tion, but 1974 is still considered a possible date for this counterpart to the U.S. Skylab, scheduled to fly next year. Soviet officials are also said to be showing increasingly keen interest in building a reusable space shuttle.

Further studies of the moon are foreseen as continuing along the lines of the current Luna series, featuring lunar orbiters, rovers, and samples returners. An advanced booster might permit combining the latter two missions into one soft-landing spacecraft.

As for planetary probes, the congressional analysts predict a continuation of a large Soviet commitment to this program, partly for the sake of science and partly to convey the impression that the solar system is a "Soviet pond." Little Russian enthusiasm has been detected for sending a leapfrogging spacecraft on a Grand Tour of the outer planets, but a flyby mission to Jupiter, comparable to Pioneer F, set for launch this month, is probable. So is a race with the U.S. Viking spacecraft, which is to land on Mars in 1976 to televise pictures of the landscape and look for signs of life. Viking, the study predicts, "may be beaten in time, if not in overall quality and amount of data returned."

Whether or not this makes any difference is another question. But it seems safe to say that the space race is alive and moderately well at Tyuratam, Kapustin Yar, and Plesetsk, if not at Cape Kennedy. Most assuredly, Sheldon writes, "the Soviet program is not a sham. It may be exploited for political purposes, but it is real and it is pursued in earnest."—ROBERT GILLETTE

Human Environment Conference: Search for a Modus Vivendi

London. As the U.N. Conference on the Human Environment draws closer, the problems of organizing a massive international meeting on such a politically touchy subject become increasingly apparent. As well as a diplomatic dispute over whether East Germany should have full representation at the Stockholm conference, there are also sharp divisions over the seriousness of environmental problems —and hence over the importance that should be attached to the conference.

The first problem continues to be the most important. Although East Germany appears likely soon to become a full member of the United Nations, it remains until then in a kind of international limbo. The U.N. General Assembly last October turned down an attempt to extend invitations to the conference to all de facto governments, favoring instead what is known as the Vienna formula. This admits countries that are full members of the United Nations or that belong to one or more of the associated international agencies. By this reckoning, East Germany is out and West Germany is in, by virtue of its belonging to several of the international agencies.

Followers of the late John Foster Dulles no doubt find the dispute satisfying, but it has brought environmentalists close to despair. East Germany is a major industrial power and a major polluter; by all logic it should have a place at Stockholm. Worse, the dispute also includes the Soviet Union, which has already refused to take part in the preparation of the Declaration on the Human Environment, an environmental bill of rights that is supposed to climax the Stockholm meeting.

Official British spokesmen are at pains to appear reasonable. "This is not an attempt to exclude East Germany," one of them told *Science*. "The British government, with France, West Germany, and the U.S., has made it clear that some formula should be found to allow East Germany to participate fully in the conference, though not on the basis of full parity."

One such formula, the Foreign Office spokesman suggested, would be for East Germany to be invited to send a team of scientific experts to the conference. The conference organizers feel, however, that it would make little sense to send scientists to what is billed as a political conference. Nor, for the same reason, is it likely that the conference could be downgraded into a symposium—a form of meeting that escapes the full rigor of diplomatic protocol. This has already happened once, when the East Germans turned up in Prague at a preparatory meeting organized by the Economic Commission for Europe and were allowed to stay only on condition that the "conference" became a "symposium." By such niceties cold warriors are kept happy.

For the conference proper, it is very doubtful that the Swedish government would be willing to accept such a face-saver. "The Swedes won't wear it" was the comment of one U.N. man. As instigators and hosts to the conference, the Swedes are in a fairly strong position to impose their own view. "They would be frightfully disappointed if the diplomatic problems did disrupt the conference" is the view of a source at the Swedish Embassy in London. "I'm sure they are trying very hard to go ahead with a full-blooded conference."

A more satisfactory solution to the impasse would be to elect East Germany to one of the international agencies before the Stockholm conference begins in June. The World Health Organization has a meeting in May, for example, but has not put the question on its agenda. Another possibility would be for East Germany to be quickly elected a member of the International Atomic Energy Agency.

The amount of pressure the Soviet Union is prepared to exert on behalf of the East Germans is still not clear. Although the Russians have refused to help draft the conference declaration, they have not yet refused to turn up at the last of the preparatory meetings, to be held in New York from 6 to 17 March. So it is not yet clear whether they will definitely withdraw from the conference if East Germany is not seated on a parity with West Germany. The Foreign Office view seems to be that the Russians will back down, par-

ticularly since the Chinese have said they will come.

In any event, U.N. sources believe that the conference will go ahead, with or without East European representation. The argument that it would be politically impossible for Sweden to hold the conference without its Eastern neighbors is "overdone," according to these sources. "The Swedish government has agreed that the conference will go on, come hell or high water," one U.N. man put it.

Even if the meeting does go ahead, nobody expects Stockholm to be all sweetness and light. Already, some environmentalists feel, the conference has been severely compromised by its refusal to consider the population explosion. This was part of the price paid for persuading underdeveloped countries to come to a conference they have no heart for. Hardly a single underdeveloped country takes pollution seriously: at the recent Group of 77 Meeting in Lima, the subject was mentioned only once—by Brazilian Foreign Minister Mario Gibson Barboza.

His view may be taken as fairly typical. Conceding that underdevelopment does produce its own environmental problems—Mexico City is said to be the seventh most polluted city in the world—Gibson argued that the pollution of underdevelopment is a localized phenomenon resulting simply from a lack of resources, while "the other type of pollution, infinitely more prejudicial in its global effects, is a by-product of the intensity of industrial activity in the highly developed countries."

Whatever the truth of Gibson's argument, it is widely believed, even though there were countries at the Lima conference that went even further, denying the existence of any pollution at all in the underdeveloped world. It is safe to assume that at Stockholm the underdeveloped countries will oppose any ban on the use of DDT or the imposition of any global code of environmental practice, unless it is so loosely phrased as to be worthless. At an earlier pollution meeting at Jyväskylä in Finland, delegates from developing countries warned that they would view the banning of DDT as genocide. And global environmental standards, they said, were merely a means of perpetuating underdevelopment by inhibiting industrialization and economic growth in the Third World.

Conflicts of this sort are fairly pre-

Vietnam Land Devastation Detailed

Two scientists recently returned from Vietnam treated members of Congress last month to a dismal account of the ravages the United States has perpetrated on the Vietnamese environment through bulldozing and bombing—damage which, they say, far exceeds what was done by the herbicide spraying program which was halted last May. Senator Gaylord Nelson (D–Wis.) promptly introduced a bill calling for the National Academy of Sciences (NAS) to undertake a comprehensive study of the ecological havoc the United States has wrought in South Vietnam, Laos, and Cambodia, and to recommend ways this country can rectify some of the damage.

The scientists, Arthur H. Westing of Windham College in Vermont and E. W. Pfeiffer of the University of Montana, say the bulldozing and aerial bombing used for tree-clearing and annihilation of enemy sanctuaries has caused more damage than any U.S. military action. Yet, says Westing, this activity "has somehow escaped the attention of the scientific community," presumably because it can be confined under the heading of "conventional warfare" and does not carry the cachet of danger attached to chemical carryings-on.

The bulldozing exercise, carried out by private American companies with huge "Rome Plows," was stepped up with a vengeance after the herbicides were phased out. Bulldozers strip the land down to the naked soil at the rate of 1000 acres a day, utterly destroying the wildlife habitat and leaving the land open to erosion and leaching of its mineral nutrients. These plows have already destroyed over 800,000 acres [the entire herbicide program cleaned out 5.5 million acres (*Science*, 8 January 1971)].

Even this destruction is modest compared with the bombing, says Westing. "Carpet" bombing by B-52's has left some 23 million moonlike craters averaging 25 feet in depth and 40 feet in diameter. Ten percent of South Vietnam's rice lands have been destroyed by this procedure.

"The basic Pfeiffer-Westing pitch," says Westing, "is that far more important than the ecological impact of the herbicides is the total impact of the war." The proposed NAS study would thus cover areas not touched on by the NAS Herbicide Assessment Commission, which recently submitted its preliminary report to the Department of Defense.

Nelson introduced his bill with a passionate speech in which he said: "The cold, hard, and cruel irony of it all is that South Vietnam would have been better off losing to Hanoi than winning with us. . . . I am unable adequately to describe the horror of what we have done there. There is nothing in the history of warfare to compare with it. A 'scorched earth' policy has been a tactic of warfare throughout history, but never before has a land been so massively altered and mutilated that vast areas can never be used again or even inhabited by man or animal."

The proposed legislation—a companion House bill was introduced by Representative Gilbert Gude (R–Md.)—instructs the NAS to do a preliminary 6-month study under a maximum authorization of $10 million. The onus of DOD sponsorship is removed by the stipulation that the money be directly appropriated to the President. (The DOD-funded NAS herbicide study has been hampered by the fact that anthropologists, fearing that any association with DOD would compromise them in the eyes of the people they're studying, have refused to take part in it.)

The bill is now in the Senate Foreign Relations Committee. A member of Nelson's staff says the bill is likely to get considerable attention as one of a number of upcoming actions dealing with environmental warfare. Among these are the following: an Executive understanding which would include herbicides under the noxious substances banned by the Geneva Protocols, a review of the NAS herbicide study, and ratification of a proposed international convention on biological warfare.

—CONSTANCE HOLDEN

Symbolic Changes at NSF

The National Science Foundation, in keeping with the trendiness of the times, has chosen to emphasize its concern for humanity and cooperation by adopting a new seal that depicts little hand-holding people arrayed around a circle containing a map of the world.

The chauvinist, imperialistic-looking eagle perched atop a clutter of scientific paraphernalia was too "busy," an NSF spokesman explained, and didn't print well. In its place is a simpler graphic that bespeaks the internationality of science. On letterheads, the world map is replaced by the initials of the foundation.

Old seal

New logo

The NSF has been pulling up its socks throughout the image department. Press releases are now topped by a blaring blue strip of newsprint rather than the stodgy old black-and-white seal.—C. H.

dictable. Less easy to anticipate are the wide differences of emphasis even within the developed world. The many environmental meetings that have preceded Stockholm have shown that Americans tend to take a much gloomier view of the situation than do Europeans. Marshall Goldman of Wellesley College, who reported the Jyväskylä meeting for *The Nation* (18 October 1971, p. 358), noted a wide gap between U.S. and European attitudes. British environmentalists habitually take an optimistic (they would say level-headed) view of the future of mankind. Even a man like Kenneth Mellanby, author of *Pesticides and Pollution* and something of a guru among the British conservation movement, can find good words to say about DDT and does not believe that SST's will disrupt the atmospheric balance. The more apocalyptic visions of the future remain a minority taste in Britain, though a growing one. The Royal Commission on Pollution, Britain's watchdog body, produced a report that even environmental minister Peter Walker feared might be taken as complacent. But so far there is no substantial public pressure in favor of a more radical stance; the environmental movement here is still a collection of pressure groups with no real constituency.

What line will the British take in Stockholm? Throughout the preparations for the conference, U.N. sources have been complaining privately of the obstructive attitude the British have taken. Conservative governments normally behave suspiciously toward the United Nations, and this attitude has been dutifully reflected by the delegates sent to Geneva. Both British and American delegates have been critical of the slow-moving U.N. bureaucracy. "The incompetence of the U.N. may not matter in the normal course of events," said one source. "If a development project is late starting, or doesn't get the money it needs, then who notices? But it's no use saving the whales after the last whale has died." The attitude has therefore been that, if the environmental problem has any importance at all, it has too much importance to be entrusted to the U.N.

As the conference approaches, there are signs that this hard line is softening a little. Peter Walker is anxious to make a good impression in Stockholm and is politician enough to ensure that Britain takes a positive role. But even Walker's confidence that Britain's environmental organization is right must have taken a battering in the last few months. Conservation groups have revealed that fly-by-night dumping contractors have been depositing waste cyanide on ordinary municipal rubbish heaps, and *Private Eye*, a scurrilous fortnightly magazine, broke the story of a smelting plant owned by Rio Tinto Zinc and opened as recently as 1968 which has been poisoning its workers with massive doses of lead. (The plant has since been closed for improvements.) Failures like these have exposed the inadequacies of British control measures.

The most enthusiastic European nation at Stockholm will undoubtedly be Sweden, a pacesetter in environmental concern. In 1969, the Swedes passed their Environment Protection Law, probably the most comprehensive attempt yet to legislate against environmental damage. A Concessions Board grants licenses for new industrial developments and requires guarantees that such developments will not cause environmental damage. It is advised by a powerful Environmental Protection Board, which brings together all of the government agencies with an interest in the environment. The system depends on cooperation between government and industry, with legal sanctions being applied only as a last resort. The Swedes have worked hard to make the Stockholm conference a success.

Other European countries seem to be taking the conference as it comes. The French are said to have taken a reasonable line during the preparations, as have the West Germans, when they were not insisting on the exclusion of East Germany. The documents prepared for the conference will be published in March and are said to be a fair compromise between predictions of doom and overconfident optimism.

"In facing the environmental challenge," conference Secretary-General Maurice Strong has said, "we are all equal—all underdeveloped. The high technology, high income, high pollution societies of the industrialized world today need to rediscover the values and the social concerns which are deeply embedded in the cultures of the developing world at least as much as the developing countries need to have access to the technologies and markets of the industrialized world." This neat attempt to associate both developed and underdeveloped countries in a joint concern for the environment is perhaps typical of the kind of rhetoric that is to be expected from Stockholm. Perhaps the best chance of producing something more concrete comes in the discussions about ocean pollution, a subject that everybody agrees is international in its implications. With luck, it may be possible to achieve initial agreement on a master plan for managing global ocean resources. Other possibilities include steps toward a global monitoring system to keep watch over the atmosphere and the oceans, the creation of an international registry of chemical compounds, and support for research into the forecasting of the effects of economic growth on human welfare.—NIGEL HAWKES