of Georgetown University, says it has to feel its way. The first order of business will be a meeting in September—a workshop at which committee members and ASCI officers will meet with the people who count in science in Washington: members of the staff of the President's Office of Science and Technology, key congressmen and their aides, and the like. Schreiner thinks that this will be useful but, from experience with the National Kidney Foundation with which he is closely associated, he also has considerable respect for the one-to-one, face-to-face kind of lobbying that often gets things done. Without accepting or rejecting Fudenberg's plan, he says that the full-time Washington "representative" of the Kidney group has been most effective. Yet, he says, "I'm not sure that the young turks are really ready for that kind of political activity."

Indeed, the majority of young and old turks argue that their societies, designed only to hold scientific meetings, are inappropriate vehicles for political action. For one thing, they are victims of what has been called the "turnover phenomenon" in presidents. The position is honorific; men serve but for a single year. Says AAP councillor Smith, "I believe that to be effective, lobbying must be a more full time activity than our dispersed membership and lack of staff can provide. We look to the American Association of Medical Colleges [AAMC] and, particularly its Council of Academic Societies, to be our voice in Washington." Each of the three clinical societies is a dues-paying member of the AAMC, as are about 50 other specialty research societies. Highly active in guiding affairs within the medical teaching and research communities, persons who take part in AAMC committee work are often also involved in the business of the clinical societies.

The AAMC, which moved its headquarters from Chicago to Washington about a year ago, is, indeed, striving to become the political spokesman for academic medicine. It certainly has been influential in finding university-based researchers to testify before congressional committees on legislation relating to research and education; and its officers now are becoming fairly well known around town. (AAMC officials frequently take credit for blocking the section of the cancer legislation that would have taken the National Cancer Institute out of the National Institutes of Health and made it a separate agency.) Nevertheless, the AAMC does not see itself as a lobbying organization but, rather, as one ready and willing to render advice. "In the conventional sense, we don't lobby," says August Swanson who heads the Council of Academic Societies. "We tend to wait to be asked our opinion on things by Congress or NIH." The increased visibility that comes with being in Washington and the ties that are being built up with political figures make it possible, however, for the AAMC to indicate when and what it would like to be asked, and that's a start.

—BARBARA J. CULLITON

Israel: Pollution Problems Rife, but Other Issues Take Priority

Jerusalem. Twenty minutes before the train arrives in Jerusalem, conductors run through the cars and shut the windows. Seasoned passengers whip out handkerchiefs and cover their faces. The reason for this flurry of activity is that the Holy City, with a population of more than 300,000, does not yet operate any sewage treatment plants. Train passengers, therefore, are welcomed to "Jerusalem the golden, with milk and honey blest," by the overpowering stench of untreated sewage and swarms of hungry mosquitoes.

A highly technological, Western-oriented Israeli state, in spite of its renowned accomplishments, has failed to deal effectively with its crisis-level pollution problems. In this respect, Israel is a microcosm of the problems facing both developing and already industrialized nations.

The case of Israel is particularly interesting for industrialized Western countries, for, unlike most lesser developed nations, Israel has cultivated its scientific resources well and has traditionally placed great emphasis on basic research and high technology. In addition, the Israeli government has passed a good deal of antipollution legislation. The Kanowitz law of 1961, according to Anthony Peranio, chairman of an environmental group in Haifa, ". . . is an excellent law which is sort of an 11th Commandment: 'Thou shall not pollute thine environment.' " Nevertheless, despite the existence of a strong and influential scientific community and antipollution legislation, Israel has been unable to cope with environmental pollution. For example, when Robert Chass, an official of the Air Pollution Control District in Los Angeles, visited Israel last spring, he said that the atmosphere of Tel Aviv has become proportionally worse than the smoggy air of Los Angeles.

"We Israelis have a genius for spontaneity," remarked an Israeli politician, "which means that we have no talent at all for planning." But Israelis have had little time for planning. Because a "siege" mentality or an actual state of war has existed since the birth of the Israeli state in 1948, crisis management has pervaded the government. Defense, which accounts for about 50 percent of the national budget, has been the top national priority.

In addition, Israel is still a "lesser developed country"—that is, relatively poor compared to developed Western nations—and is struggling with the burdens of industrialization. National product per capita is about $1500 (compared to $4380 in the United States and $2200 in West Germany*). Israel's growth rate, about 9 percent annually, indicates that she has had little time or resources to devote to other concerns.

Another factor that has diverted attention from the importance of pollution avoidance is Israel's preoccupation with immigration. The Ministry of Ab-

* Organisation for Economic Cooperation and Development statistics for 1968.

sorption, the government agency in charge of attracting new immigrants (olim) and administering the wide range of olim privileges—guaranteed housing, tax deductions, duty-free purchases and the like—seeks 2.5 million new immigrants by 1981. Thousands of housing units and schools must be built, services provided, and jobs created for the olim if they are to be "absorbed" into Israeli society. Not only is the concept of immigration deeply rooted in Zionist ideology, it is connected to defense. As has often been noted, Israel's only natural resource is "human power." Ex-Prime Minister Ben-Gurion awarded monetary prizes to families with more than ten children, for large families and immigration mean more man- and womanpower for Israel's defense.

Educating the Public

Recently, however, partially in response to the United Nations–sponsored conference on "Man and the Environment" to be held in Stockholm this June, Israel's National Council for Research and Development (NCRD) and the Israeli Academy of Sciences and Humanities (IASH) established the Israel National Committee on the Biosphere and Environment (INCBE). The committee, composed of representatives of concerned government ministries and scientists appointed by the NCRD and the IASH, is studying the effects of environmental pollution in Israel—collecting data leading to the identification of key pollution areas, recommending suitable legislation and other action, educating the public about environmental concerns, and preparing a master plan for national action for the protection of the environment. In addition, the committee will represent Israel at all international environmental organizations, such as the International Biological Program, UNESCO's program "Man and the Biosphere," and the Stockholm conference. The INCBE's first task was to prepare a report, to be distributed at the Stockholm meeting, on the environment in Israel. The report, released in March 1971, is the first general survey ever conducted in Israel on the state of the environment as a whole.

U. Marinov, one of the editors of the first INCBE report and chairman of the NCRD's life sciences division, confessed that very little is known about the extent and seriousness of environmental pollution in Israel, but said that by "intuition" Israelis know that their most serious ecological problem is water pollution. Since over 90 percent of the estimated potential water resources is already being utilized, concern about water quality has assumed a high priority. Because this area has long been crucial to Israeli survival, the search for new water resources and the protection of existing sources have received early attention, unlike other environmental issues.

Since the early 1950's, the government has had a general policy aimed at water conservation and water pollution control. Efforts to use urban wastewater in agriculture and to reduce pollution levels in wadis (dry riverbeds) and streams have resulted in the establishment of 180 waste-water reclamation projects throughout the country. These projects make it possible to use nearly 20 percent of the total urban sewage flow for agriculture during the rainless summer months.

In spite of these early projects, pollution of surface- and groundwater sources is arousing serious concern. Pollution has already limited full utilization of existing water resources. According to the INCBE's report, water pollution results primarily from urban waste-water, industrial wastes, petroleum products, and agricultural chemicals and insecticides. Pollution problems are compounded by several factors: Israel's rapid rate of industrialization; the concentration of one-third of Israel's nearly 3 million people in a rather small coastal area; the increasing demand for water as a result of a rising standard of living; and the extensive use of chemical fertilizers, pesticides, and herbicides. In addition, topographical and climatic factors—the concentration of rainfall in the northern half of the country (about 1000 millimeters a year, compared with 20 millimeters in Elath, which is located in the south); the fierce thunderstorms of the Negev Desert, in which most of the rainfall cannot be accumulated; and months without any rain—contribute to Israel's water problems.

More than 400 water wells (out of a total of 2000) now contain nitrate concentrations in excess of the recommended limits for drinking (45 parts per million). Lake Kinneret, the Biblical Sea of Galilee, which supplies approximately one-third of Israel's freshwater, is becoming dangerously polluted by nitrates. Although typically there is disagreement about the source of the nitrates, Yoram Avnimelech, head of the soils and fertilizers laboratory at the Technion (Israel's technical university), believes that the nitrates come from the Hula Valley, former swampland reclaimed for agriculture. Within 5 to 10 years, he believes, the Kinneret's waters may not be drinkable unless something is done about the nitrate seepage. Avnimelech was seeking funds from the government to carry out in the Hula region a large-scale test of a sprinkling system that he believes would leach the nitrates deep into the soil, thus preventing them from being washed into the lake during winter rains. However, little has been done about the lake, primarily because, as Marinov pointed out, "No one has had judicial power to do anything." At least four government agencies and authorities have intense interest in the Kinneret: the Ministry of Interior, in the lake's fisheries; the Ministry of Tourism, in the Kinneret as a resort area; the Ministry of Agriculture, in the lands surrounding the lake; the mayor of Tiberius, in whether the town should dump its untreated sewage into the lake; and so on. Involvement of so many different interests, and the absence of one group or agency with clear jurisdiction over the area, has stymied action.

Because the water crisis was a reality rather than merely a threat, Israel's Parliament, the Knesset, in November 1971 attempted to correct judicial fragmentation through the passage of a new anti–water pollution law, an amendment to a 1959 law. The new water law grants judicial and enforcement authority to a single body of representatives chosen by the various ministries and groups concerned, in order to clean up polluted water sources and to prevent further pollution of Israel's water supply. The new law also provides for direct public representation through the establishment of an advisory committee, an innovation in Israel's pollution laws. It is hoped that the new law will eliminate many of the political obstacles to saving the Kinneret and other imperiled water sources.

Groundwater Pollution

As in most developing countries, sewage pipe systems in Israel are more highly developed than are facilities for sewage treatment and disposal. For example, the Israelis have just finished a sewage collection plant in the eastern part of Jerusalem. Although the government is planning to build three sewage treatment plants for Jerusalem in the next 2 years, there are no such plants now. Hence, partially treated or untreated waste-water flows from Israel's

urban areas through hundreds of miles of wadis, resulting in groundwater pollution, mosquitoes, poisoned fish in streams, and an unbelievable stench around major urban areas.

Marine pollution by urban wastewater is another problem plaguing residents, primarily of the Tel Aviv area. The daily dumping of some 100,000 cubic meters of waste-water into the sea near Tel Aviv has forced the Ministry of Health to close some of the surrounding beaches. The INCBE's report indicates that, although several regions in Israel are developing sewage disposal plans, the major obstacle to the creation and implementation of a national sewage plan is the difficulty of obtaining the funding necessary for such a long-range, major project.

Soil pollution seems to be another pressing environmental concern. The paucity of fertile land in the heavily agricultural economy and the Israeli passion for "making the desert bloom" has led to excessive fertilization of the land. The average rate of fertilization is estimated at 34 kilograms per hectare in dryland farming, and up to 115 kilograms per hectare on irrigated land. Nitrification is the most urgent problem, since nitrates are leached out of the soil and pollute the groundwater pumped from aquifers for industry, agriculture, and home use. Hydrologists, chemists, and plant physiologists are now being organized into research teams in Israeli universities to conduct multidisciplinary studies on nitrification, herbicide utilization, and other aspects of soil pollution. The INCBE report asserts almost pleadingly, "Now that the importance of the problem is recognized, and preliminary work has been begun, it is hoped that the progress achieved by concerted research will lay the groundwork for practical action to alleviate soil pollution."

Another problem Israel faces is that the country is quite literally up to its ears in garbage: because the Israeli diet is rich in fruits and vegetables, solid waste contains a great deal of moisture, making incineration difficult. According to G. Shelef and U. Aloni of the Ministry of Health, the moisture content of solid waste is about 70 percent in winter and 60 percent in autumn. Israelis produce about 1 kilogram of refuse per capita per day, or about half what Americans produce. Since incineration is impractical, disposal has been troublesome. At present, according to Marinov, one-third of the refuse is turned into compost, one-third is buried sanitarily, and one-third is simply thrown out into open dumps without treatment. Sanitary landfills are limited because of the danger of polluting groundwater. An intergovernmental committee was formed in 1964 to study the problem of solid waste disposal, but the committee's principal effect was to reiterate the severity of the problem. Solid waste disposal is not the only problem: refuse collection seems equally annoying. Collection systems range from 1500-liter refuse tanks that are mechanically loaded onto trucks and dustless compression vehicles to horse-drawn carts.

The Israelis are also beginning to be concerned about noise and its physical and psychological effects on man, especially since the average Israeli spends a good deal of time outdoors and with windows open when indoors. The INCBE report attributes the major sources of noise pollution to ". . . motor vehicles, industrial plants, and places of entertainment."

Other areas of environmental concern include food contamination, nature reserves, urban environmental quality, environmental aspects of arid zone research, and environmental education in Israel. Unlike other countries, Israel is not interested, at least officially, in people pollution (population control), because it runs counter to the national ideology. Unofficially, however, many scientists and social scientists are concerned about the social ramifications of large families, since 92 percent of Israel's large (more than four children) families are of Afro-Asian descent and are very poor, relative to Jews from Western backgrounds. Not one of INCBE's ten subcommittees, however, is responsible for population control research.

The only environmental issue that seems to have generated substantial public concern is air pollution. In the heavily industrialized Haifa and Tel Aviv areas, air pollution levels are posing threats to health. The levels of settling particulates in the vicinity of a cement factory near Haifa, for example, were found to be three to four times higher than those allowed by the American standards for this type of pollution. According to Anthony Peranio, a senior lecturer at the Technion's faculty of civil engineering and an early member of the Public Council for the Prevention of Noise and Air Pollution (Malraz), the incidence of respiratory diseases is much greater in Haifa than in the southern part of the country. Asthma, he noted, is six times more prevalent in Haifa than in Jerusalem. Peranio is now chairman of the Haifa Public Council for Conservation of En-

FAS Group en Route to China

The Federation of American Scientists (FAS), a nongovernment organization, is now the first group to have successfully arranged visits of U.S. scientists and scholars to the Peoples Republic of China. A three-member delegation left Sunday for a 3-week visit to China. They are: Marvin L. Goldberger, who is FAS chairman, Jeremy T. Stone, FAS's director, and Harvard sinologist Jerome A. Cohen.

According to FAS sources, the purpose of the trip will be to "explore ways and means of improving peaceful, creative, and cooperative contacts between Chinese and American scientists."

FAS has also announced that the Chinese had also invited three FAS-connected economists to visit China in September. They are Harvard economist John Kenneth Galbraith, current president of the American Economic Association (AEA), and economics professors Wassily Leontief and James Tobin of Yale. The three economists will be the official guests of the Institute of Economic Studies of the Chinese Academy of Sciences.

A return visit to China is planned by Arthur W. Galston, chairman of the FAS committee on Sino-American Exchanges and a professor of biology at Yale. Galston will spend the summer in China as the guest of Kuo-Mo-jo, president of the Chinese Academy of Sciences. Galston and Ethan Signer, of the Massachusetts Institute of Technology, went to China in May 1971 (see *Science*, 7 January 1972) as the first U.S. scientists to visit that country in more than two decades.—D.S.

vironmental Quality, which, unlike the national organization Malraz, is not dependent on government grants, but relies on a membership fee for funds. "One of our problems has been the dependence of the national organization on government funds," Peranio said. "We didn't have to appeal to and involve the public directly."

One of the first widely publicized environmental issues to elicit public concern was Malraz's attempt to prevent the enlargement of the Reading D power plant in North Tel Aviv in 1967–1968. Although the courts ruled against Malraz and allowed the plant extension to be built in spite of its proximity to existing residential districts and Tel Aviv's largest housing development area, Peranio believes that public consciousness and interest were aroused by the long court fight. "Public awareness is growing," Peranio commented, "but very slowly, especially in comparison to the country's rate of development and energy demands."

The INCBE report indicated that within a year, 1969 to 1970, fuel consumption rose by 10.8 percent to 4.8 million metric tons. Peranio estimates that, if the present rate of increase is maintained, Israel's electrical power growth will double over the next 11 years, thus keeping pace with the United States' energy growth rate. Israeli oil, however, has a high sulfur content; its use, therefore, results in the emission of large quantities of sulfur dioxide and particulates. On the basis of weight, about 160,000 tons of sulfur dioxide, 60,000 tons of nitrogen oxides, and 250,000 tons of carbon monoxide are emitted annually. Much of this comes from motor vehicles, which increased from about 70,000 in 1960 to 210,000 in 1969. Israeli automobiles have high emission rates, according to the environmental report, because Israelis have bad driving habits and because the average automobile is old, relatively poorly maintained, and overloaded.

One of Haifa's major sources of air pollution is the cement industry, which emits 75,000 metric tons of particulates annually. The Haifa Public Council for Conservation of Environmental Quality has been trying to apply public pressure to induce its neighboring cement plant to use filters that would prevent over 99 percent of the cement dust from getting into the air, but it is claimed that filters would add about 12 percent to the plant's capital expenditures. Thus far, nothing has been done about the dust. The case of the cement industry illustrates the difficulty the government faces in forcing industry to curb pollution-causing practices. The country has a tremendous cement shortage; Nesher is Israel's only cement company. If the government heavily fines or closes down Nesher, it closes Israel's sole cement producer. "We're trying very hard," said Marinov, "but it's much more difficult here than in the United States."

Peranio, however, belittles the government's efforts in protecting the environment. He charges that Israel has excellent antipollution laws, such as the Kanowitz Law, that outlaw practices causing excessive noise and air pollution, but that the government has not enforced them. At the time of the Kanowitz Law's promulgation, it charged various ministries—Transport, Development, Police, and Health—with the establishment of air, water, and other standards and regulations. Now, more than 10 years later, none of the ministries have followed through, except the Ministry of Transport, which recently announced regulations that require diesel-powered vehicles to be inspected once a year for excessive emission, but that contain no provisions for checking vehicles during the year. Peranio admitted that the limited pollution abatement activities of the ministries might be partially explained by inadequate budgets and staffs (the Health Ministry has been allowed 20 million Israeli pounds, about 10 percent of its budget, for pollution activities), but insisted that there could be no justifiable explanation for their failure to prepare standards and regulations.

Pollution and Productivity

The new committee, the INCBE, is especially sensitive to potential criticism that environmentalists are against increased productivity. "We must not sound as if we're against progress," Marinov remarked, "or that would be the end of us." It runs contrary to Israeli ideology to question increased productivity. Although Marinov believes that the new committee will be very influential in identifying key pollution areas and recommending appropriate legislation, he admits that the major task the committee faces is changing public opinion—evoking concern about environmental issues and changing Israel's aspirations from "building the country" to "preserving the country." It is difficult to judge how committed the Israeli government is to solving its environmental problems. The INCBE is only an advisory committee and can do no more than recommend legislation to the government. Many fear that, alalthough the committee's work may be informative, its suggestions and recommendations will not be translated into practical action. Although the committee has been given adequate funds to finance its own operations—hiring full- and part-time staff, printing brochures, and the like—it has little money for environmental research and pollution prevention. Therefore, the committee will be dependent on other government ministries and the NCRD for research. Even when the government wishes to take some sort of action, it is sometimes frustrated by fragmented jurisdictional authorities and competing interest groups, as was the case with the "dying" Lake Kinneret.

The blame for Israel's failure to fully protect the environment is transferred in a circle of mutual recrimination: the government blames the public; Peranio, on behalf of Malraz and the public, blames the government for not controlling industry. To environmentalists, it's a very familiar pattern and, as usual, the fault probably rests with all concerned. Some Americans who have immigrated to Israel complain that Israeli citizens lack the spirit of voluntarism that pervades American society. Israelis, they claim, are waiting for the government to do everything, rather than attempting to have a direct impact on society themselves or pressuring the government to do something about pollution. The government, on the other hand, working in sort of a constant pressure cooker, tends to respond only to those problems that cannot be overlooked. Marinov believes that the establishment of his multidisciplinary committee to study, make recommendations, and plan for the environment as a whole is an encouraging step on the government's part.

If the Stockholm conference does nothing else, it will have induced Israel and other developing nations to give some attention to environmental issues and to at least begin thinking about pollution control procedures that may help them avoid the mistakes of other Western nations.—JUDITH MILLER

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