during a 15-minute time-period."

The team plans to publish these data in *Physics Letters A*, one of whose editors, Jean-Pierre Vigié, is a physicist and onetime aide to Louis de Broglie.

Vigié has become a "cold fusion fan" and is working hard to defend the continuation of research in France. He attended the Third International Conference on Cold Fusion in Nagoya, Japan, along with two collaborators and a fourth French representative. Clearly there is growing interest in cold fusion in France, since that nation sent no representa-

tives to the 1991 conference in nearby Como. Despite the interest, little work is taking place, because of continuing pressure from the "high priests" of French science, who continue to denounce experiments as "unscientific" and go so far as to forbid their junior colleagues to conduct them.

CEA throwing up roadblocks:

At the prestigious Atomic Energy Commission (CEA) there simultaneously exist strong interest, ideological resistance and dogmatism, and great pusillanimity in the face of administrative authorities. Some scientists want to try replicating the Fleischmann-Pons experiments, and some even visited them at their laboratory. But ideological resistance is coming from the honchos at the CEA fusion program, who all have expressed their hostility to any cold fusion program. The pusillanimity is a result of the fact that the French nuclear sector has been under attack recently: After having benefitted so much from a strong show of political will to implement a nuclear program, CEA is now caving in to the "green disease" infecting all political parties. The most recent example of this degeneration was the denial of authorization to restart the Superphénix, the world's largest nuclear breeder reactor, a joint project of France, Germany, and Italy.

CEA's executives now don't want to rock the boat by entering fields subject to "media controversy." CEA has forbidden the few of its scientists interested in cold fusion to work on it—and forbidden them to talk to journalists. Notwithstanding, one of them plans to spend a week with Fleischmann and Pons.

Another development has occurred in the laboratories of Royal Dutch Shell, in Rouen, Normandy. One scientist, who has been working on cold fusion since 1989, will soon publish a paper in *Fusion Technology*. He claims to have surpassed what he calls "electrical breakeven," obtaining two watts thermal for every watt electric supplied. In contrast to most cold fusion researchers, he is not working with an electrolysis apparatus, but rather with a gaseous charging apparatus: He generates sparks between two points and a palladium electrode in a closed cell filled with deuterium gas. The sparks dissociate the deuterium molecules and thereby create atomic deuterium. This atomic deuterium much more easily enters the palladium structure, even at normal pressure. The researcher calculates (and measures), that he is getting a loading ratio—the number of deuterium atoms inserted into the palladium structure as a ratio of the number of palladium atoms—of about 0.75. But, locally, at the site of the sparks, he estimates that he gets a loading ratio greater than 1.0, the condition recognized by most cold fusion scientists as necessary to obtain excess heat.

The Shell scientist, after a thorough peer review by the chief scientists at Shell in Holland, has been given a green light to continue his research with Shell funding, but not at the Shell laboratory. He is presently looking for a laboratory where he can work.