SCIENCE NEWS of the week

Star Wars Lasers: A Question of Technical Integrity

President Reagan and other high government officials received "overly optimistic, technically incorrect" information concerning development of a nuclear-powered X-ray laser, says the scientist who until 1985 directed weapons research at the Lawrence Livermore (Calif.) National Laboratory. The X-ray laser, which is designed to channel the radiation generated by a nuclear explosion into an intense, directed beam, is a key element of the Reagan administration's Strategic Defense Initiative or "Star Wars" program (SN: 12/14/85, p.375).

Roy D. Woodruff, the lab's former associate director for nuclear weapons, says that physicist and former Livermore director Edward Teller, acting on data provided by Livermore scientist Lowell L. Wood, has conveyed "bad" information to the nation's top policymakers. Moreover, Woodruff complains that Roger E. Batzel, Livermore director, although aware that the information was inaccurate, refused to correct misleading statements made by Teller.

"For us to be potentially basing national policy on the speculations of Dr. Wood, advanced through Dr. Teller, is totally inappropriate," Woodruff told SCIENCE NEWS this week. "The representations by Dr. Teller were not in keeping with the laboratory's position. They were much more optimistic, and I don't believe they were founded on actual results."

Woodruff's remarks follow the release last week of confidential documents concerning grievances filed by Woodruff with the University of California, which operates the Livermore laboratory for the U.S. Department of Energy. The documents were sent anonymously to Robert M. Nelson, a scientist at the Jet Propulsion Laboratory in Pasadena, Calif., and co-chair of the Southern California Federation of Scientists, based in Los Angeles.

"It seems to me that something fishy is going on," says Nelson. "This may be only the tip of an iceberg. There's a good case for a thorough investigation." Teller, Wood and Batzel so far have refused to comment on Woodruff's allegations. Woodruff says he is "outraged" that Nelson's group decided to release confidential papers.

The documents shed light on the difficulties that led to and followed Woodruff's 1985 resignation from his post as associate director and his subsequent demotion to staff scientist. Until now, he had made no public statement about the reasons for his resignation, refusing to carry the debate out of official channels and classified forums into the public domain.

"I resigned my post out of principle," Woodruff now says. "I liked the job, and it was a very difficult decision. But I didn't want to be responsible for a program where the potential for progress was being reported by Edward Teller."

In the two years since his resignation, Woodruff has tried to stabilize his career and laboratory position despite what he calls "bureaucratic harassment." At the same time, he says, "I've tried very carefully and methodically . . . to make sure that as many of the policymakers in the government as possible knew that there were at least some doubts in the mind of one technical person about the X-ray laser and where it was going." However, unlike Teller, Woodruff did not have direct access to Reagan.

To many observers, the central issue raised by the Woodruff case is the quality of scientific and technical information conveyed to policymakers and the lack of opportunities for presenting dissenting views. Rep. George E. Brown Jr. (D-Calif.), who met with Woodruff last week, may ask the General Accounting Office to investigate the specific question of whether Teller's and Wood's statements to the President and his advisers about the X-ray laser were inconsistent with those made by laboratory officials to Congress. "Brown sees this as a question of scientific integrity," says a member of his staff.

This type of conflict is nothing new. "It has been [a concern] since the beginning of scientists advising the President," says historian Gregg Herken, presently at the California Institute of Technology in Pasadena. Herken is preparing a book on the role of presidential science advisers, from the Roosevelt to the Reagan administrations.

Where new technologies are concerned, Herken says, scientists on both sides of an issue have often presented the best possible cases for what they believe in politically. "It's deceptive to speak of totally objective science," he says. Teller, Herken adds, played a crucial role in persuading Reagan to adopt a Star Wars program, based partly on the promise of X-ray lasers.

The latest revelations may have a negative impact on the credibility of the entire X-ray laser effort. "I remain committed to [the X-ray laser] as an appropriate research program," Woodruff says. "But we don't know at this date whether we can make a weapon and, if we can, how effective it would be. At this juncture, we can't even say it's possible."

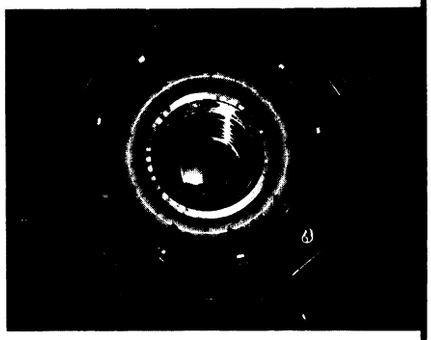
Livermore's official response to the controversy has been to make no comment and to acknowledge that the X-ray laser is a complex topic that arouses a lot of debate and legitimate differences of opinion. — *I. Peterson*

A most powerful X-ray machine

A nuclear-fission explosion produces an intense flux of X-rays. For decades, scientists and engineers interested in the effects of weaponry have used machines that make X-rays without the explosion to test the effects of bomb-generated X-rays on various objects. This month, researchers began operations of Saturn, the most powerful such X-ray simulator in the United States.

Developed at Sandia National Laboratories in Albuquerque, N.M., Saturn is designed to produce an X-ray dose of up to 5 trillion rads per second for 15 to 20 nanoseconds, making a peak dose of 100,000 rads. This is four times the dose available in Sandia's previous X-ray simulator, according to James E. Powell, manager of the laboratory's simulation technology department.

In Saturn, 36 independent channels, arranged like spokes of a wheel (seen in top view in the illustration), amplify pulses of electric power, which are then fed to a large diode made of several concentric rings in the center of the circle. The combined power pulse generates a pulse of electrons in the diode, and these electrons strike a heavy-metal foil to produce the X-rays. Saturn as a whole is 96 feet across, and its irradiation chamber and the elevator that lifts objects into it are designed to take loads as large as an entire satellite.



In addition to simulating bomb damage, the machine will serve Sandia's research on X-ray lasers, and it could be available for other scientific research, though expensively. It costs about $70,000 a day to run. — *D. E. Thomsen*