case once again to William E. McCormick, head of HSRI and the man who had originally denied Clark's request. In a new memo, McCormick urged that it be denied again. Edwards argued that this step was further denial of due process because Clark was not provided with McCormick's data and arguments and was not given a chance to rebut them.

Evidently, Edwards won the due process argument, for Fleming's statement urged that the new procedures "should accord fully with the requirements of due process." In the whole course of Michigan's performance since last fall as a testing ground for ending sex discrimination, the Fleming statement on due process is one of the few clear precedents which can possibly be followed at other colleges.

However the scales tip for Cheryl Clark, events so far have produced a number of lessons. "Personnel officers aren't equipped to be sensitive to this kind of thing," says Judith Lonnquist, the Chicago legal counsel for the National Organization of Women (NOW). "You can't expect them to be." And lawyer Edwards says, "Until now, college personnel offices have been the defenders of the employers. Like management in the early days of the labor movement, they have considered themselves the sole determinants of their employees' futures."

Another lesson is that a body like the Women's Commission cannot afford to ignore individual cases. The Michigan Women's Commission (apparently regarded by radical women's groups as too "establishment" and by some campus administrators as luckily ineffectual) was originally established after negotiations began with HEW. The commission had first planned to stick to general policy issues. In order to learn about salary problems, the commission made a computer model of the salaries paid to men in specific university research and teaching jobs. The model then predicts appropriate salaries for anyone else, including women, in similar jobs.

Last month during the protests over the Clark case, the commission hired a full-time research worker to pull out the personnel files for individual women whose salaries were more than 10 percent below the model's predicted salaries. But the researcher, Zena Zumeta, says, "What I do then is a touchy political question."

A third lesson is that the sex discrimination issue lends itself to embarrassing commentary by university officials and affects the institution's public image. Earlier this year, Fleming's Assistant for Human Relations, William Cash, was quoted in *The Michigan Daily* and the *New Republic* as saying "once you let women know they've got you over a barrel, they'll take everything they can get from you. Women just make life difficult." And Vice President for State Relations and Planning Fidele Fauri was quoted in the same articles as having said, "In tight times like these we can't afford to have any contracts held up. We just want to get these bastards at HEW off our backs."

But now Michigan officials pipe another tune: they refuse to comment on the progress, or nonprogress, of the HEW negotiations. Fauri says there is no "intentional" sex discrimination at Michigan. University Public Relations Director Jack H. Hamilton said that he didn't know whether there is discrimination against women at the university. "There is discrimination in society as a whole but at a place as large as the university I wouldn't know."

The university is making no statements about whether the Clark case has hindered the HEW negotiations or retarded approval of an affirmative action plan. However, Lonnquist (NOW) points out that a university which shows good faith and good intentions increases its chances of smooth negotiations. Lonnquist says that providing due process is an effective way for universities to demonstrate good intent. "It makes them look like supergood guys" and "more credible to the outside." Finally, of course, due process minimizes the chances that Clark or someone like her could conceivably take the university to court for denial of her constitutional rights.

As to the future, Clark and other women complaining about unequal pay could have an easier time after the end of this congressional session. Amendments to the nation's basic minimum wage and hour laws now before the House and Senate could require universities to give equal pay for university women.—DEBORAH SHAPLEY

NOAA and Oceanographic Research
"Wet NASA" Idea Dries Up

In the 1960's, before the National Oceanic and Atmospheric Administration (NOAA) was created, NOAA boosters coined the nickname "Wet NASA" for the civilian agency they hoped would lead a multi-billion-dollar technological development program in the oceans. When NOAA came into existence in October 1970, the U.S. economy had slipped, and mounting public concern about the environment had rendered technological development for its own sake an anachronism of the space era. The Nixon Administration made a half-hearted attempt to restyle NOAA to fit the times by including it in a federal reorganization of environmental activities last fall, but the Administration awarded decision-making authority to the Environmental Protection Agency (EPA). Nine months after its creation, NOAA is an anemic agency without clear identity, which measures its budget in the millions, not billions.

Several major factors have combined to weaken NOAA. The new agency suffers from a lack of Administration support, budget stringencies, and the absence of a constituency. Under NOAA's present leaders, who seem more committed to remaining members in good standing of the Nixon team than championing the nation's marine effort, it is unlikely that the agency will steer the national program on an independent course.

To provide some idea of the limitations on NOAA, it is noteworthy that none of the five areas of marine activity which the Nixon Administration designated in the fall of 1969 as priorities for new initiatives are assigned to the new agency. The five are: coastal zone management, establishing coastal zone laboratories, Great Lakes restoration, the International Decade for Ocean Exploration, and Arctic experi-

mental research. Planning responsibilities for the first three went to the Interior Department, and the last two, which are ongoing programs, went to the National Science Foundation (NSF). In addition, some marine enthusiasts are disturbed that NOAA is not conducting major research into the feasibility and environmental impact of such activities as aquaculture, sea mining, underwater systems for man-in-the-sea operations and construction of offshore facilities (that is, airports and deep-water ports).

The nation's coastlines, which are expected to be the critical focus of marine activity during the next few years, represent a test case for NOAA's future. The issue of which agency will play the lead role in coastal zone management and research is still unresolved. But it appears unlikely that NOAA will compete aggressively enough to gain the principal jurisdiction.

NOAA officials characterize the agency as "the civil center of strength" for marine affairs and related atmospheric and geophysical activities, but the facts present a different picture. NOAA's fiscal 1971 marine sciences budget of $109 million does exceed that of any other government agency except the Department of Defense (DOD), which has $225 million.* However, NOAA is, for the most part, a supplier of scientific survey data and services. It is also heavily weighted on the atmospheric side. Almost three-fifths of the agency's current $283-million budget goes for atmospheric activities, and nearly two-thirds of its 11,300 employees work in atmospherics. Most of the remaining budget is spent on marine activities, with a small portion reserved for earth sciences. On the oceanic side, NOAA has principal responsibility only for fisheries resources and mapping and charting of the oceans. The former Environmental Science Services Administration (ESSA), with the old U.S. Weather Bureau as its major segment, dominates NOAA, comprising 75 percent of the agency's budget and manpower.† The Weather Bureau alone accounts for more than half of NOAA's budget and manpower.

Perhaps the most fundamental problem facing NOAA is the Nixon Administration's demonstrated reluctance to support development of a major national oceanographic program. First, Vice President Spiro T. Agnew, in a June 1969 speech to the Marine Technology Society, pointed to more pressing national priorities and continuing inflation as reasons why the Administration "cannot rush full speed ahead into marine development programs." Second, the National Council on Marine Resources and Engineering Development, which had been an active "marine presence" in the federal bureaucracy under former Vice President Hubert H. Humphrey as chairman and Edward Wenk, Jr., as executive secretary, declined under Agnew's chairmanship and met an early death on 1 May of this year. Although the cabinet-level body created by Congress in 1966 was intended to be temporary, the House Appropriations Committee cut off its funds prematurely. Many of those who have participated in the 12 years of studies and planning for a strong national oceanographic program view expiration of the council's life as a setback. Third, knowledgeable observers of ocean politics in Washington say Nixon probably would not have created NOAA by executive reorganization in the first place had it not been for movement in Congress to create an independent agency with new authority and with about five times the manpower, three times the initial budget, and seven times the seagoing vessels.

Under Administrator Robert M. White, a meteorologist by training, NOAA is unlikely to chart a separate course from that suggested by the Administration's statements and actions. White has proven himself a loyal member of the Nixon team rather than an advocate of advancing the national oceanographic program. He showed during hearings last month before Senator Ernest F. Hollings' (D–Fla.) Subcommittee on Oceans and Atmosphere that he will remain a good soldier even if that means sacrificing power for his organization. Addressing himself to a bill (S. 307) which would ensure greater responsibility for NOAA, White testified that there is no need to legislate increased responsibility for NOAA. "I believe the authorities of S. 307 are not essential and that enactment is not necessary to carry out a vigorous ocean and environmental research program," he told the subcommittee. Last week, White told the House Merchant Marine and Fisheries Committee that personally he would consider a legislative charter for NOAA "desirable." However, he indicated that such a charter would have to be "properly drawn"—that is, acceptable to the Administration—for him to endorse it. White's skill as an in-house politician and administrator have gotten him where he is today, according to observers who have followed ocean politics closely from both inside and outside the federal government for more than a decade. Since joining the federal Civil Service 8 years ago, he has moved from chief of the U.S. Weather Bureau, to ESSA administrator, to his present post.

Proponents of a strong national oceanographic program express the fear that White may tend to give preferential treatment to atmospherics at the expense of marine functions within his organization. The fact that White took a month off during NOAA's first half-year to attend meetings of the World Meteorological Organization in Geneva reinforces their suspicions. Those interviewed by *Science* agreed that White has the ability to grasp quickly the problems and possibilities of the oceans, but some worry about his conviction when it comes to marine affairs.

Like White, nearly everyone else in a key post at NOAA arrived there via the federal bureaucracy. William Aron and David Wallace, both marine biologists who joined the agency during May, are the first new faces in top administrative positions. Wallace, formerly with the New York State Department of Environmental Conservation, is associate administrator for ocean resources management. Aron, formerly of the Smithsonian Institution, is an administrative staff assistant in charge of NOAA's new Office of Ecology and Environmental Conservation. NOAA officials hope the two appointments will temper criticism of the agency for being top-heavy with atmospheric specialists. Before Wallace and Aron joined NOAA, no one in the directorate and only two major line component

* Other agencies and departments that share in the 1971 federal marine sciences budget are: Commerce Department minus NOAA, $31.9 million; Interior Department, $30.3 million; NSF, $48.9 million; Transportation Department, $27.3 million; Atomic Energy Commission, $8.6 million; Health, Education, and Welfare Department, $6.7 million; State Department, $8.3 million; Agency for International Development, $0.5 million; Smithsonian Institution, $2.4 million; National Aeronautics and Space Administration, $2.1 million; EPA, $17.6 million.

† When NOAA was created, its major constituent elements, in addition to ESSA, were: Bureau of Commercial Fisheries (Interior); National Sea Grant Program (NSF); National Data Buoy Project (Coast Guard); National Oceanographic Instrumentation Center (Navy); National Oceanographic Data Center (Navy); Trust Territories Program (Navy); Ocean Station Vessels Program (Navy); Marine Sport Fisheries Program of Bureau of Sport Fisheries and Wildlife (Interior); Marine Minerals Technology Center of Bureau of Mines (Interior); Elements of U.S. Lake Survey (Army Corps of Engineers); Federal Hydroclimatic Network (Corps of Engineers); International Field Year of the Great Lakes (Corps of Engineers).

heads were qualified oceanographers.

A nearly static NOAA budget has shaped the national oceanographic program. NOAA has no programs beyond those that existed previously in separate components—because, says John W. Townsend, NOAA's associate administrator, there is no new money. He points to a few new initiatives in the proposed fiscal 1972 budget, in which the President is recommending a total increase of $43 million for the agency. But the House has already voted to cut the proposed 1972 NOAA budget from $326 million to $310 million, and the Senate has yet to act on it.

At least one of the programs now in NOAA is more strapped for funds than before it joined the new agency. The National Sea Grant Program, which follows the Land-Grant model and supports universities setting up major marine centers as well as individual oceanography projects, suffered a setback in its rate of budget increase in moving from NSF to NOAA. One Sea Grant official said that, at the present budget rate, no new grants can be made. He estimated that Sea Grant has been forced to turn down between $100 to $200 million offered by state governments, universities, and private foundations proposing projects on a matching basis since it was established 4 years ago.

NOAA's present jurisdictions are so confined that it would be incapable of asserting the leadership of a major national marine effort, according to Wenk, who is now teaching at the University of Washington, Seattle, and writing a book called *The Politics of the Oceans*. Responsibilities which NOAA supporters think the agency should have are scattered around other government agencies. NOAA plays a role subordinate to other agencies in oceanographic matters concerning environmental protection, mineral resources, and research. NSF's fiscal 1971 budget for marine research exceeds that of NOAA when NOAA's mapping and charting activities are discounted. Howard Pollock, a former Alaska congressman who is now NOAA's deputy administrator, said he believes the Administration has indicated by its actions that it considers the Interior Department rather than NOAA to be the leader in the mineral resources area. Pollock speculated that if the United States were to issue permits today to private companies for mining magnesium nodules in the ocean, "the licensing authority would probably be given to Interior." White described NOAA's auxiliary position in the environmental power structure before Senator Philip Hart's (D–Mich.) Subcommittee on the Environment last February. He said the EPA has the decision-making authority for federal responsibility governing the effect of man's activity on environmental quality; the Council on Environmental Quality will provide the policy guidance on such matters; but NOAA "intends to have a key input not only on fishery matters but on all oceanic and atmospheric matters requiring decisions by EPA to safeguard our environment when we have the necessary expertise."

Even within the confines of the responsibilities that NOAA now has, few innovative changes have been made in 9 months. When NOAA moved into operation the same afternoon Nixon announced its creation, it was "essentially the old ESSA with some new parts fitted in," according to Townsend. The old ESSA leadership moved up immediately to command the larger agency, scattered at 29 different locations around Washington, D.C., alone. Virtually nothing new has happened since. In fact, White said in an interview with *Science* that he would be "the first to admit NOAA is more like a collection of the groups that came into it than a coherent agency." Agency officials are planning a new organizational structure, but that too will reflect NOAA's present missions, according to White.

NOAA has no constituency in the form of a strong special interest or well-mobilized public interest group. During the 1960's, entrepreneurs and some elements of the aerospace industry gambled large sums of money on the hope that ocean sciences would take a great leap forward during the 1970's, but such interest has largely evaporated. The only lobbying organization that has ever attempted to represent diverse oceanographic interests on Capitol Hill is the National Oceanography Association (NOA), a one-man operation with an extremely modest annual budget of about $50,000 founded 5 years ago by a public relations firm, Wilson E. Hamilton and Associates. "It was probably naive to think we could get a consensus of the various interest groups on any issue concerning the oceans," said Dick Rigby, the association's executive secretary. Instead of continuing to promote a strong national marine program NOA's board of directors decided recently that they will cater in the future to the well-heeled offshore oil interests, the one segment of the oceanographic community which vigorously opposes major federal involvement in the oceans.

Conservationists interviewed have little faith that NOAA will fulfill its environmental function as long as it remains under the Department of Commerce, which, they say, has traditionally represented the industrial and economic viewpoint rather than espousing public use and enjoyment of natural resources. Recent lobbying by Commerce in support of several major fuel companies' plans to industrialize about 100 miles of the Delaware Bay coastline lends credibility to the conservationists' argument. The Delaware State legislature, in the face of strong opposition from the U.S. Commerce and Treasury departments and a dozen major corporations, enacted a law earlier this month which will ban heavy industry along the entire coastal strip in question. Commerce Secretary Maurice H. Stans went as far as to personally summon Delaware's Governor Russell Peterson, a Republican and former Du Pont executive, to his office to lobby against the legislation. Nevertheless, Peterson, who had supported the bill's passage, signed it into law.

Spencer Smith, who has been representing conservation interests on Capitol Hill for 17 years, described Commerce as "the biggest supporter and developer in the exploitation of resources of any individual department." He said that he and fellow conservationists would oppose assigning principal coastal zone responsibilities to NOAA "like we would oppose World War III." However, Smith and other conservation lobbyists interviewed expressed a strong preference for housing coastal zone responsibilities in Interior, a land-oriented agency, which, to some degree, reflects their own greater concern with land, rather than marine, problems.

White told a press conference in March that there is "obviously a conflict" between the environmental conservation role of his agency and its role in developing resources of the sea. Nevertheless, somebody must make decisions in "the best national interest," he added. Conservation lobbyists interviewed are afraid, however, that, when the political pressure is on, he may tend to give more weight to economic value than environmental impact.

Will NOAA assert enough initiative to engineer a major civilian program in the oceans? To a large extent that

will depend on how much support it can muster in the Congress, which has initiated most advances made in the national marine program during the past 12 years. Right now support in Congress for refashioning NOAA into a powerful agency through legislation would probably be limited to a small group of individuals led by Warren G. Magnuson (D–Wash.), Claiborne Pell (D–R.I.), and Hollings (D–S.C.) on the Senate side and Alton Lennon (D–N.C.) and Charles A. Mosher (R–Ohio) in the House, all of whom have oceanography subcommittee responsibilities. "It is very unlikely that they would be able to get a majority in either House to do anything that would inject us into the oceans in a big way at this time," said one Senate aide.

The congressional committees to which NOAA reports are as diverse as NOAA is fragmented. "The committee chairmen are just not about to give up anything within their jurisdiction," said John M. Drewry, who retired recently after 10 years as chief counsel of the House Merchant Marine and Fisheries Committee. The report of the Stratton Commission, which originally proposed the creation of NOAA, states that the reorganization of federal agencies to provide a coherent focus for marine activities can be successful only if major adjustments in committee jurisdictions are made.

Moreover, unlike some other agencies, NOAA does not report to Congress for an annual authorization. If NASA, for example, can sell its programs to Representative George P. Miller ‡ (D–Calif.) of the NASA Oversight Subcommittee, Miller will fight for them. NOAA reports annually to Representative John J. Rooney's (D–N.Y.) Appropriations subcommittee, where the primary reflex is to cut budgets.

NOAA's prospects for extending its authority also hinge on whether it gets control over research and management in the coastal zone, according to Wenk, who is not alone in his assessment of the importance of the coastal zone to NOAA. Environmental concern coupled with continuing tight budgets are focusing whatever attention is being paid to the oceans on the coastal zone, the 17,000-mile strip where the land and its people meet the sea and the Great Lakes. Conservationists say that unless the coastal zone is properly managed, adverse practices such as filling in the wetlands, helter-skelter commercial developments, and dumping pollutants into the bays, gulfs, and estuaries will cause irrevocable ecological changes.

White wants authority over the coastal zone, but so far he has been unwilling to publicly undercut the Administration's position on this issue. The Nixon Administration is recommending that responsibility for land use management, which would include the coastal zone, be assigned to Interior. Although White was a member of a four-man panel of the Stratton Commission, which recommended giving coastal zone responsibilities almost exclusively to NOAA, he completely reversed his position during hearings last month before the House Merchant Marine and Fisheries Committee. The NOAA administrator testified that the Department of Commerce supports the Administration's proposed Land Use Planning Act, and "it makes great sense to us" (NOAA). Chairman Lennon, whose committee is considering coastal zone bills paralleling the Stratton Commission recommendations, called White's reversal an apparent situation of "institutional restraint." Senator Hollings, who also advocates placing the coastal zone under NOAA, reportedly does not intend to invite White to address himself to the question directly before his Subcommittee on Oceans and Atmosphere, because he and other subcommittee members feel certain White would again support the Administration at NOAA's expense.

Placing the coastal zone under Interior could stunt NOAA. "To subdivide the marine environment artificially and assign the coastal function to another agency would renew wasteful splintering that NOAA was intended to correct," Wenk said in a speech last fall. If debate over whether Commerce or Interior should have jurisdiction serves to delay passage of any coastal zone policy, which now seems likely, the national oceanographic program as a whole will suffer.

Without a national coastal zone policy, the opportunity to exercise management may vanish within a few years, Wenk said. The states need federal seed money as well as a national policy to give them the political courage to buttress themselves against the vested interests trying to prevent coastal zone management, he said. Similarly, some advocates of a major developmental program in the oceans say the technological base constructed by industry during the 1960's will also disappear unless the Nixon Administration demonstrates commitment in terms of leadership, policy, and funding.

Even NOAA's enemies recognize that sooner or later the United States will have to mount a major national effort to explore, utilize, and conserve the resources of the oceans. Conversely, NOAA's most ardent promoters admit that an ocean program designed according to the space model would be undesirable. However, the idea that this nation's oceanographic effort will get out of the doldrums during the 1970's is, at best, more of a hope than an expectation. As Feenan Jennings, director of the International Decade for Ocean Exploration, predicted, "It looks now as though the timetable for a major marine thrust will be more like 20, 30, or even 40 years from now."

—JUDY CHASE

Formerly education writer for the Honolulu Star-Bulletin, *Judy Chase is now a free-lance writer living in Washington.*

‡ Miller is also chairman of the House Committee on Science and Astronautics.

RECENT DEATHS

Nathan W. Ackerman, 63; clinical professor of psychiatry, College of Physicians and Surgeons, Columbia University; 12 June.

Thomas A. Baker, 78; former dean, School of Arts and Sciences, University of Delaware; 29 April.

Jack Bangs, 57; clinical professor of audiology and speech pathology, Baylor University College of Medicine; 2 May.

Alan M. Bateman, 82; professor emeritus of geology, Yale University; 11 May.

R. Keith Cannan, 77; former chairman, medical sciences division, National Research Council/National Academy of Sciences; 24 May.

Ralph Cleland, 78; emeritus professor of botany, Indiana University; 11 June.

Rolla E. Dyer, 84; former director, National Institutes of Health; 2 June.

May G. Wilson, 80; professor emeritus of clinical pediatrics, Cornell University; 14 June.

Jane R. Winer, 52; assistant professor of rehabilitation medicine, Mount Sinai Medical School; 7 June.

Erratum: In the article "Lead Poisoning: Zoo animals may be the first victims" (p. 130, 9 July), an erroneous figure was given in column 3, paragraph 3, lines 5 and 6. It should have read 3900 micrograms per gram of dry weight.