the federal government." A source of the trouble was the "extension into the NIH easy money era of the Flexner concept of the triple threat man (teaching, research, patient care). In some departments the feeling that a man should be a great clinician fell into disuse. If you stay with the idea of the triple threat man, as patient load increases you must increase the staff. But where is the lab space and free time to work in the labs coming from?

"This is the problem of the medical schools. We must find a way to diversify the function of the faculty. One solution would be to create two kinds of faculty appointments. You might create a postgraduate medical school to exist side by side with the undergraduate medical school."

An immediate problem, as Kaplan sees it, is to create an incentive plan to provide Stanford with competitive salaries and funds for research.

The problem of incentives and the question of such new departures in organization as creation of a cancer center and cardiac center are in abeyance while Stanford searches for a new dean to replace Robert S. Glaser, who resigned last spring to become a Commonwealth Fund executive.

The acting dean is John L. Wilson, who came to Stanford as an associate dean when Stanford took on administration of a regional medical program. Wilson is held in generally high regard by the faculty. In style he is anything but a confrontationist, but he is credited with taking relatively strong initiatives in the area of budget and day-to-day administration, considering his acting capacity. But the tougher policy problems have been tabled in the interim.

Internal pressures building at Stanford, such as those for creation of semiautonomous cancer and cardiac centers, some pessimists feel could dismember the medical school. Others, like geneticist Joshua Lederberg, think it may be possible to establish a new form of specialized treatment center connected to medical schools which would allow the schools to increase income without breaching the integrity of medical education.

Those familiar with the realpolitik of medical schools feel that something substantial must be done soon, since the resentments that produced the demand for an incentive plan and the center proposals are near the flash point in many schools. How Stanford deals with these problems or fails to deal with them will be important beyond Stanford, because, in making its reputation, Stanford inevitably made itself a model for other schools.

Stanford is being subjected to other strong centrifugal forces. Among the strongest is the demand from activists that the school commit itself more deeply to meeting the needs of the community. The implications for research and governance at Stanford of these demands will be the subject of a third article.—JOHN WALSH

Federal R&D: Domestic Problems Get New Efforts But Little Money

The popularity of the idea of diverting some of the nation's technically skilled manpower from defense and space research to work on the solution of pressing domestic problems has not been lost on the Nixon Administration. A year ago, for example, in connection with the budget for the current fiscal year (FY 71), the White House revealed an analysis of federal research and development programs which declared, "Emphasis is being placed on research and development relating to environmental, education, housing, transportation, and crime problems." In principle this policy could lead to major new programs and increases in the now scarce supply of R&D funds. But progress during this past year has been slow, and prospects for the future do not look much better.

One of the changes to be noted so far is that several civilian agencies with no previous scientific or engineering orientation have joined the list of R&D supporters and consumers, and others have upgraded their previously lackluster technical abilities. The Justice Department and the Post Office, for example, have begun new programs within the last 2 years, and the Departments of Transportation (DOT) and of Housing and Urban Development (HUD) have centralized and renovated their R&D efforts. These four agencies are distinguished by the fact that their R&D programs contain more D than R and emphasize machinery and systems development. Consequently industry and not-for-profit think tanks, rather than universities, have been the major recipients of funding from these programs. All four agencies rely more on contracts and grants than on in-house programs to accomplish their missions, and, except for some DOT funds, essentially all the R&D dollars are spent out-of-house.

Large amounts of new money have not yet been forthcoming, however. Justice, for example, has only $10 million in R&D money for the current fiscal year (FY 71), HUD has $35 million, and the Post Office has $60 million. DOT has about $490 million in this year's R&D budget, but over half of this amount is for the supersonic transport (SST) and has not yet been approved by Congress. These programs are tiny compared to the nearly $8-billion R&D effort in the Department of Defense or the $3.5 billion spent by the National Aeronautics and Space Administration (NASA). A sign of possibly higher levels of spending on hardware and development programs oriented to domestic problems is contained in the Administration's budget requests for the coming fiscal year, which were released last week. The Administration is proposing increases of $125 million in DOT, almost $50 million in the Post Office,* $15 million in HUD, and about $15 million in Justice. But these figures are projec-

* The Post Office will become a quasi-public corporation on 1 July 1971, under the control of a Board of Governors. The FY 72 budget has not yet been approved, and Congress must also pass on the federal subsidy funds in that budget.

tions and actual appropriations by the Congress may well be considerably less.

Despite shortages of funds, it is clear that things are stirring within these four agencies. The pattern of R&D efforts which emerges from interviews with research administrators is one of ambitious programs which, although they contain very little new money so far, are impressive in their intended scope.

The largest of these programs is the one within DOT and includes the SST, although the protracted Senate debate over the controversial plane may mean that Transportation will never see the $290 million initially budgeted for it. Exclusive of the SST, however, DOT has about $200 million in the current fiscal year for work related to five different modes of travel—air, highway, rail, urban, and marine. In addition, the department is funding some research on the problems of noise and tunneling technology which apply to more than a single type of transportation. The projects range from new efforts to improve the air traffic control system to an experimental vehicle safety program aimed at reducing injuries and deaths from automobile crashes. Other major projects include the design of a 300-mile-per-hour train for intercity transport, the Coast Guard's work on oil spill detection and treatment, and air-sea rescue technology.

New Money for Mass Transit?

The amount of DOT money devoted to R&D on urban mass transportation has been decreasing for several years, despite the seemingly urgent needs of cities for alternatives to cars and highways. However, this trend may be reversed in the coming year. The FY 72 DOT budget provides a $51-million increase for urban mass transit, the largest single increase in the department's R&D programs. If Congress approves the expanded program, most of the money will go into new demonstration projects like the current DOT effort to development a track air-cushion vehicle for the Los Angeles area.

One of the problems facing DOT is the lack of able technically trained professionals within its constituent agencies. While strengthening these agencies, the department has also added 33 new professional staff to the office of the Assistant Secretary for Systems Development and Technology, Robert Cannon, to provide more centralized management of the R&D programs and to help integrate the research efforts directed toward the various modes of transportation. Work on a new air traffic control system for the 1980's and other long-range research is administered directly from Cannon's office rather than by one of the department's constituent agencies, a change that is reflected in the $9-million budget increase that the office received from Congress last year. Another newly acquired in-house resource is the Transportation Systems Center (*Science*, 22 January 1971). Although greater utilization of the Center and the department's expanded technical staff may mean an increase in the amount of in-house R&D, the bulk is still contracted out to industry.

While transportation research is moving ahead on all fronts, the same is not true of efforts to halt urban blight. The Department of Housing and Urban Development has been frustrated so far in its attempt to start a broad R&D attack on urban problems. The main component of the HUD program is the 2-year-old Operation Breakthrough, a $30-million demonstration program aimed at revitalizing the housing industry in this country. However, HUD was denied an additional $20 million by Congress last year, a sum with which it had hoped to begin work on utilities, building technology, and urban development history. Although still small, the current $35-million level of R&D spending does represent a twofold increase over 2 years ago.

The Breakthrough program is trying to increase the interest of manufacturing industries in housing and to promote a shift to factory-built housing. Contracts have been negotiated with groups of planners, developers, and housing fabricators to construct more than 2500 prototype units at eight sites, the largest of which is a 500-unit project in Jersey City, New Jersey. The demonstration projects attempt to incorporate currently available techniques and explore them more thoroughly rather than develop wholly new construction methods and materials. In addition to stimulating an industrial network, HUD's program has financed work at the National Bureau of Standards on novel criteria for the testing and evaluation of housing construction. The criteria are based on the performance—durability, strength, and safety—of the housing units rather than on the traditional specifications of materials and methods of construction. HUD expects the performance criteria to lead to new and more flexible housing codes. HUD cites as evidence of progress the fact that eight states have already adopted new laws which encourage industrialized housing and that labor unions have shown some willingness to go along with the new techniques.

Construction in the Breakthrough program will be completed in 1971 and HUD hopes at that time to shift its R&D emphasis to such problems as land use, population distribution, and housing management. The department plans to study ways to prevent the destruction and deterioration of housing by looking at such possibilities as tenant participation and ownership opportunities. However, political support seems to be lacking in both the White House and in the Congress for any major new R&D initiatives in the urban area. HUD's authorized budget request for FY 72 includes fewer R&D funds than were requested last year.

Justice R&D Aims at Street Crime

The Justice Department is a newcomer to R&D, but it appears likely to became a regular spender in this area. The bulk of the department's tiny R&D program is hidden away in the fledgling National Institute of Law Enforcement and Criminal Justice, a part of the Law Enforcement Assistance Administration (LEAA). The Institute's $7.5-million budget supported more than 100 projects last year, ranging from a study of the effects of chronic use of marihuana at the University of Texas in Galveston to a survey of private and auxiliary police forces by the RAND Corporation. Police equipment and techniques such as the development of a small, hand-held radio account for the largest part of the R&D effort (about 35 percent), with 20 percent devoted to improving courts and prosecution and 16 percent to studies of crime prevention. Only a small fraction, about 6 percent, goes for work on improving the correctional system. The Institute makes no bones about the fact that its first priority in planning the R&D program is street crime, with burglary a close second. Drug-related crime and "collective violence" rank lower, with organized and white-collar crime near the bottom of the list.

The Institute has no plans to build up any substantial in-house R&D programs, and it apparently has no trouble finding people eager to do criminal jus-

NEWS IN BRIEF

● **FRANCE CREATES NATURE MINISTRY:** A new ministry for the "protection of nature and the environment" has emerged from the first reshuffling of the French Cabinet since Premier Georges Pompidou took over in June 1969. The ministry, according to French diplomatic sources, will combine functions performed in the United States by the Environmental Protection Agency and the President's Council on Environmental Quality, and will generally oversee the country's physical development. The new minister is Robert Poujade, a young Gaullist politician who became secretary general of the ruling party, UDR, in 1967. The secretary general of the ministry is Serge Antoine, who headed the High Committee on the Environment that was charged with formulating a national environmental policy. The first business of the new ministry will be to implement the 100 measures recommended by the committee. The ministry's budget for fiscal year 1972 will be 100 million francs ($25 million).

● **ENVIRONMENTAL STATEMENTS:** The President's Council on Environmental Quality (CEQ) has announced that it will require federal agencies to publicly disclose environmental impact statements 90 days before the decisions which they affect are made, and 15 days before any public hearings. The impact statements, required by the Environmental Quality Act of 1969, must be prepared on any planned legislation or administrative actions which significantly affect the environment. The law says the statements must be made public, but citizens' groups have complained that they are released too late for the public to exert any influence on the final decision. The new CEQ guidelines were issued following congressional hearings and are expected to take effect after a 45-day comment period.

● **LABOR SAYS WHOA TO ENGINEERS:** All fields of engineering have been dropped from the Department of Labor's list of occupations for which preference is given in immigration. Since no national manpower shortage exists, would-be engineering immigrants must now show proof that they have a job in the United States before being granted a visa.

tice R&D. In fact, Clarence Coster, associate administrator of LEAA, told *Science* that the Institute had been besieged by aerospace firms wanting to use their unemployed systems development talents, but that proposals from these firms tended to be too grandiose and expensive for law enforcement systems. The Institute does seem to favor small grants and contracts, which are typically less than $200,000. Nonetheless, private firms are the largest performers of R&D for the Institute. Hughes Aircraft, for example, is studying police procedures for control of crowds and demonstrations. Universities are also undertaking a large share of the work, such as the study of prevention and control of burglary being done by the University of California at Davis. Local and state governments, particularly state police forces, and federal laboratories like the National Bureau of Standards are also involved. The Institute is also supporting about 50 graduate students with fellowships for research in criminal justice.

Post Office Budget Rising

The tradition-oriented "rain or shine" image of the Post Office is changing slowly to that of a modern and mechanized, gadget-happy organization as part of creating an engineering competence in an agency which previously had none. Post Office R&D spending has more than tripled in the last 2 years to reach $60 million, and Harold Faught, Assistant Postmaster General for Research and Engineering, believes that it will continue to climb for a while. What ultimately will be established as a "sensible level of effort" Faught does not know, but he points out that 2 percent of the total budget of over $8 billion (a percentage used elsewhere in the government to justify R&D budgets) would entail almost another tripling of R&D spending.

The keynote of the Post Office R&D effort is systems development rather than research, with the main emphasis on programs to give the Post Office some immediate help in its struggle with 82 billion pieces of mail per year. Priority projects in what the Post Office calls a "cautious crash program" include the design of heavy-equipment handling machines, separate facilities for bulk mail, and the development of a code sort system for letter mail. When fully operational, the code sort system will use sophisticated optical character readers to code letters with house number, street name, and zip code in a way that could be read by simple and inexpensive sorting machines operating under computer control, thus allowing complete mechanization of mail handling. Going into operation now in more than 18 central post offices is a zip-mail translator system which uses computer-assisted sorting machines. Other major projects include industrial engineering work to design more efficient operating procedures and work on improved retailing services such as vending machines for Post Office lobbies. With regard to the far future, the Post Office is looking into the possibilities of electronic mail, a start toward which is the current Telex mailgram program.

About 85 percent of the Post Office R&D work is contracted out. There has been a wide range of industrial involvement in Post Office programs, including defense contractors such as the Institute for Defense Analyses and the Mitre Corporation. General Dynamics, for example, did a survey of the current state of the art in electronic mail devices. The Post Office is supporting some university work on basic problems, such as pattern recognition for optical character readers, and is also making use of the National Bureau of Standards. In-house industrial engineering staff is being increased, and the Post Office recently moved into its new laboratory in Rockville, Maryland, which will be used for machine testing, advanced development of fluidics devices, and work on closed circuit TV systems. Overall, Post Office programs show an increased use of computers, such as the XDS Sigma II being used in a mail-sorting experiment in Cincinnati, and of electronics in general.

Expanded R&D programs in civilian agencies have also brought in a new breed of technical men. In three out of the four agencies—DOT, HUD, and the Post Office—the top research administrators themselves represent a conversion of manpower from aerospace and defense R&D to domestic technical problems. Cannon in DOT was formerly director of Stanford University's Guidance and Control Laboratory. Before that he had been chief scientist for the Air Force and had worked in the aerospace industry. Faught came to the Post Office from Westinghouse's Astronuclear Laboratory, where he had spent 21 years, and where as general manager he guided that firm's work on nuclear powered space systems. Harold Finger, Assist-

ant Secretary for Research and Development at HUD, has spent most of his life in the development of aircraft and space systems. At NASA, he directed work on nuclear propulsion and space electric systems, and eventually served as associate administrator. Talking with these men gives the impression that, if funds become available, they intend to help redirect the nation's reservoir of technical talent toward solving domestic problems. Cannon, for example, told *Science* that this hope was one of the main reasons why he came to Washington.

Money, however, is a problem. Pressures to hold down the size of budget deficits and congressional resistance to new spending may well prevent any substantial follow-through on these fledgling domestically oriented R&D programs. Finger, of HUD, told *Science* that all the talk about changing national priorities and solving domestic problems had not yet helped with his budget problems. It may be quite a while before technological systems devised to aid domestic problems begin either to perform as well as the Apollo moon-landing system has or to be funded at similar levels.

—ALLEN L. HAMMOND

APPOINTMENTS

Emilio Q. Daddario, former congressman from Connecticut, to senior vice president, G+W Precision Engineering Company, Manchester, Conn. . . . **John W. Schwada**, chancellor, University of Missouri, Columbia, to president, Arizona State University. . . . **Robert J. Uffen**, chief science adviser to the Federal Cabinet, Ontario, to dean, faculty of applied science, Queen's University, Ontario. . . . **Izchak Friedman**, acting dean, School of Engineering and Science, Pratt Institute, elevated to dean. . . . **Helen M. Kleyle**, professor of education, Duquesne University, to dean, School of Education at Duquesne. . . . **Thomas W. Mou**, professor of preventive medicine, Upstate Medical Center, State University of New York, to university dean for health education. . . . At Wayne State University, **Arnold M. Weissler**, professor of medicine, Ohio State University, to chairman, internal medicine department, School of Medicine, and **L. Murray Thomas**, acting chairman, neurosurgery department, elevated to chairman, also in the School of Medicine. . . . **Hector C. Sabelli**, acting chairman, pharmacology department, Chicago Medical School/University of Health Sciences, elevated to chairman. . . . **Lee V. Leak**, assistant professor of anatomy, Harvard Medical School, to chairman, anatomy department, Howard University College of Medicine. . . . **Carl Savit**, technical assistant to the director, Office of Science and Technology, appointed chairman, Interdepartmental Committee for Atmospheric Sciences, Federal Council for Science and Technology. . . . **Edward A. Mason**, professor of nuclear engineering, M.I.T., to chairman, nuclear engineering department, M.I.T. . . . **Paul D. Cratin**, associate professor of oceanography, University of Miami, to chairman, chemistry department, Central Michigan University. . . . **Earle Fowler**, professor of physics, Duke University, to chairman, physics department, Purdue University. . . . **William L. Haberman**, manager, manned space flight program and planetary mission studies, National Aeronautics and Space Administration, to chairman, mechanical engineering department, Newark College of Engineering. . . . **Jeorg W. P. Mayer**, chairman, mathematics department, George Mason College, to chairman, mathematics department, Lebanon Valley College.... **Robert S. Davidson**, professor of psychology, Bryn Mawr College, to chairman, psychology department, Lebanon Valley College. . . . **Paul L. Schiff, Jr.**, assistant professor of pharmacognosy, Butler University, to chairman, pharmacognosy department, University of Pittsburgh. . . . **Peter A. Cerutti**, assistant professor of biochemical sciences, to chairman, biochemistry department, University of Florida. . . . **B. R. Baumgardt**, professor of animal nutrition, Pennsylvania State University, to chairman, animal science department at the university. . . . **Werner R. Loewenstein**, professor of physiology, Columbia University College of Physicians and Surgeons, to chairman, physiology department, University of Miami School of Medicine. . . . **Daniel F. Merriam**, chief of geologic research, Kansas Geological Survey, University of Kansas, Lawrence, to chairman, geology department, Syracuse University. . . . **William Goffman**, professor of library science, Case Western Reserve University, to dean, School of Library Science at the university.

RECENT DEATHS

Rudolf Aebli, 73; former clinical professor of ophthalmology, New York University; 2 January.

William F. Chollar, 60; assistant professor of education, Kansas State University; 14 January.

Harold S. Colton, 89; founder and director emeritus, Museum of Northern Arizona; 29 December.

Charles D. Coryell, 58; professor of chemistry, M.I.T.; 7 January.

Homer J. Dana, 80; professor emeritus of electrical engineering, Washington State University; 17 December.

Leo P. Doyle, 85; professor emeritus, School of Veterinary Science and Medicine, Purdue University; 3 December.

William K. Gregory, 94; former professor of anthropology, Columbia University, and curator, American Museum of Natural History; 29 December.

Ralph S. Hawkins, 82; former chairman, agronomy department, University of Arizona; 25 December.

Columbus O'D. Iselin, 66; former director, the Woods Hole Oceanographic Institution; 5 January.

Oscar Lewis, 55; professor of anthropology, University of Illinois, Urbana; 16 December.

Sarah A. Luse, 52; professor of anatomy, College of Physicians and Surgeons, Columbia University; 28 December.

E. Laurence Palmer, 82; professor emeritus of science and nature education, Cornell University; 17 December.

Bailey B. Pepper, 64; chairman, entomology and economic zoology department, Rutgers University; 22 December.

Johannes M. Proskauer, 47; professor of botany, University of California, Berkeley; 20 December.

Howard W. Robinson, 74; former professor of physiological chemistry, Temple University; 25 December.

Theodore B. Russell, 66; clinical associate professor of medicine, College of Physicians and Surgeons, Columbia University; 30 December.

Edwin W. Schultz, 83; professor emeritus of bacteriology and experimental pathology, Stanford University School of Medicine; 2 January.

Charles M. Slack, 69; retired research physicist, Westinghouse Electric Corporation, 25 December.

Clair Wilcox, 72; professor emeritus of economics, Swarthmore College; 2 January.