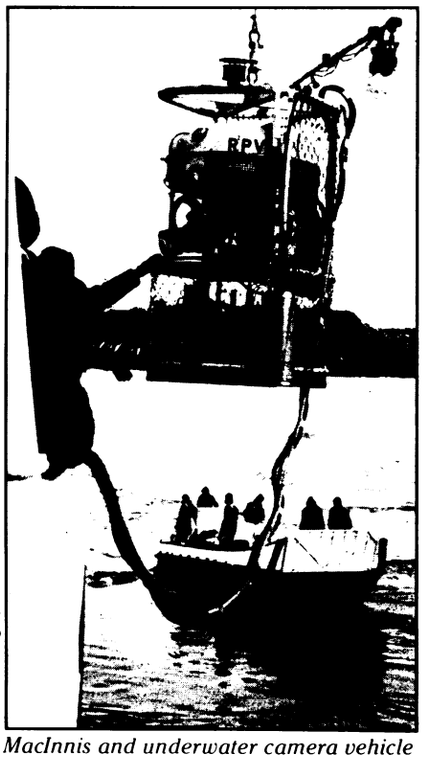

National Geographic Society

MacInnis and underwater camera vehicle on location in the Canadian high arctic.

trolled Voyager 2 when it photographed Saturn as it passed by.

MacInnis says the research is significant because the Arctic is on the threshold of opening up for oil and gas. Oil and gas taken from Alaska's north coast and the Beaufort Sea will be carried right over the shipwreck in giant tankers before the end of this century, he said. Just to the east of where the ship was found, at the mouth of Lancaster Sound, oil exploration is beginning. "We are looking at the future seaway to the north, so we are trying to use the shipwreck as a scientific opportunity to learn more about the biology, geology, and sea ice of the region," says MacInnis.

The researchers have already discovered, not far from the ship, a trench as wide as a street and about 10 feet deep, made by the foot of an iceberg as it dragged along the ocean bottom. "No human eye has ever seen, face to face, that particular geological entity," says MacInnis. "These are the kinds of things that we will be studying in next year's scientific program, in addition to the archaeology of the ship."

The research is also part of a continuing program to develop the capacity for human beings and unmanned systems to explore beneath the polar ice cap. "It's really something to be sitting drinking coffee in comfortable surroundings, knowing that a system is making a dive into subfreezing waters," says MacInnis. "At −1.6°C, if we wore ordinary clothes, the water would incapacitate us within seconds and kill most of us within minutes. What we have here is an extension of the human eye into the Arctic region." □

Proposal to remove penalties in DNA rules

In a proposal hastily spliced together at the Sept. 10 meeting, the Recombinant DNA Advisory Committee gave preliminary approval to eliminating "regulatory" aspects of the guidelines that currently apply to research with recombinant DNA. The proposal, approved 16 to 3, will be open for public comment until the final vote of the National Institutes of Health committee, expected in January.

"There is no justification left, if there ever was any, on scientific grounds for imposing guidelines other than the code of accepted laboratory practice," says David Baltimore, the MIT scientist who introduced the proposal.

As a voice of dissent, Richard Goldstein of Harvard Medical School insists, "Some members still have some concerns on the scientific level."

Under the newly proposed guidelines, adherence to standards would only be "recommended" to laboratories using recombinant DNA, including those receiving government funding. The proposal includes no sanctions to be applied against laboratories that disregard the suggestions. Baltimore says, "The proposal merely puts recombinant DNA in the same bag with other experimentation."

The proposal replaces the complicated system of assigning levels of appropriate safety measures in the current guidelines. The new suggestion is that scientists in general look to safety measures appropriate for the organisms they are employing. If they are transferring genes into disease-causing bacteria or using disease-causing viruses as carriers, they should employ at least the precautions recommended for work with those organisms by the Centers for Disease Control or the Department of Agriculture. If the scientists expect the transferred DNA to make the host more virulent, they should take that into consideration in deciding on precautions. Otherwise, experiments using organisms that do not cause disease may be carried out under the conditions, known as PI (or in industry, PI-large-scale), of standard microbiological practice.

In support of this simplification, Kenneth Berns of the University of Florida College of Medicine says, "There is genius in having a simple set of guidelines. They can be more inclusive than the telephone book we now have."

While the new proposal does not prohibit any experiments, it does flag two areas in which experiments should not be performed except under unusual circumstances. Included in this "exhortation" section, are experiments that introduce new drug resistance factors into disease-causing organisms and those that transfer genes for certain toxins.

The Recombinant DNA Advisory Committee (RAC) is retained under the new proposal (as a place for people to go with questions, Baltimore says), but no mention is made of the local institutional biosafety committees, which are required by current guidelines. The proposal leaves to each institution the decision of how it will monitor its recombinant DNA research. Only "unusual events" will be reported to the National Institutes of Health.

A background document prepared by a working group of the committee summarizes why most of the members believe the time has come for a major revision of the guidelines. Experience with the limits and possibilities of the recombinant DNA technique, seven years of explicit discussion of danger potential and some specific risk assessment studies have provided scientists with somewhat better parameters for discussing the dangers, the working group says. It also points out that the guidelines have evolved into an extremely complicated, piecemeal document in response to modifications initiated by specific requests and that administration and revision of the guidelines requires scientists to spend "considerable time" on committees and on obtaining approval for experiments.

Working group chairman Susan Gottesman summarizes the group's conclusions on hazards: Most random and intentional combinations of genes produced in recombinant DNA experiments will not create a special danger. The gene combinations are not likely to be unique in nature; they are not likely to survive in the environment and they are not likely to be harmful.

The working group presented a proposal that included the simplification of safety specifications, but it recommended that following the guidelines still be mandatory for laboratories receiving funding from the National Institutes of Health. It would also require that investigators get permission of the local institutional biosafety committee before doing certain experiments. Gottesman says, "In my judgment, there are still scientific reasons for having someone besides the principal investigator look at some of the experiments before they proceed."

Baltimore combined parts of the working group proposal with parts of a proposal he had previously presented with Allan Campbell of Stanford University. The Baltimore-Campbell proposal revoked the mandatory nature of the guidelines and reduced the suggested safety measures for most experiments to the PI level.

The Baltimore-Campbell proposal was published in the FEDERAL REGISTER on March 20 and evoked a mixed response. Francine Simring of the New York-based Coalition for Responsible Genetic Research says, "Given the intensely competitive nature of the research and its development, this proposal would facilitate lower safety standards and less careful

procedures. For some individuals and groups, regulation alone acts as a deterrent."

Scientists who wrote in support of changing the guidelines from regulations to recommendations include Stanley N. Cohen and Paul Berg of Stanford and William J. Rutter and Howard M. Goodman of the University of California at San Francisco.

Some of the discussion at the Sept. 10 meeting focused on political and social functions of the guidelines. Berns reports that scientists at a prestigious meeting this summer, as well as his congressman, want some federal guidelines maintained to keep public confidence and avoid regeneration of public concern.

"We did provide Congress with the opportunity to say 'the problem is being handled, we don't need legislation,'" Baltimore says. "I think we [of the RAC] need to be here to give substance to the notion the federal government is still interested in the guidelines." □

Bacterial hazards at Mt. St. Helens

While Mt. St. Helens simmers without erupting, the gravest danger to those allowed within the restricted zone near the volcano may be posed by tiny airborne water droplets. Scientists testing water in the zone find that about half the samples show abundant levels of seven or eight different *Legionella* bacteria, although not all strains are capable of causing disease in humans.

Only one of the *Legionella* bacteria causes Legionnaires' disease, the illness that broke out in Philadelphia in 1976, says Clifford Dahm, a chemist at Oregon State University in Corvallis. Other less virulent strains also cause respiratory illness accompanied by headache, high fevers that persist for 24 to 48 hours and minor sore throats. Like Legionnaires' disease, the other strains are thought to be transmitted by water droplets.

In August scientists from Oregon State and the U.S. Forest Service recommended that caution signs be posted at mountain lakes to alert people of potential health hazards. When tourism increases, they say, so might the incidence of *Legionella*. The scientists are concerned that numbers of bacteria tend to increase in warmer waters, especially during August and September when water temperatures peak in the Northwest. If the volcano heats up again, Dahm says, the warming and the increase in nutrients to lakes and streams could result in further outbreaks.

Eight cases reported in the summer of 1980 and one this summer displayed *Legionella*-like symptoms, although none were confirmed through lab tests as *Legionella*, Dahm says. The illness responds well to erythromycin. □

Preventing hydrocephalus in infants

A tiny valve may for the first time hold out hope for the prevention of hydrocephalus, say two separate teams of scientists working with animal and human infants.

Valves implanted in the skulls of monkey fetuses suffering from "water on the brain" can reliably drain the fluid throughout pregnancy before a pressure build-up causes significant brain damage, report two researchers from the National Institutes of Health in Bethesda, Md. Together with the successful implantations of a similar valve in a human fetus by a team of Colorado surgeons in April, the NIH work—reported by Gary Hodgen and Maria Michejda in the Sept. 4 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION—offers a preventative treatment for the estimated 4,000 hydrocephalic infants in the United States each year.

Hydrocephalus is one of a number of conditions that can be triggered by defects in the neural tube, the bundle of embryonic nerve fibers that becomes an infant's brain and spinal cord. Neural tube problems strike two of every 1,000 babies in the United States, often with devastating effects. Some of the defects, like mild cases of spina bifida, in which a gap in the spinal column permits the spinal cord to protrude to the surface of the infant's back, can be repaired successfully after birth. But until now, prenatal hydrocephalus, a condition often accompanying spina bifida, has damaged the developing fetal brain before surgeons could offer help.

When hydrocephalus strikes, a block in the neural tube prevents fluid that usually bathes the brain and spinal cord from circulating throughout the system; rather, the fluid is trapped in certain brain cavities, or ventricles. The cumulative pressure exerted by collecting fluid can result in mental retardation, convulsions, paralysis, and even death in many infants.

Physicians can detect hydrocephalus in ultrasound images as early as the twentieth week of pregnancy, but have been able to offer distraught parents only postnatal shunting of the fluid, which can help in milder cases, or abortion.

"When confronted with the consequences of severe fetal malformations," says Hodgen, "the adage 'an ounce of prevention is worth a pound of cure' seems worthy of serious consideration." To test their method of defect prevention, Hodgen and Michejda induced hydrocephaly in 36 rhesus monkey fetuses. Between the second and third trimesters of the mothers' pregnancy, the researchers, guided by ultrasound images, inserted the valve in some of the infants through a small incision in each mother's abdomen, and into a seam in the fetal skull.

Once the needle-thin tip of the device penetrated 14 millimeters of the fluid-filled ventricle, metal threads at the broader top of the valve locked the vent in place, until its removal at the infant's birth. If pressure in the fetus's head rose above a normal 60 millimeters of water, the valve automatically shunted excess fluid into the surrounding amniotic sac.

Of the monkeys with valve implants, 80 percent survived birth and of those, nearly all seem healthy and neurologically normal nine months later, Michejda reports. But, she says, further tests of the developing animals' motor and cognitive skills will be needed to assess any subtle brain damage. Only 10 percent of the hydrocephalic monkeys without valves survived birth, and all died within two weeks.

The successful work in monkeys gained immediate human relevance earlier this year when a team led by William H. Clewell of the University of Colorado Health Sciences Center in Denver installed their own prosthesis in a 24-week-old hydrocephalic human fetus, using techniques similar to those used at NIH. The infant was delivered by Caesarean section several weeks prematurely in mid-July when the shunt clogged and pressure in the brain again began to build. A different type of shunt was inserted after birth and the youngster is "alive and eating and is now at home with the family," Michael L. Johnson, a member of the surgical team, told SCIENCE NEWS.

"Needless to say, we are very excited about this surgical procedure in the fetus and its potential implications for the unborn child with hydrocephalus," Johnson says. "Unfortunately, it may be some time yet before we can adequately evaluate the success of the procedure from a neurologic and developmental point of view." □

Valve vents excess fluid from brain of 120-day-old monkey fetus.

JAMA