where the development of the airplane was in 1910 or 1915," said H. Crane Miller, counsel for Hollings' subcommittee and a former Stratton Commission staff member. The funding of ocean programs increased dramatically in the middle 1960's, but the level of support has virtually frozen. For example, the annual growth rate of academic marine science programs funded by the National Science Foundation and the Office of Naval Research was 7.3 percent from 1963 to 1966 but declined to 2.2 percent from 1966 to 1968, not even covering rising costs.

The Navy, with a marine science budget of some $239 million this year, continues to dominate U.S. oceanography. But even the Navy's funds are down by $24 million from last year, requiring deactivation of some research ships and postponement of new projects. "We have had our share of the cuts, but only our fair share," said Rear Admiral O. D. Waters, Jr., the Oceanographer of the Navy. "We have had to slow down, but nothing vital has been dropped." The Administration's request for fiscal 1971, however, would cut the Navy programs by another $19 million and increase the civilian oceanography budget by $40 million.

The Navy cooperates extensively with civilian ocean agencies, especially through the Oceanographic Data Center and the Instrumentation Center. For example, Navy data on water temperature is fed to the Bureau of Commercial Fisheries to guide fishing vessels to favorable waters. But, as Admiral Waters points out, "it is only happenstance, really, when our programs benefit the civilian sector. . . . Our purpose is always military."

On the NOAA proposal, the Navy has taken no formal position except to request that, whatever is done, the Coast Guard retain its semimilitary role. It is known, however, that many Navy oceanographers are unenthusiastic about a NOAA, viewing it as a potentially serious competitor for money and programs.

If effectively promoted, civilian oceanography could indeed win formidable support in Congress. There are, after all, 30 coastal and Great Lakes states with a direct interest, and the nation is increasingly resource-conscious. In hopes of tapping this potential support, oceanography lobbying groups and newsletters are proliferating. For example, the Washington-based National Oceanography Association added 700 new corporate and individual members in 1969, for a total of 2100. (In a poll, the membership heavily favored creation of a NOAA.) Sea-related industries are badly in need of new federal initiatives in developing technology.

Should civilian oceanography develop its own effective lobby, the marine science programs might be more than able to hold their own in a new Department of Environmental Affairs. Even NOAA champions such as Lennon and Hollings concede that such a department makes sense. But they contend that a single ocean agency is needed first, to reorganize existing programs, establish goals, and attract the necessary public and congressional support.—WILLIAM CONNELLY

William Connelly is the Washington correspondent for the Winston-Salem, N.C., Journal and Sentinel *and has been covering the NOAA dispute on Capitol Hill.*

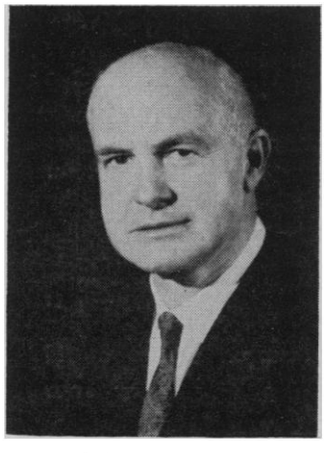
NSF: White House Nominates Four to Long-Unfilled Posts

The White House last Friday nominated four men to the National Science Foundation (NSF) assistant directorships which were created in 1968 and have yet to be filled. No nomination to the agency's number-two post, the deputy directorship, was put forward. The word on the Washington science grapevine has been that an earlier nominee met a White House rebuff, but a new nomination is said now to be nearing the end of the White House approval process.

Senate confirmation is required for the deputy director and four assistant directors, all of whom are presidential appointees.

The four nominees:

► As assistant director for research, Edward C. Creutz, 57, now division vice president in charge of research and development for Gulf General Atomic, San Diego, California.



Edward C. Creutz

Lloyd G. Humphreys

Louis Levin

Thomas B. Owen

► As assistant director for education, Lloyd G. Humphreys, 57, professor of psychology at the University of Illinois.

► As assistant director for institutional programs, Louis Levin, 61, who has been executive associate director of NSF since 1968.

► As assistant director for national and international programs, Rear Admiral Thomas B. Owen, 50, who has been chief of naval research since 1967.

Although it is risky to count presidential nominations before the White House hatches them, unusually strong indicators point to George S. Hammond, professor of chemistry at Caltech, for nomination as deputy director.

The appointments, and an agency reorganization which is now being carried through, give NSF director William McElroy an unusual opportunity to influence the agency's aims and methods of operation. The new assistant directors are said to have been chosen essentially by McElroy although suggestions and help with the elimination process came from the National Science Board, the prestige-heavy governing board of NSF whose membership is drawn from outside government.

It is known that a hitch in NSF's high-level recruiting effort was caused by a White House reaction to one candidate for the deputy directorship. The name of NSF official Louis Levin, who was nominated last week to one of the assistant directorships, was reportedly put forward twice for the deputy directorship and failed to gain White House approval. According to several persons queried on the matter by *Science,* including Philip Handler, chairman of the National Science Board and president of the National Academy of Sciences, there was nothing personal or political in the Levin turndown. The explanation was that the White House felt that the deputy directorship was a highly "visible" job and that a "new face" was preferred rather than someone identified as an NSF old hand.

There is considerable concern among nongovernment scientists that NSF remain a "nonpolitical" agency, as was demonstrated by the furor which surrounded the blocking of the appointment of Franklin Long as NSF director last year (*Science*, 18 and 25 April and 2 May 1969). Long's views on arms control and disarmament were apparently a factor in causing the nomination to be short-circuited.

The NSF law reads that "Before any person is nominated as Deputy Director, the President shall afford the (National Science Board) and the (NSF) Director an opportunity to make recommendations to him with respect to such appointment." A canvass of several members of the NSB indicates the board feels the President and his staff have made the current nominations on their merits and are abiding by the ground rules for NSF appointments.

In making its announcement last Friday, the White House did not comment on the appointments or the long delay in making them. The NSF amendments creating the five new jobs were enacted in 1968, but the long hiatus cannot be chalked up simply to bureaucratic paralysis. The change in Administration and the search for a new director to succeed Leland J. Haworth accounted for more than a year. When McElroy took over last July he ordered a full review of agency organization and procedures. After an interagency study group reported, a reorganization plan was devised, which among other things defined the duties of the top assistants. The reorganization was announced in early November and the search for the men to fit the job descriptions began in earnest.

At the outset, apparently, McElroy asked for suggestions from the board and then handled most of the initial contacts and interviews himself. Those who took part in the search say that individuals approached about the jobs tended to take weeks to consider the prospect and recruiting bogged down. Consequently, the National Science Board formed an eight-member task force to make an intensive effort. F. P. Thieme, president of the University of Colorado, who acted on this task force, says the group met to make lists of good candidates and then each task-force member contacted several of the persons listed. In this way, he says, it was possible to carry on discussions with a number of potential appointees without committing McElroy. Thieme agrees with Handler and others on the board that the final nominees were "Bill's candidates."

The nominees for assistant directorships have all earned Ph.D.'s in the sciences but in their current occupations individually represent a fairly wide range of experience—industry, NSF, university, and the military. Creutz earned his doctorate in physics at Wisconsin in 1939, Humphreys a Ph.D. in psychology at Stanford in 1938, Levin a Ph.D. in biology and chemistry at St. Louis University in 1934 and Owen a Ph.D. in chemistry at Cornell in 1950.

Creutz would come to NSF from a top post in industry research administration, but McElroy and Handler recoil at any suggestion that his nomination hints a shift in emphasis at NSF toward applied research at the expense of basic research. Handler says that Creutz has the confidence of the top university physicists and other scientists consulted on the appointments; others point out that Creutz spent half his career in academic research.

Given the present mood in the universities the appointment of a Navy flag officer to a top policy post in the civilian science agency, which many scientists regard as peculiarly their own, is not likely to go unremarked. As one NSF staff member wryly put it, "we call him Dr. Owen who happens to be an admiral." The rationale for the Owen selection is not simply based on his experience as head of naval research. NSF maintains big national research facilities like the National Center for Atmospheric Research at Boulder, Colorado, and the Green Bank and Kitt Peak observatories and is also perennially involved in large international programs such as the International Biological Program and the Antarctic Research Program. NSF's record at managing big programs is not superlative (Project Mohole lingers as a perpetual reproach), and Owen's talents and Navy training are said to be what NSF needs in the management of large installations and programs involving imposing logistical problems.

Levin has been involved with institutional program administration during most of his years at NSF, which he first joined in 1952. Humphreys has headed the psychology department at Illinois and has a national reputation for his work in educational psychometrics. Both men seem to be regarded by their peers as highly qualified for the jobs for which they have been nominated.

McElroy says that in addition to each assistant director overseeing one of the four main groupings of programs designated in the agency reorganization, he expects an important duty of the four men will be to serve on an executive planning committee with the NSF director, deputy director and the assistant director for administration. Bernard Sisco was appointed last fall to this latter post, which does not require a presidential appointment.

—JOHN WALSH