"That is possible," was Hutt's reply. "But to ban a product like margarine or whipped topping or coffee whiteners, which are perfectly legitimate, safe products . . . to me is not in the spirit of democracy and the marketplace as I know it in America today."

Technical flexibility is fine in theory, yet in practice most people believe they prefer traditional foods and blame technology for the debased versions that tend to drive them off the market. But the role of technology is more complex, as FDA commissioner Kennedy explained when Representative Margaret M. Heckler (R–Mass.) accused him of having allowed ice cream quality to deteriorate far enough already. "The FDA has not presided over this deterioration in the quality of ice cream," Kennedy responded. "What happens, as happens in any technology, is that people find out how to do something a little better within the old limits, and then people exercise their preferences in the marketplace. There is plenty of ice cream sold that is absolutely delicious. It just costs a lot to make, just as it costs you a lot to make it at home if you choose to be a rebel against the quality of the ice cream that is in the supermarket."

"Restrictive law does two things," says Hutt. "It fences out some people, but it also fences in the people it is designed to protect." The milk producers have to fight the FDA on ice cream in order to protect their own basic protection, the dairy price support program. As major victims of technological progress—the number of dairy herds has shrunk from 4 million to less than 200,000 in the last 20 years—they are perhaps owed a measure of protection to ease the impact. But protection as a pain-killer is different from protection as a habit.

The FDA's proposed standards come into effect on 7 September, unless the milk producers are granted a delay or unless they end-run the agency in Congress. Whether or not the standards change, American ice cream will continue to be made from dairy products of one sort or another, unlike in England, for example, where 80 percent of ice cream is made of fish oil, pig fat, or soybean oil. The FDA could hardly be having more trouble from the milk producers' lobby than if it had suggested just such a recipe.

—NICHOLAS WADE

Moratorium for the Bowhead: Eskimo Whaling on Ice?

The plight of whales under the onslaught of commercial whaling fleets makes many Americans feel passionately protective. And the right of Eskimos to pursue their arduous way of life and preserve their culture commands considerable sympathy and support.

Now it seems that the federal government will be forced to choose between Eskimo rights and the possible survival of one species of whale—the bowhead. And, to complicate matters, the decision could have a serious effect on U.S. credibility as a strong partisan of protection of all whales.

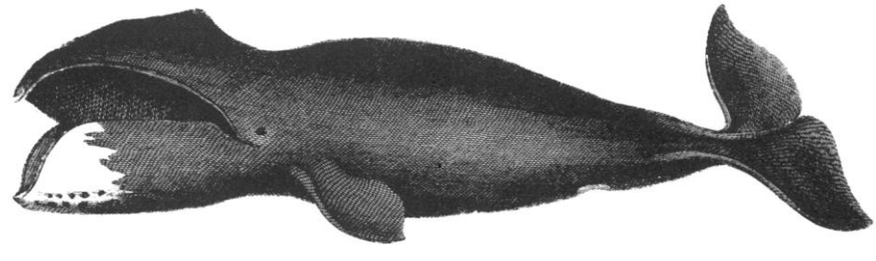
At issue is the special exemption under which the coastal Eskimos of northwest Alaska have been able to hunt the bowhead whale. The bowhead, *Balaena mysticetus*, is the biggest—up to 60 feet long—of the arctic whales and plays a central role in Eskimo life both as a source of food and as the keystone of the native culture.

The bowhead has been completely protected from commercial whaling since the early 1930's and is on the U.S. endangered species list. However, a special exemption for aboriginal whaling has been allowed under the rules of the International Whaling Commission, which is made up of the major whaling nations.

At its annual meeting in Canberra, Australia, in June, however, the IWC adopted a moratorium on the killing of bowhead whales in the North Pacific by native Alaskans and other aboriginal people. Siberian Eskimos have also hunted the bowhead, but killed them in relatively small numbers.

The IWC action was prompted by reports of a rapidly increasing harvest of bowheads by Eskimo crews in the past few years. The commission's scientific committee, which urged the moratorium, was especially concerned by the rapid rise in the number of whales reported struck but not killed by the explosive "bombs" used by the Eskimo whaling crews.

The Eskimos have reacted angrily to the threat of the moratorium. They charge that federal officials failed to warn them that the IWC was seriously concerned about the bowhead. They resent what they see as arbitrary action by the international body when commercial whaling is not involved. They are suspicious of conservationists, and feel that some of them conspired to have the exemption removed as part of a campaign to prohibit all whaling. The Eskimos also vigorously dispute the statistics on which the action was based. They insist that the increase in the number of whales apparently wounded but lost reflects new reporting methods which actually exaggerate the impact of the harvest. And not



Available photographs of the live bowhead don't do the whale justice. This lithograph from a remarkable 1820 book on the arctic regions by whaling captain William Scoresby, Jr., is regarded as the most satisfactory representation of the whale extant. Scoresby's writing on the bowhead is mentioned in the chapter on cetology in Herman Melville's *Moby Dick*. The lithograph is reproduced from an article on the bowhead by Scott McVay in the January-February 1973 *American Scientist*.

a few Eskimo whalers say that the bowhead population has actually been increasing in recent years.

No firm figures on the total population are, in fact, available, but most estimates put the total in the range of 1000 to 2000 animals. What made the IWC scientists fear that recent Eskimo whaling activities may be inhibiting recovery or actually reducing the bowhead stocks was mainly the number of whales reported struck but not landed.

Federal officials say that into the 1960's, the average annual kill rate was 10 or 15. For the last 5 years, the total numbers of whales reported killed and landed and, especially, of animals struck and later found dead (called "stinkers") or struck and lost, has climbed sharply. In 1976, 48 whales were landed, 8 were killed and lost, and 35 were reported struck and lost. This spring 26 were landed, 2 were killed and lost, and 77 were struck and lost.

The bowhead is hunted in the spring and fall as the whales migrate between the Beaufort Sea, off Alaska's northern coast, and the Northern Bering Sea where they winter. The whales move north as the ice pack breaks up in the spring and return in early fall as the ice reforms. The moratorium would go into effect in time to prohibit the spring hunt next year.

The momentum of events has made compromise difficult. The government must decide between now and 24 October whether or not to file an objection to the moratorium. If no objection is filed the ban on hunting will go into effect. Under the rules of the IWC, which has no enforcement powers, filing of an objection would preserve the status quo for the Eskimos, but could cause real difficulties for the United States in the commission.

The United States has taken the lead in pressing for protection for whales. In 1972, U.S. representatives put forward a proposal for a 10-year moratorium on all whaling, which the government continues to espouse. Since the U.N. Stockholm meeting on the environment in that year, which marked something of a turning point for the IWC, quotas on the take of whales have been cut from a total of 45,000 to 18,000.

Briefing

Congress May Gut Federal Floodplains Policy

In the wake of the recent (and third since 1889) devastating flood in Johnstown, Pennsylvania, it is reasonable to ask how another disaster could be prevented. However, according to the American Rivers Conservation Council, "Even as the rains were falling, House and Senate conferees were meeting in Washington on legislation which would seriously emasculate the one federal program which could effectively reduce new construction within flood hazard areas and consequently future loss of life and property from floods."

Among the handful of federal programs designed to promote environmentally sound land-use policies, the Federal Flood Insurance Program clearly has the strongest teeth. Though the program has complex features, one of its underlying purposes is quite simple: to discourage people from constructing new buildings in flood-prone areas. Its powers of enforcement are straightforward. Federally regulated banks—which means most banks—are prohibited from giving mortgages to individuals or developers for construction in flood-hazard areas of communities that do not join the insurance program. Conversely, communities that do join and adopt floodplain management ordinances are rewarded by the availability of federally subsidized flood insurance for existing buildings and new construction outside the clearly hazardous areas. Not surprisingly, approximately 97 percent of communities with flood-prone lands have chosen to participate.

An amendment to the proposed Housing and Community Development Act of 1977, now before Congress, would, in the opinion of environmentalists, take the guts out of the flood insurance program by stripping the mortgage prohibition. Introduced by Thomas Eagleton (D–Mo.) in the Senate and Richard H. Ichord (D–Mo.) and Gene Taylor (D–Mo.) in the House, the amendment would replace the mortgage sanction with a provision denying disaster relief to communities that are unwilling to join the program.

On the face of it, the Missouri sanction looks more stringent that the existing one on mortgages but, in fact, it opens the floodgates to abuse. Whereas it is reasonable for the government to say, "No, we won't loan you money to build a house that is likely to be flooded," it is not politically realistic to think that Washington would turn its unsympathetic back on a community after disaster struck, even if it could justly say, "We warned you."

Woods Hole Mulls *Titanic* Expedition

Ghoulish Fishing In The North Atlantic . . . *Ear hears that the Woods Hole Oceanographic Lab, those folks in Massachusetts who found the Civil War ship Monitor are getting set to drag for, and dig up, the Titanic.* From Ear, the gossip column of the Washington *Star*, 8 August.

"Is it true?" *Science* asked geologist Robert Ballard, who heads the Woods Hole diving expeditions. In part, yes. Those "folks" at Woods Hole have no intention of trying to raise the *Titanic*, but they might be persuaded to try to find her and take her picture.

Within the past couple of months, Woods Hole scientists have been approached by two independent outfits whose mission is to find and film the great *Titanic*. One is a California organization called "Big Events." The other, based in landlocked Hinckley, Illinois, calls itself Phobos, after one of the moons of Mars. With visions of the box office success of "Jaws" firmly in mind, Big Events wants Woods Hole to help it film a "docudrama". Phobos apparently is more interested in actually raising the *Titanic*.

Ballard reports that "Absolutely no decision has been made to go ahead with this expedition," but does not dismiss the possibility that something may come of it. "There is," he says, "no major scientific justification for trying to find the *Titanic*, but we are interested in some of the advanced technology problems it presents."

Were Woods Hole scientists to undertake this mission, which Ballard says has not been attempted by anyone else, they would do it with two goals in mind. One is to bring together existing technology for locating objects in the deep ocean—sophisticated tracking systems, magnetometers, sonar scanners. "Eighty percent of the technology for finding the *Ti-*

The fear is that if the United States files an objection to the moratorium on the bowhead, major whaling nations, notably Japan and the Soviet Union, which have reduced their whaling operations sharply, will be likelier to file objections and, perhaps, reverse the progress made in protecting the whale. Despite the fact that the exemption is for aboriginal whaling and not commercial whaling, William Aron, director of the office of ecology and environmental conservation of the National Oceanic and Atmospheric Administration (NOAA) and U.S. representative on the IWC, says "There is good reason to believe that U.S. credibility would be diminished" on the IWC.

Aron and other federal officials emphasize that no decision has been made on the matter of the objection. A draft environmental impact statement assessing the consequences both of filing and not filing the objection has been prepared under the auspices of NOAA's National Marine Fisheries Service and sent to the Council on Environmental Quality. Hearings in Washington and in Alaska are to follow in the first half of September. Then, having heard from the interested parties, the federal agencies concerned will hammer out a recommendation. If an objection is filed, it would be made by the Secretary of State in consultation with the Secretary of Commerce.

The impact statement on the moratorium, released as this was being written, appears to provide a fairly thorough and informed appraisal of the relation of the bowhead to Eskimo life. The Eskimos and their partisans regard the hearings as providing an opportunity to present their case which they so far have been denied.

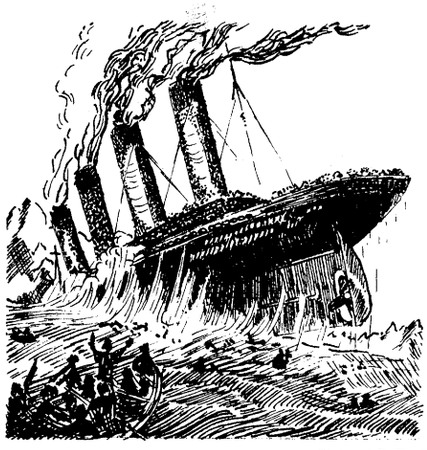
The proposed moratorium is seen by the Eskimos as a direct attack on the Eskimo way of life. Eskimos have hunted the bowhead for 3000 years or more. They resent being told they cannot go on hunting it because the whale is an endangered species, when it was the Yankee whalers of the last century and early part of this one who pursued the bowhead almost to extinction.

For the Eskimo, the bowhead hunt provides a test of manhood, and great prestige attaches to participating in a kill, particularly in captaining a successful crew. Whaling exerts a strong influence

Briefing

tanic exists somewhere," Ballard notes. "We'd be interested in integrating it."

Their other ambition is to develop new,



Richard Pellicci

high-quality technology for deep-sea photography. The *Titanic*, which went down on the night of 14 April 1912, lies somewhere off the Grand Banks of Newfoundland in an estimated 12,000 feet of water. A successful search and photographic mission would require the cameras, film, lighting equipment and other gear necessary for first-rate television, motion picture, and still shots of the ship, all in glowing Technicolor if moviegoers' tastes are to be satisfied. Getting lighting good enough for color motion picture photography at that depth is a special problem.

"This technology does not now exist," says Ballard, who is interested not in making box office spectaculars but in photography for deep-sea mapping projects. "However," he adds, "here at the lab we know enough about underwater photography to develop what we need," The producer for Big Events told *Science* that his company is ready to pay woods Hole $1.5 million or more for technological development. The director of Phobos refused any comment whatever.

An expedition to the *Titanic* would probably be an unmanned venture, using the (Alcoa) *Seaprobe* rather than the *Alvin*, which has taken researchers on diving missions to depths far greater than 12,000 feet. "It is just not worth risking someone's life by sending *Alvin* down where it could be trapped in the cables or remains of the ship," Ballard says.

An expedition to find the *Titanic*, including all the preliminary technological development, is likely to cost at least $2 million to $3 million and would not be launched until 1979 at the earliest. Woods Hole scientists figure that if things work out, what they stand to get out of this is a couple of million dollars worth of valuable technology. So far, no one has mentioned a percentage of the box-office gross.

Widespread PBB Contamination Can Affect Immune System

PBBs, those toxic flame-retardant chemicals that first claimed public attention about three years ago when they inadvertently were mixed with animal feed in Michigan, turn out not to be a problem to Michigan alone. In fact, PBBs (polybrominated biphenyls) may prove to be an environmental contaminant nationwide, posing yet unconfirmed but potentially serious threats to human health. At recent hearings of the House subcommittee on oversight and investigations, Congress heard evidence that PBB exposure may damage the immune system.

In addition, subcommittee members learned that PBBs have been found in catfish in the Ohio river and in plants, fish, soil, water, and human hair in the New York–New Jersey manufacturing area. In addition, Environmental Protection Agency officials say they are "urgently" studying fish, human hair, and breast milk for evidence of PBB contamination at plants where PBBs are used in large amounts in Ottawa and Cairo, Illinois; Oxnard, California; Iona, Mississippi; Cincinnati, Ohio; Milan, Tennessee, and Corry, Pennsylvania.

Revealing preliminary findings on the effects of PBBs on the immune system, George Bekesi of Mount Sinai medical school in New York, said he had examined blood samples from 45 Michigan farm residents. Eighteen of them showed immunologic deficits, similar to those often found in cancer patients or individuals taking immunosuppressive drugs.

House subcommittee staffers say that Congress plans to continue its investigation of PBBs as a public health issue, especially because federal agencies, including the Department of Health, Education, and Welfare, are taking what has been described as a "cavalier" attitude to what is being recognized as an increasingly serious problem.

Barbara J. Culliton

on the social and political structure of the coastal villages.

Whaling methods still follow traditional ones. The Eskimo crews operate from whaling camps on the ice and a majority still hunt from *umiaks*, the traditional skin boats. Equipment does include harpoons equipped with explosive charges and so-called "bombs" fired from shoulder guns, but this gear is patterned on 19th-century models. Black powder is used as an explosive, and the charges require fuses to fire and are, therefore, regarded as rudimentary in comparison to the technology now employed by commercial whalers.

The increased whaling activity by Eskimos is attributed in general to population growth and increasing affluence. Settlement of native land claims, the development of North Slope oil and gas resources, and the building of the trans-Alaska pipeline have provided new sources of funds to Eskimo communities. This has made possible the purchase of new boats and whaling equipment and the formation of many new crews. Some observers ascribe the higher numbers of whales struck and lost to the presence of inexperienced crews and captains in the hunt.

Culturally, the bowhead is the chief source of legend and subject of ceremony and celebration for the coastal Eskimos. But the bowhead also provides the staple diet for the significant number of Eskimos still leading a subsistence life. As food, *muktuk*, the whale's black skin with a layer of fat beneath, continues to be regarded as a great delicacy, and the *muktuk* and whale meat distributed by the crews is frozen or dried and used through much of the ensuing year. As the impact statement points out, the meat, *muktuk*, and oil of the bowhead are nutritionally very important in the diet since they provide fat, protein, and vitamins which are lacking in other game taken by the Eskimos.

Eskimo life has obviously changed from the subsistence conditions of even a generation ago. Dog teams, for example, have been almost entirely displaced by snowmobiles, and this has drastically reduced the demand for whale blubber which used to be fed to the dogs. And the eating habits of the Eskimos themselves have changed with the availability of processed food in the larger villages.

But the Eskimos feel that what is not understood is that Eskimos are seeking to adapt to outside pressures while preserving what is essential in their traditional way of life. The Eskimos see their complete relationship with the bowhead as the main prop of their traditional life. As one observer put it, "for the Eskimo, culturally it is death not to hunt the whale."

At the moment, the Eskimos, who are well organized and have gained considerable experience in working for their political, financial, and ethnic objectives, seem disposed to wait out the government's decision on the issue of the objection. If no objection is filed, the Eskimos would go to court, feeling as they do that they have grounds in international and United States law to claim that the IWC convention does not apply to the Eskimos.

Federal officials, as the impact statement makes clear, are not all insensitive to the Eskimo case. They point out that even if the moratorium goes into effect, the exemption could be restored at the IWC meeting next June. At this point, Eskimos are angry and suspicious and doubt that possibility. Their suspicion extends to conservation groups which, until recently, had good relations with the Eskimos. There are unquestionably some conservationists who think that the Eskimo culture has been fatally compromised and feel that the Eskimo claim to a whaling exemption might well be subordinated to the greater good of extending the prohibition on the killing of whales.

Most conservation groups, however, seem to feel that they have been trapped in the middle on this issue. They suggest that the exercise of good sense and good faith could lead to a satisfactory compromise because the long-term interests of the Eskimos and whales are really identical. Friends of the Earth appears to be taking the lead in a coalition of national conservation groups seeking to effect a cooling of tempers and a compromise.

Somewhat belatedly, a serious search is on for an alternative. Such a compromise, people on all sides of the issue seem to agree, would have to include some effective limitation on the hunt. And such regulations could only be workable if it involved self-regulation by the Eskimos through their traditional village organization. Rules imposed from the outside are virtually impossible to enforce under the conditions prevailing where the hunt is conducted.

It will take effort and skill to satisfy both the Eskimos and the IWC. And in the case of the Eskimos, they will probably have to be persuaded that the bowhead is really in danger and that they themselves are not to be used as pawns. Meanwhile, to one concerned but apparently unbiased observer, the situation looks "out of control."—JOHN WALSH

RECENT DEATHS

Edgar C. Adrian, 87; former professor of physiology and chancellor, Cambridge University; 4 August.

Bennett F. Avery, 75; former dean, Boston University School of Medicine; 2 July.

Kenneth K. Barnes, 55; chairman of soils, water, and engineering, University of Arizona; 13 July.

Langston F. Bate, 75; former chairman of chemistry, Miner Teachers College; 13 July.

Jesse W. Beams, 78; retired chairman of physics, University of Virginia; 23 July.

Grete L. Bibring, 78; professor emeritus of clinical psychiatry, Harvard University; 11 August.

Paul Blachly, 47; professor of psychiatry, University of Oregon Health Sciences Center School of Medicine; 3 July.

Arthur A. Coniff, 76; retired professor of biology, Georgetown University; 3 August.

Margaret D. Craighill, 78; former dean, Women's Medical College; 20 July.

Joseph H. Dexter, 84; former professor of physics, City College, City University of New York; 27 July.

Albert H. Douglas, 71; former professor of clinical medicine, Medical School, State University of New York, Stony Brook; 3 August.

Loren Eiseley, 69; former professor of anthropology and history of science, University of Pennsylvania; 9 July.

David Krech, 68; professor emeritus of psychology, University of California, Berkeley; 14 July.

William M. Lepley, 71; professor emeritus of psychology, Pennsylvania State University; 25 July.

Henry L. Lucas, Jr., 61; professor of statistics and biomathematics, North Carolina State University; 8 June.

Lawrence M. Marshall, 67; former chairman of biochemistry, Howard University; 30 July.

H. M. Marvin, 84; professor emeritus of clinical medicine, Yale University; 6 August.

Hans F. Smetana, 83; retired chief of pathology, Armed Forces Institute of Pathology; 5 August.

Kenneth G. Weckel, 71; former professor of agriculture and life sciences, University of Wisconsin; 9 July.

Erratum: Frederick III, the grandfather of economist Oskar Morgenstern, was misidentified in the 12 August issue (p. 649). Frederick was King of Prussia and Emperor of Germany; he ruled briefly in 1888.—D.S.