

opment of new types of medical equipment and drugs and an exchange of laboratory specimens. Frank J. Rauscher Jr., the new director of the National Cancer Institute, says the United States is getting ready to send to the Soviet Union samples of some hundred cancer viruses, including several suspected of causing human cancer. American scientists are anxious to receive samples of a virus that Soviet scientists say they discovered in patients suffering from leukemia and that proved capable of causing cancer in monkeys and baboons.

Environment: Sharing different approaches

Gordon J. F. MacDonald, a member of the President's Council on Environmental Quality and a major architect of the new U.S.-Soviet environmental agreement, told SCIENCE NEWS there is no doubt that both countries have a great deal to gain by it.

Envisioned in the agreement are actual joint studies, as well as the more usual information exchanges, in a variety of environment-related areas, including air and water pollution, agricultural pollution, urban problems, preservation of natural areas, climatological and genetic effects of pollution, earthquake prediction, arctic and subarctic ecology and legal and administrative approaches to environmental problems.

"Soviet approaches to technology, to population problems, to urban planning are very different from ours," MacDonald said. In one area, arctic and subarctic ecology, "by virtue of their geography, they have done a great deal more than we have."

The Soviets have also moved much further along than the United States in dispersing population into new cities in previously unsettled areas. MacDonald believes this was not accomplished through blunt coercion of Soviet citizens, but rather through incentives, such as better housing, which might work equally well in the United States.

Although U.S. and Soviet actions in pesticide regulation appear to be similar, it is possible, suggests MacDonald, that Soviets may have done more about water pollution from agricultural runoff. Air pollution from stationary fuel burning is not serious in the Soviet Union because of its abundant natural gas, but auto-caused air-pollution is growing there and the United States has valuable expertise to share regarding that complex problem.

In addition to the new cities studies, there will be unprecedented joint social scientific studies of urban problems, including mass transit needs, open space, suburban sprawl and others. □

Stockholm: Toward an ecologically aware world

The United Nations Conference on the Human Environment, which starts in Stockholm June 5, is, in a way, an anticlimax. Simply because the conference was scheduled, a great deal of environmental action has already occurred. Some 70 nations, for instance, are submitting reports on domestic environmental problems. In many cases, these reports are first efforts by these nations to assess the state of their environments.

The special agencies of the United Nations have also prepared reports on subjects of international interest, rang-

ing from deforestation to marine ecology. Other groups have written reports on environmentally significant institutional problems, running the gamut from environmental aspects of industrial growth to proposed organizations for an international environmental effort. British economist Barbara Ward Jackson has drafted a broad conceptual paper called "Report on the State of the Environment" with the guidance of an international group of scientists headed by microbiologist René Dubos of the United States.

As pointed out in earlier SCIENCE NEWS articles and in another article in this issue (p. 364), the main benefit of much of this preparation may lie more in creating public awareness of

Astronomy: The next 10 years

From time to time, the National Academy of Sciences empanels boards of specialists in one field of science or another to draw up a comprehensive report of the state of their art with recommendations for the next 10 years' progress. This week the Astronomy Survey Committee made public volume I of their report, *Astronomy and Astrophysics for the 1970's*, the first such consideration of astronomy since 1963.

Astronomy has developed rapidly in the intervening decade. There are branches of astronomy that did not exist or had only begun to exist in the early 1960's, and the report recommends new specialized equipment for them. It also appears to mark the beginning of the end of the centuries-old trend toward larger and larger single telescopes and the beginning of the beginning of the end of optical astronomy's century-old reliance on photographic plates.

For centuries optical astronomers and for decades radio astronomers have sought telescopes with larger and larger mirrors because the larger collecting area increases both resolution and sensitivity. Now it appears that the technological limit on size of fully steerable mirrors is being reached. The report does recommend two large radio mirrors. One would be rather colossal: a 440-foot dish for observations at one centimeter and longer wavelengths. The other would be a 215-foot reflector for millimeter waves, specifically to serve the new field of molecular astronomy. But these two are numbers 5 and 10 on the list of 11 priorities.

The success of other methods of achieving high resolution, notably

aperture synthesis, in which signals from a number of small mirrors are combined to simulate the aperture of a much larger one, is reflected by the report's giving first priority to the very large radio telescope array that has already been approved by the Government (SN: 3/25/72, p. 196).

A shadow no bigger than the image of a twentieth-magnitude star lies over the use of photographic plates to record data in optical astronomy. Emulsions just do not give reliable data from faint sources. A number of electronic devices similar to television cameras are under development to do the job (SN: 5/6/72, p. 300). The report gives second priority to development of these devices. If they are successful it may become possible to import aperture synthesis into optical astronomy, combining outputs from an array of small mirrors to simulate a large one. The report recommends ultimately an equivalent aperture in the 400-to-600-inch range. Failing this, another 200-inch conventional mirror should be built.

The new field of infrared astronomy should have a large ground-based telescope (three to four meters), says the report. Continued pursuit of space and high-altitude programs for X-ray, infrared, ultraviolet, radio and optical wavelengths is urged, as well as more support for theoretical studies, and, in eleventh place, a number of new astrometric instruments for better determining the positions of stars.

The committee estimates the whole high-priority program would cost \$884 million over 10 years, less than the cost of one new aircraft carrier.