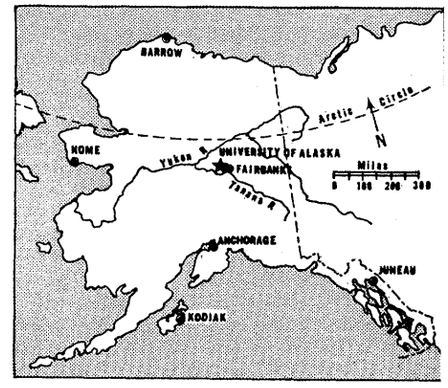
tration representative and spoke candidly on the financial plight of American science. After years of rapid growth, he said, federal support for science suddenly leveled off in 1966. "The results have been painful," he said. "It has been terribly harmful in certain fields." He added, "It is not a catastrophic situation. It isn't that funds have been cut in half. But there has been a decrease in real effort." For example, he pointed out, the 200-Gev accelerator at Batavia, Illinois, is now entering a costly construction stage and, as a result, "other projects have had to be shut down to meet these costs." DuBridge said he would like to see federal support for science return to an annual growth level of about 10 to 12 percent for several years, so as to make up for the drop-off in recent years, and then grow annually in step with the increase of gross national product. To this he added, "I think our basic science has been hurt most, and I'd like to make up for lost ground there first."

What about the cooperative efforts that he discussed during his trip?

Oh, yes, they looked very promising.

—D. S. GREENBERG

University of Alaska: Academe's Outpost in the Subarctic



College, Alaska. The University of Alaska, situated less than 120 miles below the Arctic Circle in the nation's most sparsely populated state, might be expected to be a small, struggling institution on the academic world's outer fringes. And, in fact, the university is in some respects scarcely more than that. Yet in others it is quite something else—it is an institution with a thriving and relatively large research establishment that is making a very good thing indeed of its location in the far and frigid north.

The university campus, located here at College, 4 miles northwest of Fairbanks, is on a forested rise that overlooks the broad Tanana River valley. The high peaks of the Alaska Range, far to the south, are visible from the campus on clear days. The university and the Fairbanks area are in Alaska's central plateau region, where the winters are bitterly cold—colder even than those on the Arctic slope—and where, by late December, there is almost constant darkness (dawn coming at 10 a.m. and sunset at 1:30 p.m.).

In this rather forbidding interior region of Alaska, the university, with facilities now valued at $75 million and an annual operating budget of nearly $24 million, represents what is clearly the single most important nonmilitary activity. The university has prospered, despite the fact that it has lacked a substantial population base on which to build. Alaska's population of 282,000 (the U.S. Bureau of the Census' 1969 estimate) is small and, from the university's standpoint, awkwardly distributed over the state's huge territory.

The Fairbanks area is now booming from the air traffic and other activities generated by the North Slope oil rush (*Science*, 3 October), but it still has fewer than 50,000 inhabitants, even counting personnel of nearby Army and Air Force installations. More than a third of the population of Alaska lives in and around Anchorage, which is 265 miles from here by air and more than 400 miles by road. And, for Juneau, Ketchikan, and other towns of the southeast Alaska panhandle, the university is anywhere from 600 to 800 air miles distant, or as far away as institutions in Washington State, where many Alaskans do, in fact, attend school.

This fall the university has some 2000 full-time students enrolled here (the university also has seven community colleges, three in the Anchorage area, three in the southeast panhandle, and one at Kodiak), and of that number almost three fifths are freshmen and sophomores. Most who enter as freshmen remain only a year or so; one reason many depart is that the university does not have enough professors—or at least not enough teaching professors—to offer an appropriate selection of courses at the junior- and senior-year levels. The low junior and senior enrollment, in turn, makes it harder for the university to obtain the larger legislative appropriations that are necessary if more courses are to be offered.

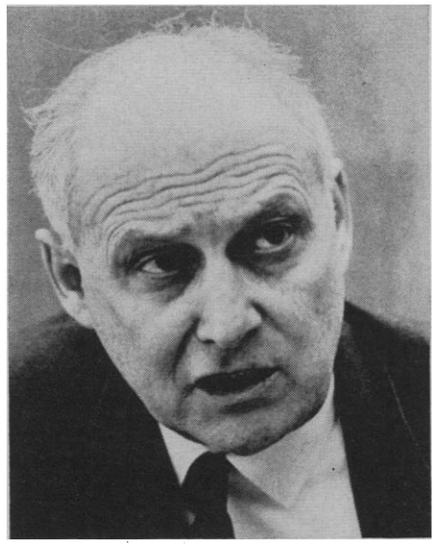
The university can in reality be regarded as made up of two rather distinct institutions. One of these is a small, uneven undergraduate school supported largely by the state. The other consists of an array of research institutes which receive some state support but which depend largely on grants and contracts from outside Alaska. Principally, of course, this outside support has come from federal agencies, though to some extent it has come from foundations and industry, now especially the oil industry. This year the institutes will spend about $10.5 million—an extraordinary amount of research activity for a small institution in an out-of-the-way place. But it is precisely because the university is located in Alaska that it has found rich opportunities for research in such fields as auroral studies, seismology, volcanology, glaciology, mammalian physiology (under conditions of extreme cold), ecology of the tundra and taiga (the swampy coniferous forests that begin where the tundra ends), arctic engineering, and the social and economic development of the Alaskan natives.

The university's beginnings go back to 1917, 5 years after a territorial government was created but some 4 decades before Alaska became a state. In that year the Alaska legislature enacted a measure to establish the Alaska Agricultural College and School of Mines here. This truly was an act of faith, for the gold rush that brought thousands of new people to Alaska around the turn of the century had waned, the territory's population was

declining (between 1910 and 1920 it fell from 64,350 to about 55,000), and prospects for agricultural development were quite limited (though not always has this been acknowledged by Alaska's leaders).

Sufficient funds to start the new college were not immediately appropriated, and it was not until 1922 that classes began, reportedly with a 1-to-1 faculty-student ratio (six instructors and six students). The students used large boxes for desks and small boxes for seats. Thirteen years later, in 1935, Alaska College, as it was called, had an enrollment of 150 students and a faculty of 18, and, given this show of progress, the legislature renamed it the University of Alaska. The University barely survived World War II, but it resumed its growth in the postwar period, and by the late 1940's the legislature was treating it more generously.

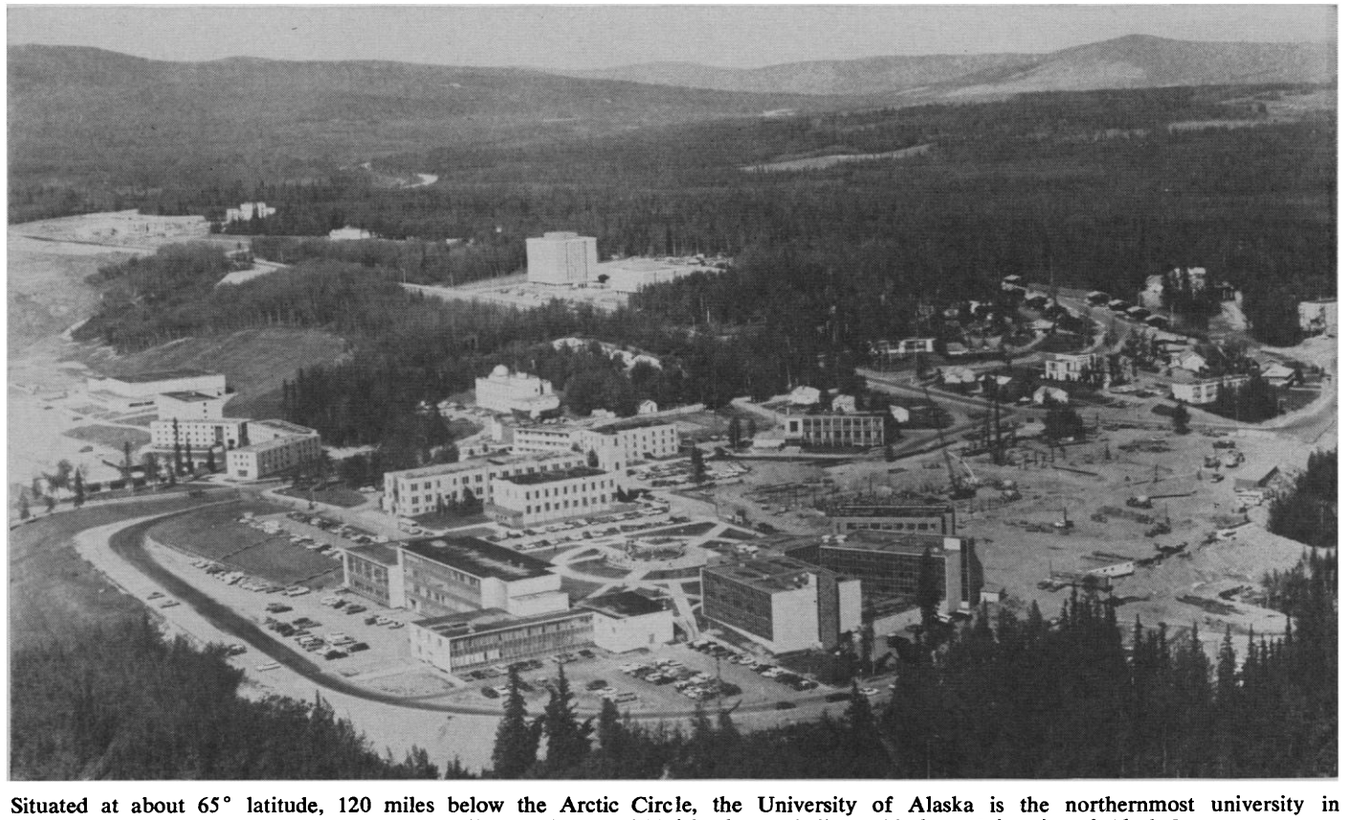
In 1946, the U.S. Congress took an unusual step and provided funds for the construction of a building here to house a geophysical institute. This step —which proved to be a major one in the university's history—was taken chiefly at the urging of four men: E. L. Bartlett, the Territory of Alaska's nonvoting delegate in the U.S. House of Representatives; Charles E. Bunnell, the first president of the university; and Merle Tuve and John A. Fleming, of the Carnegie Institution's Department of Terrestrial Magnetism, which had set up a small station for ionospheric studies here as early as 1933.



President William R. Wood
University of Alaska

The new Geophysical Institute gave the fledgling university a center of intellectual vitality, especially after Sidney Chapman, the world-renowned British mathematician and geophysicist, joined the institute faculty in 1951 as a part-time professor and advisory scientific director. Today the institute has a staff of 30 professors (plus seven support engineers and 30 research assistants), about a third of them from foreign countries such as Japan, Germany, Britain, India, and Australia (the institute's director, Keith B. Mather, is an Australian). Its expenditures during fiscal 1970 will total about $2.5 million, 80 percent of that amount coming from federal grants and contracts.

The Geophysical Institute was the first of the university's interdisciplinary research institutes and is still the largest. It has trained all but a few of the 33 students on whom the university has conferred the Ph.D. degree. Besides being important in its own right, it has, by its example, encouraged the establishment of research institutes in other fields. Since 1960 a half dozen additional research institutes or special laboratories, such as the Institute of Marine Science, the Institute of Arctic Biology, the Arctic Environmental Engineering Laboratory, and the Institute of Social, Economic, and Government Research, have been established. These institutes represent a significant intellectual resource, and several federal



Situated at about 65° latitude, 120 miles below the Arctic Circle, the University of Alaska is the northernmost university in the Western Hemisphere. The campus is 4 miles northwest of Fairbanks, at College, Alaska. [University of Alaska]

agencies profit from (and contribute to) that resource by having laboratories of their own on campus. These facilities include, for example, the Alaska Water Laboratory of the Federal Water Pollution Control Administration (FWPCA) and the Public Health Service's Arctic Health Research Laboratory.

Much of the credit for the university's rapid growth since 1960 goes to President William R. Wood, who assumed his present office in that year, and coming to Alaska from the University of Nevada where he had been academic vice president. Wood generally has been effective with the state legislature in Juneau (though he encountered some shoals there last winter), and, on the federal scene, he seems to have been a capable grant swinger.

But there are some at the university who believe that, during his first years as president, Wood was more interested in keeping federal funding agencies happy and in building up the university's research program than he was in respecting academic freedom. The case most often cited in point is that of William O. Pruitt. Pruitt, a mammalogist, was employed by the university during 1959 and 1960 under an Atomic Energy Commission contract to make a study of the ecology of terrestrial mammals in the Cape Thompson region of northwest Alaska, where the AEC was planning to conduct Project Chariot to excavate a harbor by means of a nuclear explosion (a project later abandoned).

In articles, letters to newspapers, and other ways Pruitt tried to raise an alarm about radiocontamination of the lichen-caribou-Eskimo food chain of tundra regions from nuclear blasts. At the termination of the AEC contract, Pruitt (who, since leaving Alaska, has spent most of his time in Canada and is now at the University of Manitoba) was dropped from the biology department and not given the regular faculty appointment that he had expected. Moreover, his research report to the AEC was heavily edited by his department chairman, though not all references to radiocontamination of the food chain were deleted.

Some present and former faculty members think the administration's unwillingness to retain Pruitt was due partly to a belief that, if Pruitt stayed, the AEC and possibly other federal funding agencies would be offended. Albert W. Johnson, who is now dean of the College of Sciences at San Diego

NEWS IN BRIEF

• **GEOLOGIST PLANS TO QUIT APOLLO PROJECT**: Eugene Shoemaker, principal investigator of field geology for the Apollo program, has announced he plans to quit the space program because of his dissatisfaction with national space goals. He said the Apollo program is developing "another big transportation system that has no identifiable scientific purpose." He said that the scientific data which was obtained from the manned moon landing could have been gathered with unmanned systems at one-fifth the cost about 3 years ago. Shoemaker, who is chairman of California Institute of Technology's Division of Geological Sciences, said he would continue with NASA's moon flight program through the third manned landing, as his contract stipulates. The geologist is just one of several scientists who have quit the space program recently over space priorities.

• **DRAFT RULE CHANGE**: President Nixon has announced that draft-eligible graduate students will be allowed to delay induction until the end of the academic year. Under the terms of the old policy, which was announced last October after considerable outside pressure from educators and after considerable delay by the Selective Service headquarters, graduate students were allowed to delay induction only until the end of the semester in which they were currently enrolled.

• **UCLA ACADEMIC FREEDOM ISSUE**: The UCLA Faculty is challenging a University of California Board of Regents' decision to bar Angela Davis, a 25-year-old Communist and black militant, from teaching a course for credit at UCLA. The Regents decision has been criticized by faculty members who feel the Davis dismissal proceedings are a violation of principles of academic freedom. The Faculty Academic Senate has demanded that Miss Davis, who is reportedly being dismissed by the Regents because she said she was a Communist, be permitted to teach a course for credit, which was assigned to her by the dean of the UCLA Philosophy Department. Miss Davis, a graduate of Brandeis who did her graduate work under Marxist philosopher Herbert Marcuse at the University of California at San Diego, has said, "I can't and won't keep my politics out the classroom." She was scheduled to teach a course in "Recurring Philosophical Themes in Black Literature." The University of California has maintained an anti-Communist ban since 1940 and has barred Communists from assuming faculty positions since 1950.

• **MIAMI SNAIL CONTROL**: The State of Florida on 1 October initiated an intensive control program to destroy thousands of fist-sized snails, *Achatina fulica*, found in a 13-square block area in Miami. A corn meal bait, which contains calcium arsenic and metaldehyde, is being spread by the Florida State Agriculture Department to kill the snails. The origin of the snails in the Miami area is still unknown, but U.S. Agriculture Department officials cooperating in the program believe that several of the snails were brought from Hawaii 3 years ago by a child as a gift for his grandmother. The snails, which multiply hermaphroditically, reach adulthood in about 30 days.

• **KAPITSA VISIT**: Pyotr L. Kapitsa, noted Soviet physicist, said last week that he is in favor of "anything that brings the Soviet Union and the United States closer together." Kapitsa was visiting the National Academy of Sciences, in Washington, D.C., roughly the half-way point on his 3-week good will trip through the United States. Although he favors increased scientific cooperation between the United States and the U.S.S.R., Kapitsa said that competition in space was good for both sides. He also feels that antiballistic missile construction is a waste of money.

• **SOLID WASTE MANAGEMENT REPORT**: The Office of Science and Technology has released a report that surveys solid waste management. The report recommends that the federal government initiate a broad program for research, development, and demonstration in solid waste management. *A Comprehensive Assessment of Solid Waste Problems, Practices, and Needs* may be obtained for $1.25 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

State College but who was a professor of botany at the University of Alaska (and an investigator under the AEC contract) when Pruitt was here, is one who believes that Pruitt's dismissal was motivated in part by such a concern. And *Science* has additional information, obtained confidentially, indicating that Johnson's belief is well founded.

Yet in recent years no substantial issues of academic freedom have arisen at the university and a tenure system finally has been established (no professors had tenure when Pruitt was here). And several years ago, when a professor of economics was being denounced by the governor of the state for having said that Alaskan agriculture would never be of major importance, Wood defended him. Moreover, last year a University Assembly, in which the faculty has the majority voice (and in which students are represented), was established as the institution's primary body for setting academic policy.

Faculty morale at the university seems reasonably good, though many people come here for a few years, "see Alaska," and return to a warmer clime. Not everyone, and especially not all faculty wives, can endure the Fairbanks winters. Lows of 40 or 50 degrees below zero are common and may persist day after day. From early December through February intense cold and long hours of darkness keep people mostly indoors, where some fall victim to "cabin fever" (the symptoms may range from extreme lethargy to heavy drinking or fierce quarreling with one's spouse).

Salaries here appear competitive at first glance, but, taking the high cost of living into account, they are modest enough. Housing is scarce and expensive, partly because several years ago the university administration flouted faculty opinion by yielding to pressure from Fairbanks real estate people in not seeking to have on-campus housing expanded.

Though most students do not remain a full 4 years, they generally seem to enjoy the university while here. This seems not to be true, however, of the Eskimo, Indian, and Aleut students, a couple of hundred of whom are now enrolling each year, many coming directly from native villages or all-native boarding schools. Relatively few of those native students adjust to the unfamiliar academic routine and become acculturated to the new social setting. They usually stay to themselves, though if white students discriminate against them this seldom seems to be done consciously or overtly. Most of the natives drop out, often "just disappearing" without a word to school authorities.

Except for the passive discontent of the natives, students here do not appear especially restless. More than three fourths of them are from Alaska and tend to be vocationally oriented types who do not make waves. The university attracts some potential militants from California and other places, but they have not found the climate—in either the literal or figurative sense of that word—conducive to militant student behavior. In winter even the most hotblooded are likely to find their passions cooled by 50-below weather. Such demonstrations as occur here are likely to take place in spring or early fall. On the day and

POINT OF VIEW

Women and Professional Advancement

The following excerpts are taken from a statement of the women's caucus to the general business meeting of the American Sociological Association on 3 September 1969. The statement was presented by Alice S. Rossi, associate professor of sociology at Goucher College.

Where women are concerned, the majority of men sociologists still engage in the "put down," via ridicule, exclusion masked as sexual flattery, and overt as well as covert denial of the civil rights of women in hiring and promotion. The same white men who experience embarrassment and outrage in old screen stereotypes of the superstitious, foot-shuffling servility of a Steppin Fetchit still accept and act upon a stereotyped set of expectations of male intellectual and social dominance and female intellectual and social dependency that is as outrageous to women as the Negro stereotype is to Blacks. . . .

As sociologists, we should be capable of distancing ourselves from the dailiness of public and private life, and to work with rather than against any movement dedicated to an expansion of individual opportunity and human rights. It is a failure of the society, and of the sociology profession in particular, to find, as the women's caucus survey of graduate departments did this spring, that women were 30 percent of the doctoral students in graduate school this past year, but only 4 percent of the full-time full professors in graduate departments; or to find that women are 39 percent of the Research Associates in the elite graduate departments but only 5 percent of the Associate and 1 percent of the full Professors in these same top departments. It is outrageous that a custom persists whereby a woman Research Associate or Lecturer with a Ph.D. and ten years or more of research experience cannot apply for research funds as a sole principal investigator while a young man with a brand new assistant professorship but no prior responsibility for conducting research can readily do so.

Women are tired of the rationalized litany of their male colleagues—"but women drop out of graduate work to marry and rear a family." In 1969, the question is: what are you, the men in graduate sociology departments, doing to retain these highly selected women graduate students? Since these women are carefully selected (else they would never be admitted to your departments), it is more a failure of a department than of the students if they leave without a degree. Do you permit easy transfer of graduate credits to another university? Do you suggest part-time study with stipend support to ease study-home combinations of responsibilities? Has any department studied its Ph.D. drop-outs, much less established policies aimed at reducing this loss of talented young people? Has any sociologist surveyed his own university student, employee, and faculty body to gauge the need that might be met by the establishment of university day care centers for pre-school youngsters? . . .

hour of the AEC's recent nuclear shot on the island of Amchitka in the Aleutians, some 100 students held a "peace prayer" on campus, but this was quite orderly.

Student and faculty life has its attractive aspects, especially for those who like the outdoors. A good many faculty people have comfortable homes in the forested hill country within a few miles of the university, and moose browse guilelessly in their gardens. Some students live in cabins back in the woods and come in for classes on their skis, though the onset of deep winter usually drives them into dormitory housing.

Some faculty members say that a principal shortcoming of the university is that it has not yet found an identity of its own—that, too often, it lends itself to Alaskan boosterism. They recall, as a recent example of this, the letter that Earl H. Beistline, dean of the College of Earth Sciences and Mineral Industry, wrote last March to the director of the FWPCA's Alaska Water Laboratory, complaining about a laboratory report that had described placer mining as a source of stream pollution. Beistline said the report "belittled" the gold-mining industry. He suggested that if clean water was important to tourism, so too is the sight of a busy gold dredge.

A tendency of the university to yield to mindless boosterism would be especially unfortunate now, when the oil rush is accelerating Alaskan development, producing huge new state revenues, and raising important questions of environmental protection. Through programs of research and analysis related to current Alaskan issues the university can help to identify policy alternatives and raise the level of public discussion and decision-making at a critical time.

The university's research institutes are, in fact, engaged in research arising from the oil rush; most of these studies are under oil industry sponsorship. The Institute of Marine Science is now making some studies at places which might be subjected to oil spills, such as along the arctic coast and in Valdez Arm, at the southern terminus of the proposed trans-Alaska pipeline, which will extend from Prudhoe Bay, on the North Slope, southward for 800 miles to the port of Valdez. The Institute of Arctic Biology is researching ways to revegetate and restore tundra and taiga disturbed by the pipeline construction or other oil industry activities. And the Arctic Environmental Engineering Laboratory has been helping the industry determine how best to construct the pipeline, which must be laid in or over hundreds of miles of permanently frozen ground (permafrost).

(Not all of the university investigators seem to understand one another, however. For instance, in an interview with *Science* last summer, Charles E.

HEW Blacklisting Issue Ignites Again

The fact that the Department of Health, Education, and Welfare (HEW) has been excluding scientists from parttime advisory panels on the basis of security and suitability checks came to fuller attention last week.

The exclusion of many noted scientists from HEW's scientific panels was first publicly revealed and documented in *Science* (27 June and 18 July). After attracting some outside attention, the subject lay somewhat dormant until last week when *New York Times* reporter Richard D. Lyons wrote four extensive articles on HEW blacklisting procedures. Other news organs quickly picked up the story; major stories on HEW's practices appeared on NBC TV's Huntley-Brinkley show, on CBS TV's national news programs, and on the national educational television hookup.

Previously, the HEW leadership had seemed to give little attention to complaints by scientists and scientific organizations on HEW's security practices. However, on 9 October, the day that the first front-page *New York Times* story appeared, HEW hastened to announce that it has appointed a committee to examine HEW's security procedures including the exclusion of scientists from its panels. The committee will consist of five HEW officials: Undersecretary John G. Veneman, Jr., Assistant Secretary for Health and Scientific Affairs, Roger O. Egeberg, general counsel Robert C. Mardian, executive assistant L. Patrick Gray, and Frederick H. Schmidt, who has served as the head of HEW's controversial security office for the past 16 years. Harlan Reid Ellis of Columbia University will assist the group.

The HEW spokesman said that the committee had been appointed 2 weeks ago, but the existence of this committee was not mentioned to the representatives of various scientific organizations who met with HEW Assistant Secretary James Farmer on 7 October to protest exclusion of scientists from these advisory panels. In view of the timing of HEW's announcement, it seemed as if the committee might well have been created primarily in response to the press attention which HEW was receiving on this matter.

The 7 October meeting between the scientific organizations and Secretary Farmer resulted in no assurance that the current system would be changed in HEW. However, with the mounting adverse publicity which began on 9 October, HEW officials may now take the matter more seriously and may finally summon up the energy to reexamine this system.

The scientific groups concerned about the HEW security system plan to continue their efforts to force revision. The organization primarily responsible for rallying the support of other scientific groups is the American Orthopsychiatric Association, which has its headquarters in New York City. Dane G. Prugh, a past president of the association, said last week that he plans to continue the fight to change the HEW security system for years if necessary and urged other scientific organizations to bolster his association's efforts with time and money.

By maintaining its security system through many Administrations, HEW has made itself a sitting duck for impassioned and persuasive attack. One of the most forceful comments appeared in the *Washington Post* on 11 October. In a fiery editorial entitled "Blacklisting for the Fun of It," the *Post* concluded, "Queried by *Science* last June, HEW Secretary Robert Finch said that he was 'looking into' the matter of blacklists. How does he like what he sees? Does it make any sense? Is it honorable? Does it comport with the American concept of freedom?"—BRYCE NELSON

Behlke, director of the engineering laboratory, observed: "The tundra is delicate, but so what? If it's torn up, esthetically that's poor. But if there is nobody there to look at it, what's the difference?" Tourists do not visit the North Slope, Behlke said, and scarcely anyone else goes there, except "occasionally a college professor in summer on a boondoggle, with a grant to go to the end of the earth to study something that does not need to be studied.")

The university, and especially its Institute of Arctic Biology, will play a large role in studies of the tundra and taiga biomes under the International Biological Program, which should provide insights useful to the state and federal governments for shaping arctic policies. No other institution is so well situated for these studies except the Naval Arctic Research Laboratory (ARL) at Barrow. The university, under a contract with the Office of Naval Research, provides the logistic support for this laboratory, and some scientists here use ARL facilities.

The university's Institute of Social, Economic, and Government Research, which, incidentally, obtains much of its financial support from the Ford Foundation, is providing some highly independent views of development activities in Alaska. For example, one of the institute's young tigers, Gregg Erickson, a resource economist, proposed a radical change in state policy almost on the eve of Alaska's recent North Slope oil lease sale that produced $900 million in bonus bids. He recommended that the state slow the pace of oil exploration and development by postponing the lease sale and sharply increasing its tax on oil production. Another institute economist, Arnold R. Tussing, has suggested that, before the oil industry is granted the federal permit to build the trans-Alaska pipeline, it should be made to pay *all* costs of the project, including those incurred by the public as the result of destruction of scenic values and loss of fish and wildlife.

In sum, in its state university Alaska has a substantial, diversified, and sophisticated research resource that could be the envy of a number of states that have larger populations. Given a spirit of intellectual independence and proper financial support by the state government and federal agencies, the university can be enormously useful in helping to guide Alaska's future.

—LUTHER J. CARTER

APPOINTMENTS

A. Rosenthal

F. W. Ness

Aaron Rosenthal, comptroller, National Science Foundation, to comptroller, National Academy of Sciences. . . . **Frederick W. Ness**, president of Fresno State College, to president, Association of American Colleges. . . . **Max E. Caspari**, professor of physics, University of Pennsylvania, to chairman, physics department at the university. . . . **Arnold F. Brodie**, professor of biochemistry, University of Southern California School of Medicine, to chairman, biochemistry department at the school. . . . **Gerald W. Medsger**, executive officer of the mathematics department, U.S. Military Academy, to director of research at the academy. . . . **F. Douglas Lawrason**, vice president for academic medical affairs of Merck Sharp and Dohme, to associate dean for academic affairs, University of Texas Southwestern Medical School, Dallas. . . . **Gordon Deckert**, acting chairman, psychiatry and behavioral sciences department, University of Oklahoma Medical Center, appointed chairman of the department. . . . **Joe Hitt**, chairman, electrical engineering department, University of Detroit, to dean, Graduate School at the university. . . . **Beaumont Davison**, chairman, electrical engineering department, Ohio University, to dean, College of Engineering and Technology. . . . **Albert H. Rosenthal**, professor of political science, University of New Mexico, to director of the new Advanced Program in Public Science Policy and Administration at the university. . . . **Keith Waterhouse**, professor of urology, State University of New York, Downstate Medical Center, to chairman of the urology department there. . . . **Robert S. Knox**, professor of solid-state physics, University of Rochester, to chairman of the department of physics and astronomy at the university. **Norman S. Cohn**, professor of botany, Ohio University, to chairman, botany department at the university. . . . **Robert C. Spencer**, dean, Graduate School, University of Rhode Island, to president of Sangamon State University, which is to be established in Illinois. . . . **Charles L. Miller**, head, civil engineering department, M.I.T., to director, Instrumentation Laboratory at M.I.T.. . . . **Richard A. Carpenter**, assistant chief, science policy research division, legislative reference service, Library of Congress, to chief of the new environmental policy division at the library. . . . **Alvin R. Tarlov**, acting chairman, medicine department, Pritzker School of Medicine and the biological sciences division, University of Chicago, appointed chairman of the department.

RECENT DEATHS

Ora C. Bradbury, 79; former chairman of the biology department, Wake Forest University; 8 September.

Thomas Francis, Jr., 69; former chairman of the epidemiology department, University of Michigan School of Public Health; 1 October.

Richard P. Hall, 69; professor emeritus of biology, New York University, University Heights; 12 September.

Robert Kohr, 44; professor of mechanical engineering, Purdue University; 10 September.

Edwin B. Matzke, 67; former chairman of the biological sciences department, Columbia University; 28 September.

Warren S. McCulloch, 70; neurophysiologist and a pioneer in the science of cybernetics; 24 September.

Walter H. Newhouse, 72; emeritus professor of geology, University of Chicago; 21 September.

Arthur Shapiro, 59; professor of psychophysiology at the unit for experimental psychiatry, Pennsylvania Hospital; 30 September.

Charles E. Teeter, 66; associate professor of chemistry, Southeastern Massachusetts University; 22 September.

Andrew A. Thompson, Jr., 46; research geophysicist, Army Ballistic Research Laboratories, Aberdeen Proving Grounds; 17 September.

Gordon T. Whyburn, 65; alumni professor of mathematics, University of Virginia; 8 September.

S. Bernard Wortis, 65; chairman, department of psychiatry and neurology, New York University Medical Center; 5 September.