try to conceal it—which provides an extra added twist," he remarked. The problems facing the SDI designers "are at the forefront of modern statistics research," Friedman said. "There is a natural marriage there. Both statistics and the SDI can benefit."

A number of members of the mathematics community object to the very idea of SDI research and have urged their colleagues not to seek SDI funds. There was a symposium at the meeting in August of the International Congress of Mathematicians to that effect, for example. But these views were not a part of the recent briefing. Nonetheless, some mathematicians did ask questions related to how SDI money would affect basic research. Jagdish Chandra of the Army Research Office asked whether the work would be classified and whether researchers receiving SDI funds would need security clearances. Ionson replied that the math projects would be

Some mathematicians warned that their research might not have quick payoffs.

unclassified, although the investigators "are welcome" to apply for clearances and thus to get closer to the heart of the program. Daniel Mostow of Yale University, who is president-elect of the American Mathematics Society, asked whether these would be new funds or whether the money would be pulled from other programs that currently support mathematicians. Ionson assured him the funds are new.

Some mathematicians also warned that their research might not have the quick payoffs that the SDI administrators want. Ronald Graham of AT&T Bell Laboratories, for example, notes that the SDI administrators are hoping for solutions to very specific problems within a few years, but those solutions frequently rely on as yet unrealized advances in basic research. Graham says, "there are no quick fixes. When you fund math research, especially basic math research, that's a long-term activity. If the research is good, it will find applications in many areas. But it may take 10 or 20 years."

But Graham argues that "this is an opportunity for mathematicians to say what they can and cannot do." Phillip Griffiths of Duke University, who is chair of the National Academy's Board on Mathematical Sciences, agrees. "Mathematicians cannot only solve problems but, perhaps more important, they can tell what can't be solved," he says. ■ GINA KOLATA

Briefing:

Vaccine Compensation Bill Passed

After 4 years of debate, Congress has finally passed legislation to provide compensation for children who are injured after receiving vaccines such as diphtheria-pertussis-tetanus, or DPT, that are mandatory in most states. But the battle isn't over. Whether the President will sign the bill is unclear. Furthermore, a bill to enact the tax to fund the compensation must be introduced by the House Ways and Means Committee. "We don't have a total bill yet," one congressional staffer says.

The bill, which was championed by Representative Henry Waxman (D–CA) and Senator Paula Hawkins (R–FL), has two goals. The first is to compensate injured children; the second is to try and create some stability in the vaccine market. Vaccine manufacturers have been dropping out of the market, and those who stayed have raised their prices—and especially their prices for the risky DPT—claiming that lawsuits by parents of injured children have made their liability costs so high as to be ruinous. Waxman expects the legislation to result in lower vaccine prices when this litigation burden is relieved.

The vaccine compensation system will have two parts. First is the federal vaccine compensation program that requires the families of injured children to seek no-fault relief through the system before deciding to take their case to court. An arbitrator, or "master" will set compensation for children whose injury from a mandatory vaccine occurs within a prescribed period after the vaccination.

The maximum compensation for the death of a child or for pain and suffering is $250,000. There are no limits on the compensation for medical expenses and rehabilitation. Injured children also can receive payments for lost earnings, but not until they are 18 years old. Children whose vaccine injury occurred before the legislation goes into effect can be compensated for their present and future medical expenses.

After learning the amount of the compensation awarded to their child, parents can reject it and go to court. But they cannot recover damages from a vaccine manufacturer on the grounds of negligence if the manufacturer complied with Food and Drug Administration standards. This should make it more difficult for parents to win in court and should protect manufacturers from costly suits.

The parents are free to sue their physician for negligence if, for example, he failed to recognize that their child was at high risk for vaccine-induced damage and to recommend that the child, therefore, be exempt from otherwise mandatory vaccination. Physician negligence is not part of the new legislation.

The Waxman no-fault bill, which is the one passed by the House and Senate, was based in part on a 1985 report from the Institute of Medicine. In particular, notes Roy Widdus at the institute, the compensation scheme in the Waxman bill is "the most favored one in our report."

On the unresolved matter of legislation for the vaccine tax, it is clear that the Administration is vehemently opposed. However, Hill staffers point out that the tax is designed to create a compensation system that is self-sustaining; it should require no federal appropriations past the first 1–3 years, they say. Final resolution of the issue awaits the next Congress. ■

GINA KOLATA

Researchers' Dreams Turn to Paper in U.S.-U.S.S.R. Fusion Plan

Ever since President Reagan and Soviet General Secretary Mikhail Gorbachev met in Geneva last November, Administration officials have struggled over a pledge to expand international cooperation in research on magnetic confinement fusion. While the summit language did not obligate either country to carry out any specific task, American and Soviet scientists have advocated construction of a major new experiment—the Energy Test Reactor (ETR). Seen as the forerunner of a new type of nuclear power reactor, the device would allow researchers to study plasmas burning at more than 100 million degrees Farenheit.

For now, however, it appears that the United States is unwilling to pursue such an ambitious goal with the Soviets. Instead, the Reagan Administration is expected in the near future to propose that American scientists undertake just a design study with the Soviet Union, Japan, and the European Economic Community. While the exact dimensions of the undertaking are "classified" for the moment, Administration officials say it will probably call for determining the design parameters, assessing related engineering and technology problems, establishing a management structure, and refining cost projections for the ETR, which have been estimated at $4 billion.

The proposal clearly falls short of the

dreams of plasma physicists and engineers who are striving to develop an economic power reactor fueled by the fusion of two hydrogen isotopes, deuterium and tritium. But it still may provide President Reagan with a way to fulfill his summit pledge calling for "the widest practicable development of international cooperation" on fusion. This smaller, cheaper venture is the "compromise" position struck by feuding officials within the Departments of Defense (DOD), Energy (DOE), and State, the National Security Council (NSC), and the President's Office of Science and Technology Policy.

The high technology employed in fusion research has caused DOD to oppose any international collaboration with the Soviet Union that entails actual construction and engineering. DOD officials worry that such close cooperation would lead to a transfer of technology to the Soviet military (*Science*, 23 May, p. 925). However, a 4-month review of this question was undertaken by an interagency working group coordinated by NSC, but it did not conclude that technology transfer problems were unmanageable, according to Administration sources.

Energy Secretary John S. Herrington reportedly does not see the technology transfer issue as an insurmountable problem either. But in a recent letter to Defense Secretary Caspar Weinberger, sources say, Herrington indicated that at this time he could not support entering into a binding commitment with the Soviets to collaborate on an actual machine. Anson Franklin, DOE's director of communications, says the secretary also has concluded that an ETR project does not fit in with the department's budget priorities—even if project costs were split among a number of participants.

The planning project that the United States is expected to unveil soon would keep the door open for a potential collaboration with the Soviets in the future. It also leaves the United States, Europeans, and Japanese free to pursue next-generation machines individually, or on a bilateral or multilateral basis without the Soviets. Prior to the Soviet overture last fall to expand cooperation in fusion research, talks were under way between the EEC, Japan, and the United States concerning collaboration on a next-generation machine like an ETR. These discussions have continued on a separate track.

It is unclear how the Japanese and Europeans will respond to the U.S. proposal to conduct a design study with the Soviets. The American plan appears quite similar to the International Tokamak Reactor (INTOR) study done under the auspices of the International Atomic Energy Agency. The Soviets have participated in INTOR since its inception in 1978. Toichi Sakata, first secretary of the Japanese Embassy in Washington, says he is not sure how interested Japanese scientists will be in carrying out another study with the Soviets. The Soviet scientists, he observes, were late in performing some tasks on INTOR, and the quality of their work was uneven.

American industry and government officials predict, however, that the Japanese and Europeans will go for the proposal because it provides all parties with a graceful way out. Stephen O. Dean, president of Fusion Power Associates, an industry trade group, notes that the Japanese and Europeans have not sought to build a machine with the Soviets. It has been the American fusion community, he says, that has recently suggested including the Soviets in the construction of a new experimental device. How Moscow will react to a proposal for an ETR planning exercise is uncertain. It clearly falls short of the ambitious reactor the Soviets pressed for in a meeting with DOE officials last spring in Geneva. ■

MARK CRAWFORD

Researcher Reprimanded For Pseudorabies Test

Saul Kit, head of the division of biochemical virology at Baylor College of Medicine in Houston, Texas, has been reprimanded by the National Institutes of Health for failing to consult institutional and federal biotechnology safety committees before conducting outdoor experiments with genetically altered animal vaccines.

In June 1984 Kit inoculated a herd of quarantined swine at the Maddox Farm in Lometa, Texas, with a pseudorabies virus vaccine constructed partly by using recombinant DNA techniques. While the Department of Agriculture (USDA) subsequently found Kit's vaccine to be safe and effective, an NIH review committee concluded that he had a duty to confer with the biosafety committees at Baylor, where he is employed, and at Texas A&M University, where two other participants in the experiment work. Institutions and affiliated researchers are subject to NIH's guidelines for research involving recombinant DNA if they receive federal research funds. Kit contends that his experiment did not fall under NIH's DNA guidelines.

James B. Wyngaarden, director of NIH, endorsed on 15 October recommendations by the review committee that Kit's research activities be closely monitored for the next 3 years. Besides the usual required approvals on research, any other project that Kit undertakes that involves animals must be reviewed by the sponsoring institution's biotechnology safety committee. Baylor, and other institutions that may be affiliated with research involving Kit, also must inform NIH's Office of Recombinant DNA Activities every 6 months on projects proposed by Kit.

The review of Kit's research activities was initiated last May by Wyngaarden in response to a 28 April letter he received from social activist Jeremy Rifkin, who heads the Foundation on Economic Trends.

Reacting to NIH's findings, Rifkin says the light sanctions imposed on Kit "make a joke of the NIH review process. It says you don't have to be held accountable to any high standard—you can get away with it." Bernard Talbot, executive secretary of the review committee and deputy director of the National Institute of Allergy and Infectious Diseases, agrees that the NIH sanctions "are mild." But he defends the actions, saying they are justified in light of the ambiguities in the NIH rules identified by the committee.

Kit first constructed two separate plasmids containing DNA fragments of pseudorabies viruses. He then infected a live rabbit cell with one plasmid and a separate, live pseudorabies virus strain. After recombination of viral DNA in the cell, the derivative pseudorabies strain was inserted into another cell along with the second engineered plasmid. The end result was a deletion of genetic material that made the virus less virulent, and suitable as an animal vaccine.

Kit has argued that this end product does not constitute a "recombinant DNA molecule," an engineered structure covered by NIH guidelines that mandate review of experiments employing this technology. While criticizing Kit, the NIH committee said that the language in NIH's guidelines is vague on this point and should be clarified. At issue is whether the insertion of a recombinant DNA molecule into a living cell means the end product falls within NIH's recombinant DNA classification when no foreign DNA has been introduced.

The NIH review committee, however, noted "that historically such [gene] deletion derivatives have indeed been considered recombinant DNA molecules." In its report to Wyngaarden, the NIH committee observed that a majority of members on the biosafety committees at Baylor and Texas A&M concluded that Kit's vaccine virus constituted a recombinant DNA molecule.

Both schools' biosafety committees also concluded that a deliberate release into the