ogens in industrial processes and consumer products is likely to be a recurrent problem until the thousands of industrial chemicals now in use can be tested for safety and until some systematic way is found to screen hundreds of new chemicals synthesized each year.

According to the Chemical Abstracts Service, about 1.8 million different chemicals have been formulated. The list grows by about 250,000 new compounds annually, and 300 to 500 of these go into major commercial use each year. A great many of these are new synthetic organic chemicals, more than 9000 of which are currently produced in amounts greater than half

Briefing

Justice Joins in Appeal on Taconite Pollution

The U.S. Department of Justice, after deliberating several weeks, has now joined Minnesota, Wisconsin, and Michigan in asking the Supreme Court to allow District Judge Miles W. Lord to close the taconite plant on Lake Superior that is contaminating public water supplies with possibly carcinogenic, asbestos-like fibers (*Science*, 4 October).

After a 139-day trial, Judge Lord last April ordered the Reserve Mining Company to close the taconite plant, holding that the 200,000 people who live along the western arm of Lake Superior were threatened by the plant's daily discharge of 67,000 tons of tailings into the lake and 100 tons of particulates into the air. The plant had been shut down for only 2 days, however, when a three-judge panel of the U.S. Court of Appeals for the Eighth Circuit stayed the district court order. The panel had concluded that Judge Lord's finding of a compelling public health hazard probably was not supported by the evidence. This gave rise to speculation that the appeals court would not accept any form of proof less definitive than a "body count," and that a dangerous precedent for future environmental health cases might have been set.

The three states and the environmental groups who were suing Reserve Mining then made their first appeal to the Supreme Court, only to have it rejected by an eight to one vote (Justice Douglas dissenting). The Justice Department did not take part in that appeal. The case continued to drag along, leading to the new round of appeals by the states, with Justice now joining in.

In mid-July, Russell W. Peterson, chairman of the Council on Environmental Quality, had urged Justice to "aggressively pursue all means to eliminate this unwarranted public health menace." Then, in early September, Assistant Attorney General Wallace Johnson, in charge of Justice's land and natural resources division, recommended to Solicitor General Robert H. Bork that the department join in the new appeal. Bork, known for his conservatism and his dismissal of Eliot Richardson and William Ruckelshaus in the "Saturday night massacre," took the matter under advisement.

Prior to his decision, Bork came under growing pressure. Jutice Harry Blackmun, a Minnesotan formerly on the 8th circuit court, asked the department to take a position on the appeal. Also, members of the Michigan congressional delegation were calling on Justice to lend its weight to the states' appeal for Supreme Court review.—L.J.C.

Air Force Tries Again On Agent Orange

The U.S. Air Force is trying to revive a moribund plan to market its stocks of the herbicide known as Agent Orange for use by farmers in the United States and possibly abroad. Past Air Force attempts to give away or sell the 2.3 million gallons of the herbicide, which was withdrawn from use in South Vietnam in 1970, have run into opposition because one compound in the herbicide, 2,4,5-T, contains a teratogenic impurity known as dioxin which is one of the most harmful chemicals known (*Science*, 6 April 1973).

The Air Force has been meeting with the Registration Division of the Office of Pesticide Programs of the Environmental Protection Agency (EPA) to find out how it can register its stockpile, which is stored on Johnston Island in the mid-Pacific, and at Gulfport, Mississippi. Registration by the EPA is required by law before herbicides can be marketed. In a letter sent to the EPA before the talks, Assistant Secretary of the Air Force Frank A. Shrontz announced the Air Force's intention to have the stocks registered by the EPA for domestic use, and said that their market value could be as much as $80 million, although previous estimates put their worth at $15 million.

When the Air Force first tried to register the stockpile last year, the EPA turned back the application because cancellation proceedings were under way for 2,4,5-T. However, in a move which brought objections from environmentalists, the EPA this summer ended those proceedings and thus opened the way for anyone who owns or makes products containing 2,4,5-T to register and market them. The EPA permits the use of these products on rangelands, forests, rights-of-way, and rice crops, but all other uses are prohibited.

Part of the impetus for the original Air Force attempt to get the herbicide registered was that some business entrepreneurs had offered to market the material in Latin America. The plan was killed when the EPA decided not to permit the material to be registered. However, if the EPA allows registration now, the Air Force will be able to proceed with foreign as well as domestic sales.

But the problem of what to do with the huge stockpile of what was once considered a military weapon will remain knotty at best, and at worst, insoluble. For one thing, to register the stockpile, EPA will have to come up with a scientifically defensible standard for dioxin levels in the herbicide—which will not be easy in light of recent findings that dioxin is even more teratogenic than previously believed.—D.S.

Shuttle Pollution Study Sought

Senator William Proxmire (D–Wis.) has asked the National Academy of Sciences—National Academy of Engineering (NAS-NAE) to do a further study of the environmental impact of the space shuttle, with emphasis on the effects of its solid rocket propellants on

a ton; by 1968 production of synthetic organic chemicals (including vinyl chloride) had reached 120 billion pounds a year, an increase of more than 160 percent in a single decade.

Umberto Saffiotti, of the National Cancer Institute (NCI), estimates that of all the nearly 2 million chemicals known, no more than 6000 have been tested for carcinogenicity. Of this number, he believes, only half have been adequately tested. Altogether, about 1000 have shown some sign of being carcinogenic. And out of the thousand no more than a few hundred have been "clearly established" as carcinogens.

The NCI, working mainly through outside contracts, manages to screen about 200 chemicals a year for carcinogenicity. But as yet there is no systematic way to screen new chemicals before they become part of industrial processes and escape to the environment; indeed, federal regulators have no way of knowing which of the quarter million new substances synthesized each year will go into production.

It happens that the House and Senate have passed legislation that would require the chemical industry to test new chemicals and notify the EPA before producing them in commercial amounts. The Toxic Substances Control Act of 1973 would empower the EPA to set up a system of pre-market screening of new chemicals before they became pollutants, and the Act would give the EPA administrator new powers to restrict or prohibit production of dangerous new substances if laws already on the books did not suffice.

This legislation, however, has been stalled in a House-Senate conference committee for more than a year, partly because committee members have been preoccupied with energy legislation and mostly because they have been unable to resolve wide differences between the House and Senate versions.

The major disagreement involves the number of chemicals to be screened prior to production. Both House and Senate versions require the EPA to list classes of chemicals considered to be dangerous; new members of these classes could not be produced until a company submits data to the EPA (90 days before production begins) demonstrating their safety. The difference concerns chemicals that are *not* specifically listed by the EPA as dangerous. The Senate bill would require companies to submit a notice of impending production—though not test data—for all new chemicals, thus giving EPA a chance to determine whether testing is needed. The House version requires no such notification.

In addition, the two versions differ sharply on the matter of jurisdiction. The Senate bill would let the EPA use the new Act's powers at its discretion; the House bill downgrades the legislation to a last resort supplement to a dozen other laws already on the books, from the Atomic Energy Act to the Egg Products Inspection Act.

Not surprisingly the chemical industry vigorously opposed passage of any new toxic substances controls (although the American Chemical Society, most of whose members are in industry, supported it). Environmental and consumer groups have lined up behind the legislation, and so has an impressive list of health researchers. Among them is Irving J. Selikoff of New York's Mount Sinai School of Medicine, who told a Senate subcommittee in August that the vinyl chloride disaster might have been prevented had such legislation been in effect 20 years ago.

"More than a Prayer"

Amid renewed interest in environmental carcinogens, the staffs of the House and Senate conferees have started negotiating again. Adjournment is fast approaching, but one Senate staffer predicts that the Toxic Substances Control Act "might have more than a prayer" of passage in this session.

Even with pre-market testing for new chemicals, however, a good many man-made carcinogens are likely to slip through the net. Some, which probably act directly on the DNA in human cells to produce cancer, are relatively easy to detect. But others become carcinogens only after they are metabolized in animals (and metabolism varies greatly not only from mice to men but among individual humans as well). Still other chemicals are not carcinogens themselves but enhance the potency of substances that are.

And even with mountains of new information from the chemical industry there is no guarantee that government will act to regulate the spread of a carcinogen before it is proved harmful to humans beyond all doubt. Vinyl chloride, again, is a case in point. The first report that it had caused cancer in laboratory animals (liver tumors in mice) appeared in the May 1971 issue of *Cancer Research*, nearly 2½ years before the first human malignancies were found and reported.

Saffiotti notes that animal experiments in recent years have produced similarly worrisome evidence about dozens of other chemicals. Says Saffiotti: "The flags are up and waving for anyone who walks by."

—ROBERT GILLETTE

Briefing

the upper atmosphere. The senator is particularly concerned about the destructive effects of chlorine on ozone, the gas that protects the earth from the sun's ultraviolet radiation.

Proxmire, chairman of the appropriations subcommittee that deals with the National Aeronautics and Space Administration, has never felt much affinity for the space shuttle, which he considers a waste of money. But in this case few would disagree with him that not enough is known about the environmental effects of the propellants. The NAS study would complement work being done by NASA, which has sunk $2 million in the past year into studying shuttle effects on the environment. The agency is spending a total of $5 million a year on stratospheric pollution research.

The study of stratospheric pollution is a very young undertaking. Indeed, 2 years ago when NASA filed its environmental impact statement on the shuttle, the effects of chlorine on ozone were not deemed important, says a NASA spokesman. Now scientists are finding that the composition of the stratosphere is less homogeneous and more complex and variable than had been believed a few years ago. All that really is known is that when exhaust chemicals are unleashed into the stratosphere they are trapped there indefinitely.

The climatic impact assessment program committee of the NAS-NAE is currently completing a study for the Department of Transportation, which is an assessment of the state of knowledge on the potential effects of supersonic transports, high-altitude aircraft, and high-flying subsonic craft on the stratosphere. This committee presumably could move on to questions of shuttle pollution after it hands in its report in December. A Proxmire staffer says the Academy officials have informally indicated the study will be performed. NAS President Philip Handler has said that the request is under consideration.—C.H.