

sion, Wyngaarden has asked the panel members to meet with him on Feb. 29.

While the leadership issue remains unresolved, other aspects of the report reflect a growing refinement of the project's strategies and goals. The panel recommends a gradual "scaling up" of the project, with initial emphasis on technological development of better tools to do the actual mapping. Indeed, much of the project is now being viewed as a technical rather than biological challenge, with biomedical benefits gradually accruing as the endeavor proceeds.

"This is not ordinary biological research," said Charles R. Cantor, of Columbia University, at a session of the Boston meeting. "It's much closer to engineering." A large part of the initial challenge will be to improve automated methods of analyzing DNA and to develop computers and software capable of dealing with the tremendous amount of information that will be generated.

Toward that end, experimental parallel processors and specialized computer chips developed for the Department of Defense are showing promise, said Leroy Hood, a researcher from the California Institute of Technology in Pasadena and a developer of some of the fastest DNA analyzers available. Hood revealed that a computer chip developed for spy satellites over the Soviet Union was being experimentally applied to the gene mapping problem. The chip was designed to filter out small amounts of useful information from large pools of extraneous data. He predicted that neural net research and experimental parallel processors capable of handling large amounts of information simultaneously would also be applied to the task of "teaching" machines how to recognize genes more accurately.

As foreseen by the panel, the gene mapping program would be coordinated by a single agency that would administer grants to individual laboratories at universities and research institutes. Addressing a major point of controversy, the report insists that all the results of genomic research be peer reviewed and remain in the public domain. In the past, some private companies doing gene mapping research have been slow to reveal their findings.

According to the panelists, laboratories outside the United States would be invited to join in the mapping effort, but only after the basic structure of the project had been decided. Some attendees at the session criticized the report for not encouraging other biotechnically advanced countries to share a larger part of the initial expense. Other critics said that despite the assurance that gene mapping would not cut into other scientific funding, it would almost certainly have an effect on funding for other pressing needs such as AIDS research.

— R. Weiss

AAAS

Growth hormone may boost immunity

A hormone important for normal growth may also enhance the body's ability to fight disease, according to findings presented in Boston last week at the annual meeting of the American Association for the Advancement of Science. The research reveals new details about the relationship between the neuroendocrine and immune systems, and suggests that brain hormones may be more important regulators of white blood cell activities than was previously believed.

It's no longer surprising to find feedback between the neuroendocrine system and the immune system, said Keith Kelley of the University of Illinois at Urbana-Champaign, who led the research effort. So far, however, such research has focused mostly on how certain hormones suppress, rather than enhance, the immune system. Glucocorticoids, for example, have been shown to suppress the activities of disease-fighting cells.

Kelley's research, which appears in the Feb. 12 *SCIENCE*, shows that the growth hormone somatotropin can stimulate white blood cells called macrophages to produce more than double the normal amount of the superoxide anion, O_2^- . Superoxide anion can in turn be converted into a variety of powerful oxidizing agents important to the cells' ability to kill bacteria after ingesting them.

The research, done on rats, does not prove that somatotropin exerts the same

influence on human macrophages. But the concentrations of somatotropin used in his experiments are equivalent to those found under normal physiological conditions.

If his findings are confirmed, he said, somatotropin may prove useful not only for its growth-stimulating qualities but also as an immune booster. The hormone has already been mass-produced through genetic engineering and is commercially available as a treatment for dwarfism.

— R. Weiss

AAAS

Killer bees on skis?

So-called "killer" Africanized bees may be able to survive longer, colder winters than was previously believed, new research suggests. If this is true, the bees might migrate as far north as Canada, causing widespread damage to the North American honey and crop-pollination industry (SN: 4/4/87, p.218).

Since their accidental release in South America 30 years ago, the bees have been migrating northward, gradually replacing "domesticated" European bees along the way. Scientists say they may reach Texas this year. They are too aggressive to be kept in hives and are poor honey producers. Hundreds of deaths have been attributed to their stings. Research presented in Boston last week at the annual meeting of the American Association for the Advancement of Science shows that the bees can survive six months at 0°C and don't seem to mind being buried in snow for a week or more. □

White House presents space policy

The new "national space policy" announced last week by the White House is concerned with issues far broader — and in many ways more difficult — than a lunar base or human exploration of Mars. "The policy," according to NASA Administrator James C. Fletcher, "clearly establishes that, for the first time, the United States has a long-range goal of expanding human presence and activity beyond earth orbit into the solar system." But the directive is a matter of more than just directing to go ahead.

One major theme of the policy is increased involvement of the private sector. A 15-point "commercial space initiative" ranges from making available the huge external fuel tanks expended by the space shuttle, for use in space by commercial and nonprofit organizations, to having NASA lease space as the "anchor tenant" on an automated, research-and-manufacturing space station being proposed by a Houston-based industry partnership. The administration's plan is to award a contract to the group by midsummer, covering "space and related serv-

ices" to be available by the end of fiscal 1993.

Announcement of the space policy, in fact, originally to have taken place on Jan. 26, was held up largely by disagreements among several agencies including NASA, which fears for the funding of its own much costlier, manned station. Plans for the NASA station have already been modified and slowed in recent months, because of unexpectedly high cost estimates, but the space policy announcement included the fact that President Reagan would ask Congress this year not just for \$1 billion in fiscal year 1989 to keep the station going, but for a "three-year appropriation commitment" of \$6.1 billion.

Also in the area of "privatization," the policy reaffirms that NASA will not maintain its own fleet of "expendable launch vehicles" as an adjunct to the space shuttle except for reasons of national security. In the case of other civilian government agencies that want payloads of their own in space, such as weather and remote-sensing satellites, such agen-

cies "will encourage, to the maximum extent feasible, a domestic commercial launch industry," by contracting directly with the private sector rather than with NASA.

Last week's announcement also noted that the President will establish a National Microgravity Research Board to stimulate research in the "microgravity environment," which in this context essentially means in earth orbit, such as aboard a space station. The board is to include representatives from the Departments of Commerce, Transportation, Energy and Defense, as well as the National Institutes of Health and the National Science Foundation.

In addition, government space activities will use commercially available goods and services wherever possible, as well as avoiding any actions that may "preclude or deter commercial space sector activities." Questions of patent rights, for example, have been a sore point for years.

The administration's ambitious plans for the future, however, are likely to require more than just off-the-shelf technology. The plan is now to start NASA on a program called Project Pathfinder to develop technologies needed for "expanding human presence and activity beyond earth orbit," as well as for unmanned missions. The project is envisioned as focusing on four major areas: Besides exploration (the kind of mission) and operations (making it work), it includes "humans-in-space" (such as the biological, physiological, psychological and other needs of people on a three-year round trip to Mars, given that not even any Soviet cosmonaut has spent as long as a year in space), and "transfer vehicles" (a variety of space tugs and other craft for such tasks as moving from low to higher orbits, important, for example, in building a space station).

A major factor in plans for the U.S. space station has been the administration's goal of securing international cooperation, primarily from Europe, Canada and Japan. Late last week, the European Space Agency announced initial agreement with NASA on the text of a memorandum of understanding covering Europe's participation, which is to consist of a laboratory module attached to the station, another that is an unattached "free-flyer" positioned nearby, and an unmanned platform that would be stationed in a pole-crossing orbit rather than in the near-equatorial orbit of the station itself. Canada's contribution, a "mobile servicing center" equipped with a remotely controlled arm similar to the one Canada provided for the shuttle, is a step farther along in the agreement process. Another laboratory module, with its own remote arm as well as an external storage pallet, is to be provided by Japan, though the actual agreement texts are not yet final.

— J. Eberhart

UV radiation decreasing over U.S.?

Long-term measurements of ultraviolet (UV) radiation from the sun are not living up to scientific expectations, according to researchers who have been monitoring this radiation at eight U.S. airports. Between 1974 and 1985, they report, the amount of UV radiation appears to have decreased. However, some scientists familiar with the instruments used in this project are questioning the accuracy of the findings.

Atmospheric scientists have anticipated an increase in the UV radiation reaching the earth's surface because of recent observations that the global ozone layer has thinned since the late 1970s (SN: 1/9/88, p.20). Stratospheric ozone protects life on earth by absorbing dangerous UV radiation, and scientists have estimated that for every 1 percent drop in ozone, there should be a 2 percent increase in the amount of UV radiation reaching the earth's surface.

"That's the confusing part about this finding. The UV should be increasing," says Gerald Cotton of the National Oceanic and Atmospheric Administration's Air Resources Laboratory in Silver Spring, Md. Cotton worked with Joseph Scotto and Thomas Fears of the National Cancer Institute and Frederick Urbach and Daniel Berger at Temple University in Philadelphia. The researchers published their results in the Feb. 12 SCIENCE.

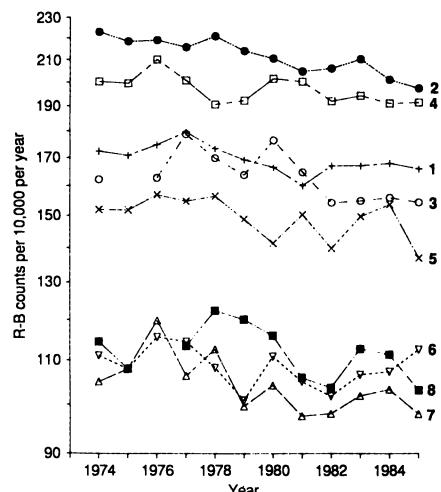
The experiment relied on Robertson-Berger meters that were stationed along the edge of the contiguous United States at cities of various altitudes. These instruments detect radiation wavelengths ranging from 280 to 330 nanometers.

Previous studies have shown that a wavelength in the neighborhood of 297 nm is most effective for producing sunburn in typical Caucasian skin, and the same range of wavelengths is known to cause changes in DNA that can lead to skin cancer.

Over the 12-year period, the researchers found a 2 to 7 percent drop in the amount of UV radiation reaching the ground. According to Cotton, these are the longest records for UV radiation measured at the ground.

This decrease does not necessarily call into question the observed loss in stratospheric ozone, says Cotton. Within the earth's troposphere — the layer directly below the stratosphere — there are many factors that absorb UV radiation, such as clouds, air pollution and even debris from volcanic eruptions.

Studies have shown that the United States has become more cloudy in recent years. In addition, volcanic eruptions, like El Chichón in 1982, send fine



Measurements from eight U.S. locations show a clear decrease in the amount of ultraviolet radiation hitting the earth. The stations are labeled: (1) Tallahassee, Fla.; (2) El Paso, Tex.; (3) Fort Worth, Tex.; (4) Albuquerque, N.M.; (5) Oakland, Calif.; (6) Philadelphia; (7) Minneapolis; and (8) Bismarck, N.D. Strength of radiation generally increases with lower latitudes and higher altitudes.

particles into the atmosphere, where they can remain for years.

"Maybe there's something going on in the troposphere that's more important than we expected," says Cotton.

However, he adds, "I'm not ruling out that there might be something going on with the instruments, too." Cotton notes that there has been some controversy over the reliability of measurements taken with the Robertson-Berger meter.

According to physicist Jon Geist, the meters are not accurate enough to monitor the small, long-term trends in UV radiation. Moreover, the instruments tend to lose accuracy over time and need to be recalibrated, a process that can often introduce error. Geist and his colleagues at the National Bureau of Standards in Gaithersburg, Md., have analyzed the design of the Robertson-Berger meter in an attempt to improve the machine.

"I seriously question whether this instrument is capable of providing data that are meaningful at this level of accuracy," says Geist. "I don't think you can tell a 10 percent change over 10 years."

Berger, who worked on the study and designed the meter used during the project, acknowledges that there were "major problems" with the machines. But he believes that the meters were accurate enough for this study.

"I think," he says, "that the long-term variations are probably correct."

— R. Monastersky