NIH director fired; Scientists protest

Although the National Institutes of Health harks back to 1887, many scientists view 1955 to 1968 as the golden years of NIH. James A. Shannon was director of NIH then, and he somehow managed to please both scientists and the Administration. When he retired in 1968, he left behind a billion-dollar legacy—the largest and most lucrative biomedical research organization in the world.

Robert Q. Marston succeeded him as NIH director. Marston was fired in 1973. Robert S. Stone succeeded Marston. Now the word from NIH is that Stone is soon to be fired. To anyone outside NIH, these two changes in leadership look like little more than a turn of the bureaucratic wheel. But to some scientists within the NIH hierarchy, the changes have sinister undertones. They view the changes as a sign that NIH has become too politicized, to the advantage of the Administration and Congress, and to the disadvantage of thousands of American scientists working under NIH grants and contracts.

The disgruntled scientists include Nobel Prize winners Christian Anfinsen, Julius Axelrod and Marshall Nirenberg, Robert Goldberger of the National Cancer Institute, Franklin Neva of the National Institute of Allergy and Infectious Diseases and Earl Stadtman of the National Heart and Lung Institute. They aired their complaints last week at a news conference sponsored by the Federation of American Scientists in Washington.

In a prepared statement, the scientists declared: "We deplore the firing of the NIH director, the second such forced change of leadership in a two-year period, as one more indication of the degree to which NIH can be vulnerable to unwarranted and counterproductive political control. A major instrument of that control is Presidential appointment of the director, a practice instituted as a provision of the National Cancer Act. We urge that this provision be repealed. The aura of career service and stability that the directorship has traditionally carried is a vital component in the establishment and implementation of major programs in health research and health care. . . ."

The scientists, asked to better define what they meant by "counterproductive political control," said they mean that there is now too much emphasis on contracting scientists for goal-oriented research rather than giving them grants and more research freedom; that there is not enough scientific peer review of how NIH research funds should be allotted and that some good scientists have been passed up for grants because of the heavy allocation of funds for cancer and heart research. In short, they believe that the Department of Health, Education and Welfare, the Office of Management and Budget and even Congress are exerting too many pressures on the NIH director. As a result, in their view, NIH is not being run as it should be. When did things start going sour? With the passage of the National Cancer Act in 1971, and the appointment of the NIH director by the President. Before that, NIH directors usually stayed in power for some years, then left to retire.

"Our view," FAS Director Jeremy J. Stone asserts, "is to protect and cherish the independence of NIH."

But was NIH ever really free from political pressures? SCIENCE NEWS asked someone who should know: Shannon. Shannon, who is now with Rockefeller University, replied: "It was under pressure, but it was a different type of pressure." In other words, he said, NIH did not always agree with HEW, but they got along well together. And HEW relied heavily on scientific inputs from NIH in drawing up the NIH budget. □

Surface features seen on distant star

For millenia astronomers who wished the stars would stop twinkling were in the same boat as King Canute, who wanted the tide not to rise. But now, to borrow a phrase from *1066 and All That,* astronomers are learning to paddle their own Canute. Thanks to high-speed photography and modern data processing, they are beginning to be able to suppress the effects of twinkling.

By taking a multitude of photographs, each of which freezes the atmospheric distortion of a star's image at a particular instant, and processing them optically or in computer, observers can reconstruct an image from which atmospheric distortion has been removed. The star is no longer a bouncing, coruscating point of light, but a shape that can be measured.

From Kitt Peak National Observatory comes a report that one of these techniques (there are several, differing in detail) has been used for the first time in astronomical history to deduce surface features of a star other than the sun. The work was done by Roger Lynds, Jack Harvey and Peter Worden, and was reported by Worden at the meeting of the American Astronomical Society this month in Gainesville, Fla.

The star involved is one of the most prominent in the sky, big, red Betelgeuse, the brightest star in the constellation Orion. After the sun, Betelgeuse is the easiest star to resolve because it is fairly close—500 light-years away—and big—800 times the size of the sun. What was found are large-scale hot and cold regions, that may be convection currents in the star's atmosphere.

The photographs processed so far were taken on March 28, 1974, with the four-meter Mayall telescope on Kitt Peak. An image intensifier was used to brighten the star's image. Three other nights of observation remain to be processed, and from them the astronomers hope to gain a better idea of what Betelgeuse's surface features are. □

Join us in orbit. R.S.V.P.

Soviet space officials have invited the National Aeronautics and Space Administration to send along some life sciences experiments on the next available Soviet biological satellite.

Nothing lavish, you understand. The experiments will each have to fit in a standardized container holding less than half a cubic foot, and they will have to be completely independent of the satellite's power, life-support and data-recording systems. Nor can they require any commands from the ground to make them work. (One container may get to ride in a centrifuge.)

And time is short. The negotiated agreement (no U.S.-Soviet deal is as simple as mere invitation) was completed in November, and NASA has to provide detailed descriptions of its proposed experiments by Dec. 31. Then Soviet officials will choose the ones they want to fly, after which NASA will have only until Aug. 15 to deliver the actual flight hardware. This means shortcutting a process which, by NASA's usual procedures, often requires years of building breadboards, mockups, test versions and finally the real thing.

The likeliest candidiates, says NASA life sciences director David Winter, are those concerned with fish-embryo development and plant and tissue studies. They'll have to be simple to be there by the delivery deadline, which is believed to have been set to accommodate a (formerly manned) Vostok-type satellite scheduled for launch during the last three months of 1975.

Soviet officials have already given NASA some typical specimen-containing modules as well as design plans for the containers that will carry the U.S. projects. There are also plans for U.S. researchers to take part in both pre- and post-flight studies of blood and tissue samples from the life forms which will be flown in the Soviet Union's own experiments.

Early in the year, NASA scientists will also offer suggestions for experiments on future Soviet probes. These could well be more elaborate than the first go-round, partly because of the available time, and are likely to include studies of gravitational and cosmic radiation effects, as well as demineralization and vestibular investigations.

The possibility of such invitational biology payloads has been an acknowledged one for a long time, but this is the first time it has been exercised by either side. □

Bad news for Brans-Dicke

In spite of the adulation that surrounds his memory, Albert Einstein did not have the last word on theories of gravitation and general relativity. There are rival formulations, not the least of which is the one of Carl H. Brans of Loyola University and Robert H. Dicke of Princeton University.

In the choice between Einstein and Brans-Dicke the shape of the sun can make a difference. It comes about this way: One of the things Einstein's theory was designed to explain was an excess precession of Mercury's orbit, an amount of precession beyond what the previous gravitational theory (Newton's) could account for. If the sun is perfectly spherical, the Brans-Dicke theory will not predict the observed amount of excess precession, and Einstein has to be preferred. If the sun is oblate, the oblateness contributes to Mercury's precession, and that plus the prediction of Brans-Dicke theory can be made to yield the observed amount.

Some observations have seemed to show some oblateness. For years now Henry A. Hill of the University of Arizona and several colleagues have been running a check with observations that attempt a precise comparison of the sun's polar radius to its equatorial radius to see if the latter is larger. Their results are in the Dec. 16 PHYSICAL REVIEW LETTERS, and they hold little seasonal cheer for partisans of Brans-Dicke.

The observation is not easy because it is not a simple thing to tell exactly where the sun's edge is. The sun sort of trails off, and the exact point to choose as the edge takes careful calculation and plausible argument. Another problem is that if the edge of the sun is brighter at the equator than at the pole, the extra brightness may give a false impression of oblateness.

It is the latter that Hill and collaborators now conclude is the case. Extra brightness at the solar equator accounts for the apparent oblateness seen by other observers. "The immediate impact of the current work removes the relevance of all earlier solar-oblateness observations to tests of gravitation theories," they write. And, in another place, "This removes the serious consequence [of previous solar-oblateness work] for Einstein's general theory of relativity."

It is cold comfort for partisans of Brans-Dicke, but it is probably not enough to make them give up yet. □

The noncosmic cosmic rays

One of Pioneer 10's earliest and most surprising discoveries about Jupiter in 1973 was that some of what scientists thought to be cosmic rays from the sun and from outside the solar system were in fact coming from the radiation belts around the giant planet. Now a group of physicists has concluded that another fraction originates nearer still, in the radiation belts of earth.

The discovery came from a satellite, Interplanetary Monitoring Platform 7, whose rotation made it possible to determine which of the charged particles it was measuring came from which direction. It also carried a particularly sensitive detecting instrument, enabling it to measure about 10 times as many low-energy protons (hydrogen nuclei below 2 million electron-volts, the "cosmic rays" in question) in a given time as had been seen before.

Thus equipped, physicists Stamatios Krimigis and John Kohl of the Johns Hopkins University Applied Physics Laboratory in Maryland and Thomas Armstrong of the University of Kansas were able to compare the proton flux from the direction of the earth with that from the direction of the sun. They discovered that even during a time in mid-January 1973, when the sun was in a particularly quiet phase, the bursts of low-energy particles pouring out from the outer (Van Allen) radiation belts trapped by earth's magnetic field kept coming at a more or less constant rate.

"Although we had long made measurements in the vicinity of the earth," says Krimigis, "we never thought that our own radiation belts were the origin of this low-energy component in the interplanetary cosmic ray spectrum. It is now clear . . . that what was previously considered part of 'cosmic rays' has its origin much closer to home. . . ."

In addition, the researchers found that the bursts seemed to correlate well with magnetic disturbances in the belts, disturbances which would create waves that accelerate the ordinarily slow-moving particles. "This gives them a kick, as it were," says Krimigis, "to where they become fast-moving nuclei and break through the belt into interplanetary space."

Low-energy cosmic rays account for less than one percent of the total low-energy spectrum, most of which is from planetary magnetospheres, so reassigning still more to the magnetospheric side leaves a minuscule amount indeed. In fact, says Krimigis, "at energies below 2 MeV, essentially most if not all [of the charged particle spectrum] is magnetospheric in origin." It is even possible, he says, that there may be no really low-energy cosmic rays reaching the solar system at all—that the polarization of the interstellar electric field turns them away, leaving nothing but magnetospheric outpourings below perhaps 20 MeV. There are no actual data available yet to prove or disprove this idea, but Pioneer 11, successor to the probe that first reassigned some cosmic rays to Jupiter (energetic electrons in that case—"cosmic rays" is a broad term), may find out as it arcs above the plane of the ecliptic on its way to distant Saturn. □

Shift toward a noncyclic universe

The controversy over whether the universe is open or closed marches on. Basically the question is this: Will the observed expansion of the universe continue forever or does the universe possess enough matter so that the mutual gravitational attraction will decelerate, stop and reverse the expansion? The first case is called open; the second closed. In an open universe, the big bang happened once and for all; in a closed universe it can repeat periodically as each collapse generates a new explosion and a reexpansion *ad infinitum.*

It is not an open-and-shut case. There are many uncertainties in the different data that must be assembled to draw a conclusion, and the argument has simmered along for decades. The latest contribution, on the open side, is by J. Richard Gott III of California Institute of Technology, James E. Gunn of Caltech and the Hale Observatories, and David N. Schramm and Beatrice M. Tinsley of the University of Texas. Unlike many previous points in the debate, this one has in the last week or so gotten into