tion on scientific communication bears a potential cost in slowing scientific advancement. The real problem is to determine what should be controlled and how it should be done.

• *What should be controlled.* The Corson panel recommended that controls be imposed on scientific communication only in areas that meet four criteria simultaneously: the technology is developing rapidly; it has "identifiable direct military applications" or dual civilian-military uses; its acquisition by the Soviet Union would confer significant near-term military benefit; and the information cannot be obtained from other friendly nations. Although the criteria have met with broad acceptance, even within DOD, they leave plenty of scope for interpretation. Some in the academic community have complained, for example, that they could be used to restrict more than the panel intended. A recent report by a committee at the Massachusetts Institute of Technology said, for example, that if the Corson panel's own qualifications are ignored, the criteria "could be read as restrictive imperatives."

DOD has compiled a list of sensitive technologies, called the Militarily Critical Technology List (MCTL), whose export it wants to restrict. The list is far too extensive to be used for determining the areas of scientific communication to be restricted, however; according to one DOD official, it is the size of a Manhattan telephone book and is "really a list of modern technology." The DOD–University Forum has proposed that a committee be set up by DOD, consisting of scientists and engineers from government, the universities, and industry, "to review research and development in the universities on the basis of the MCTL, the criteria of the Corson Report, and the burden imposed on the vitality of research and engineering development," and determine which areas are truly sensitive. The forum also recommends that this broad-based committee be an appeals body from which a researcher whose project has been designated sensitive—and thus subject to restriction—can obtain an expeditious review.

Appeals are currently referred to an internal DOD panel chaired by Stephen Bryen, a deputy assistant secretary for security policy and a hard-liner on technology transfer issues. A single veto in the panel can block a proposed transfer.

The ATS report recommends a process likely to be far more unpalatable to the scientific community. It suggests that DOD itself should draw up statements on what unclassified information should be restricted in some 20 areas of technology that the Central Intelligence Agency has already identified as prime Soviet targets. The report suggests, moreover, that DOD should base its determination on criteria that are much broader than those of the Corson panel.

• *What controls should be imposed.* Because virtually all the research likely to fall in the sensitive category will be funded by the federal government, principally DOD, there is growing consensus that constraints on scientific communication can best be handled by contractual agreements between the researcher and the funding agency. One of the chief problems at present is that researchers are generally unaware of any obligation to restrict access to information, and controls have been imposed—sometimes capriciously—after the work is under way. The DOD–University Forum is emphatic that all obligations should be negotiated in advance and spelled out in contracts, so that researchers can decide whether to accept a project under the conditions laid down.

The forum statement suggests two controls that could be applied to research deemed sensitive: No national from a designated country (a Soviet bloc nation or China) will be assigned as a direct participant—including as a long-term visiting scholar—in the project without prior approval, and publications should be sent to the funding agency for review 60 days before submission for publication. The review would be advis-

Swiss Research Questioned

The University of Geneva has recently notified the National Cancer Institute that Karl Illmensee, a researcher at the Swiss institution and an NCI grant recipient, is under investigation for alleged irregularities in the reporting of research data. According to Colette Freeman of NCI, the institute is withholding the renewal of Illmensee's $70,000 research grant, pending the outcome of the investigation.

The inquiry was launched at the behest of individuals who work in Illmensee's laboratory, says Marcel Guenin, vice-rector of the University of Geneva. The irregularities they reported involve alterations made in experimental protocols after the experiments were completed. According to Guenin, Illmensee concedes making the changes but has offered explanations for them. Nevertheless, after completing a preliminary internal investigation, the University of Geneva is forming a committee, to be composed of five or six scientists of international repute, to further investigate the charges.

Illmensee is primarily known as an embryologist and developmental scientist. The experiments that are being questioned were performed in 1982. They involve the transplantation of nuclei from cancer cells into fertilized eggs whose own nuclei had been removed. The eggs can then be transplanted into foster mothers to develop. The results have not been published, although Illmensee had presented them at a scientific meeting.

The investigation may not be limited to the 1982 experiments, however. According to Guenin, Illmensee has requested that the committee review his other work, which has now come under a cloud.

The questioned experiments are similar in design to experiments reported by Illmensee and Peter Hoppe of the Jackson Laboratory in the January 1981 issue of *Cell* (*Science*, 23 January 1981, p. 375). The *Cell* paper described the transplantation of mouse embryo cells into enucleated eggs, from which normal mice developed. Although similar nuclear transplants into amphibian eggs had been achieved some 30 years previously, success had not been reported before with mammalian eggs.

The *Cell* paper received a great deal of attention because the ability to do such nuclear transplantation paves the way for the cloning of mammals, that is, for generating multiple, genetically identical copies of an individual. However, attempts to reproduce the *Cell* results and those of other enucleation experiments performed by Illmensee have proved difficult, according to Clement Markert, an embryologist at Yale University.

Hoppe, when contacted at the Jackson Laboratory, declined to comment on the Geneva investigation. Barbara Sanford, the laboratory director, says an investigation is planned into the work performed by Illmensee when he was a visiting professor at the Bar Harbor facility.—**JEAN L. MARX**