found Washington equally eager to have them.

Whereas the congressional science fellows are hurled directly into the Capitol Hill meat grinder, NAS fellows are able to continue a more scholarly mode of life—as one fellow said, they are more concerned with "scientific advice from the scientific point of view," in an atmosphere that is a far remove from congressional pressures. NAS fellows, of which there were six last year (one has taken a permanent position on the staff) and three this year, see themselves as getting a fix on the woods after having labored among the trees. One of this year's fellows is Laurie Hendrickson, formerly a systems engineer with Aerospace Corporation in California, who was encouraged to apply to the program by his former dean, Harvey Brooks of Harvard. Hendrickson says he didn't used to think much about science policy, but now finds himself drawn by the complexity of policy analysis in comparison to space systems, where the technical issues are well definable and the means to resolve them identifiable. He is staying on in Washington, having been offered a job as a policy analyst in the Department of State.

Another fellow, Elena Nightingale, who specializes in genetic diseases, has found the NAS position a suitable next step in her career, which has progressed from microbiological research to human genetics to clinical training. Having completed one project in the Division of Medical Sciences, she has started another, on prenatal prevention of genetic disease, and has gotten a 1-year (renewable) appointment to the academy. "Things kept opening up," she says. Lab research now seems too circumscribed, and she welcomes the opportunity to do studies and prepare reports that will influence the whole field by influencing the nature of other peoples' research. The third, Neil Holtzman, is a pediatrician from Johns Hopkins whose special interests revolve around genetic screening. He is the only one going back to his old job.

Almost without exception, the participants in the programs discussed above have been delighted with the network of kindred souls they have been able to plug into; with the influence they believe they have been able to exert in areas they think are important; and, above all, with the new vistas and "options" they see opening before them.

The high quality of the scientists who have been attracted to these opportunities attests to the rarity of the opportunities, for if there already existed encouragements and channels for participation in policy-making, it can be presumed that those interested in such matters would have already found them.

Scribner sees the AAAS-coordinated fellowships as a pump-priming operation, and believes the program will eventually taper off as mutual needs are recognized and better contacts are established directly between scientists and Congress. Meanwhile, judging from the number of other societies—eight, at last count—that have shown interest in joining the trend, it seems likely that the programs will continue to grow.—CONSTANCE HOLDEN

Basic Research in the Air Force: A Tale of Two Laboratories

A year ago viewers of an evening news telecast in Dayton, Ohio, watched a beaming local congressman announce that nearby Wright-Patterson Air Force Base was going to gain 160 jobs, despite a proposed massive Air Force realignment involving the elimination of 23,000 civilian and military positions. At the end of the announcement, however, the congressman mentioned that, in the course of the realignment, the Aerospace Research Laboratories (ARL) at Wright-Patterson was to be "disestablished."

The next day, all work stopped at ARL as angry scientists and technicians besieged their supervisors with demands to know what was going on. The answer was that a major reorganization of the Air Force in-house laboratory structure was under way. The plan called for most basic research to be contracted out to universities and other institutions, and the remaining in-house research to be merged into the activities of so-called full spectrum laboratories that would cover a broad range from basic research to engineering and feasibility testing.

Both ARL and the Air Force's other in-house basic research laboratory, the Cambridge Research Laboratories (CRL) at L. G. Hanscom Air Force Base, near Bedford, Massachusetts, were to be phased out as independent entities. Also affected by the restructuring was the Rome Air Development Center (RADC) at Griffiss Air Force Base near Rome, New York, parts of which were to be moved to Hanscom and to Wright-Patterson.

The dismantling of ARL has now been in process for several months. Some equipment and offices have been moved and scientists are finding places in other laboratories. But politics has blocked the changes at the Cambridge laboratories and at Rome. Under pressure from Massachusetts and New York congressmen, the Air Force delayed the proposed changes in these states until further studies were completed last May. Then, at the end of July, the moves were halted altogether at the direction of Secretary of the Air Force John L. McLucas.

Amidst the uncertainty that followed the news of the reorganization, some Air Force scientists at ARL and CRL predicted the end of in-house basic research, and some have become so disenchanted that they have left or plan to leave the Air Force. Others, however, have adopted a wait-and-see attitude and hope that the new structure will work out in the end.

Air Force observers point out that the restructuring the Air Force was attempting is but the latest in a long series of reorganizations. In a sense, the reorganization represents a return of research to the position it occupied shortly after the Air Force was established as a separate service in 1947, when research was closely identified with product development.

After World War II, there was a steady buildup of research capacity within the Air Force, but it was only in 1961 in the post-Sputnik era that an independent research command, the Office of Aerospace Research (OAR), was created, with ARL, CRL, and the Air Force Office of Scientific Research (OSR) as its main components. OSR is the Air Force's prime research contracting agency. A few years ago, however, OAR was abolished and the research labs and OSR were merged into the Air Force Systems Command (AFSC). This, together with tight budgets, inflation, and (according to some observers) opposition to in-house research within the Air Force, has made the research laboratories more product-oriented.

In the summer of 1974, a laboratory utilization study was commissioned to look at

how the Air Force could best spend its research resources. The study panel was headed by Major General Kenneth R. Chapman, the now retired assistant deputy chief of staff for R & D, and about half of its members came from within the Air Force. The Air Force has so far declined to make the unclassified portion of the Chapman committee report available to the public on the grounds that "it contains information that is internal communications within and among Department of Defense agencies and components." A censored version can be bought for $10.10 from the Pentagon's Freedom of Information Act Office, but it contains few of the committee's conclusions and recommendations, which *Science* obtained elsewhere.

The committee was sharply critical of Air Force management for failing to clearly define the role of the laboratories and the criteria by which their performance would be judged. For example, laboratory performance was often graded according to its responsiveness to short-term Air Force needs, but at the same time long-range breakthroughs were expected. The panel members also felt that overall the quality of the civilian leadership with the laboratories was below average; even more important, because of the inflated civil service grade level in the laboratories, the best people were not motivated toward program management.

The Chapman committee emphasized the desirability of tying research to product development. Thus, the establishment of the full spectrum laboratories was encouraged. For example, the committee recommended that ARL be disestablished and those of its programs deemed relevant be merged into the development laboratories also located at Wright-Patterson. These, in turn, should be the components of a single technical center to support development of aeronautical systems, such as aircraft and their associated electronics.

Also emphasized was the increasing importance of command, control, and communications, and the electronics technology behind them, for such applications as a global satellite communications system. The committee judged that laboratory support for such systems was weak, and recommended establishment of a command, control, and communications (C^3) center, possibly by combining the relevant portions of CRL and RADC into another full spectrum laboratory to be located at Hanscom field.

Finally, the panel concluded that the Air Force does not need in-house research and that its in-house basic research should be eliminated wherever possible. The same strategy was not appropriate for exploratory development (a somewhat nebulously defined variety of research somewhere between basic and applied). Industry, the committee said, could not be counted on to be interested in everything that interests the Air Force.

What in-house research remained, along with all contracted research, would be under the direction of a single manager, the director of OSR, in part to provide much needed coordination of research with the military services.

A task force within Systems Command, headed by the AFSC commander, General Samuel Phillips, began the process of making more specific plans. It merged the four development laboratories at Wright-Patterson into a loose amalgamation known as the Air Force Wright Aeronautical Laboratories (AFWAL), and ordered the dissolution of ARL as an independent entity. The C^3 center was ordered to be established at Hanscom. The substantial geophysics and environmental sciences research at CRL was to be moved to Kirtland Air Force Base near Albuquerque, New Mexico. Similarly, that part of the RADC program not related to C^3 was to move to Wright-Patterson for merger into the development laboratories.

Some In-House Research Stays

The trend away from extramural research and toward in-house research that has existed in recent years has been noted with alarm by Air Force officials and interested politicians (*Science*, 24 January, p. 241). Projections were that in only a few years, there would be no Air Force sponsored research outside, and the Air Force would become isolated and ingrown. With such concerns possibly in mind, the task force stopped short of abolishing all in-house activity, instead, it aimed to achieve a ratio of 70 percent extramural or contracted to 30 percent in-house research. The task force guaranteed that about 7 percent of all in-house laboratory personnel would be engaged in basic research. Nevertheless, many scientists would have to go, perhaps 60 of ARL's 230 employees and 200 of CRL's 1060 workers. The proposed changes were to begin this July and take a year or so to complete.

Perhaps anticipating the anguished cries from laboratory scientists, Air Force officials emphasized that they were not plotting the demise of in-house research, and that being sent to an applied laboratory was not the same as being exiled to Siberia. However, in-house as well as contracted research would be expected to be demonstrably related to an Air Force need. For example, in solid state physics research, the days of characterizing the bulk properties of semiconductors are over, but research on specific materials with clearly shown device potential is acceptable.

The officials also pointed out that other organizations, such as the National Science Foundation, now have the mission and the ability to support a broad spectrum of basic science. Moreover, the Air Force does not see itself as an originator of new knowledge. Instead, only enough technical in-house expertise is required to enable the Air Force to be an intelligent purchaser of technology that is originated elsewhere. Thus, given its limited resources, the Air Force feels it should be using its research dollars to encourage universities and industrial laboratories to become interested in Air Force related science and technology.

The personnel cuts, admittedly traumatic for those involved, were made unavoidable by the planned growth in contract research (from $30 million in fiscal year 1975 to $50 million in fiscal year 1977) in the face of a constant research budget. As for the disruption caused by physical relocation, successful moves have been made in the past, as when the Air Force Rocket Propulsion Laboratory was established at Edwards Air Force Base in California a number of years ago from facilities previously located at Wright-Patterson.

Predictably, the proposed reorganization met with considerable hostility and criticism. Systems Command in particular was singled out as having done a poor job of calculating the costs and consequences of the proposed changes in the laboratories and the related moves. Representative Donald J. Mitchell (R–N.Y.) in whose congressional district Griffiss Air Force Base is located, was naturally concerned at the prospect of losing 1440 jobs. He contended that the Air Force had made a $100 million miscalculation; instead of saving the Air Force $29.1 million, the proposed dissolution and move of RADC would cost $70.1 million.

Mitchell claimed that such costs as mortgage payments on unsold houses, family moving expenses, and severance pay for those refusing to make the move were all underestimated or neglected. Moreover, the Air Force is said not to have satisfactorily shown what advantages are gained by collocating elements of RADC and CRL to form the C^3 center, or that they are not more than lost in the disruption and reduced productivity associated with moving.

Under the proposed changes, Hanscom was to gain 628 jobs, so congressional displeasure there was nonexistent at first. However, several CRL scientists formed a

group which they named SAVE (Scientists Allied to Veto Extinction) and began a process of lobbying local representative Paul Tsongas (D–Mass.) and the Massachusetts senators. As the significance of CRL to the technical and university communities in the Boston area was made clear, the Massachusetts congressmen joined their New York counterparts in protesting the reorganization plans. By now the entire New York congressional delegation was united (something rarely achieved) in opposition to the RADC move. Even the White House is known to have let the Pentagon know of its concern.

As a result of these efforts, the Air Force backed off implementing the establishment of the C^3 center last March. Instead, two additional studies were commissioned by the Secretary of the Air Force to look at how best to accomplish the mission the C^3 center was designed to carry out, and to look at the impact of moving the geophysics laboratory. The two studies were completed in late May.

On 31 July of this year, McLucas announced his decisions to Congress. Citing such factors as economic impact and personnel turbulence to be weighed against management efficiency and geographical collocation, McLucas concluded that the Air Force could accomplish many of its C^3 objectives without disrupting RADC, although certain manpower reductions may be effected in the future. As the Rome center would now stay put, the proposed move of the geophysics portion of CRL to New Mexico would no longer be cost effective, and would not be carried out. About 200 jobs at CRL are also still in jeopardy.

Nonetheless, some changes were made. An effective C^3 center is being established on a managerial, if not a physical, level by having RADC report to AFSC's Electronic Systems Division (ESD is the organization responsible for developing and acquiring C^3 related systems for the Air Force). Similarly, CRL may in the future also be managerially restructured, so that the portion of CRL that is relevant to C^3 would report to ESD, and the geophysics portion would be separate.

While the situations in New York and Massachusetts were held up by politics, the implementation of the laboratory restructuring at Wright-Patterson has proceeded on schedule. Last winter, the Dayton chapter of the American Chemical Society managed to rally some support from local congressmen and the governor of Ohio for a proposal to preserve ARL by having it transferred to the Energy Research and Development Administration. But when the Air Force peremptorily said, "No, we have other plans for the building," the proposal quietly died.

Air Force officials say that about three-fourths of ARL scientists have been or will be offered places in the development laboratories at Wright-Patterson. The remaining one-fourth will be held in a transitional status for a year, during which they will continue to draw salaries and be free to look for new jobs elsewhere. Many of the jobs in the laboratories, however, are far from continuations of the research that was done in ARL, not being research at all in some cases. Moreover, a majority of the highest-grade civilians apparently are not being offered permanent slots, in part perhaps in an effort to address the problem of civil service grade inflation referred to earlier.

Contrary to the fears expressed early on, the physical facilities of ARL are not fall-

FDA Rapped for Delay on New Drugs

Two University of Rochester pharmacology professors have produced a report that contributes to the ongoing debate over regulation of new drugs by the Food and Drug Administration (FDA).

In their study, "Regulation and Drug Development," William M. Wardell and Louis Lasagna say the FDA's rigid interpretation of the 1962 amendments to the Food, Drug and Cosmetic Act—which were passed in reaction to the thalidomide disaster in Europe—is inhibiting the agency from filling its responsibility to encourage the development and use of new and better drugs. As a result, they say, American patients are being deprived of therapeutic agents that are already in use in other countries.

Supporting evidence is drawn from a comparison of British and American regulatory systems. Of 180 new drugs introduced in the two countries in the decade beginning in 1962, they say, 98 are exclusively available in Britain, compared with 21 available only in the United States. A survey of British physicians also revealed that "certain drugs then unavailable in the United States had made a great impact on the prescribing habits of British experts."

The authors argue that new drugs "contribute minimally" to the problem of drug toxicity, and conclude that "it appears that the United States has lost more than it has gained from adopting a more conservative approach than did Britain in the post-thalidomide era."

The chief theme of the report is the need for more flexibility in the interpretation of regulations, and the need to allow qualified professionals more discretion in the therapeutic use of new drugs. To this end, the authors propose the creation of a distinction between the therapeutic and the investigational use of yet unmarketed drugs, such as exists in Sweden. They believe that recognized medical centers and teaching hospitals should be allowed to use investigational drugs for therapy at their own discretion: "if a respectable minority of professional opinion believes in the utility of a drug, then it ought at least to be available for those who believe in it."

The authors express concern about the "drug lag"—the long time it takes for an investigational new drug (IND) to be approved for marketing. In Britain, new drugs are approved earlier and subjected to more rigorous post marketing surveillance. In the United States, the study observes, the emphasis is on premarketing trials, and postmarketing monitoring is inadequate to measure whether the total benefits of a new drug outweigh possible adverse effects.

The report says things at FDA have improved in recent years—foreign data on new drugs are being accepted, for example, and a large backlog of new drugs finally has been cleared for marketing—but warns that the FDA is still "under intense pressure from Congress, from consumer groups, and from factions inside the agency to abandon its medically more realistic attitude."

The Wardell and Lasagna study, published by the American Enterprise Institute for Public Policy Research, concurs with many conclusions in a study by economist Sam Peltzman, who said the 1962 amendments had caused costs of new drug development to rise without noticeably enhancing their safety and efficacy. In rebuttal (*Science*, 23 February 1973), the FDA claimed the regulations had prevented many ineffective drugs from reaching the market; that a number of drugs available in Europe but not in the United States had proved to be unsafe, and that the decline in the introduction of new drugs was a worldwide phenomenon unrelated to the stricter U.S. regulations.—C.H.

ing into complete disuse. The portions of ARL that have been transferred more or less intact to the appropriate development laboratory have remained physically in place. In some cases, equipment has been moved into ARL by the development laboratories themselves, and the AFWAL staff is located there.

Many scientists at ARL and CRL are pessismistic about the future of in-house research as the result of the laboratory restructuring. A commonly voiced opinion at ARL was that within the development laboratories the atmosphere was so oriented toward development and engineering that the largely splintered research groups from ARL would inevitably be diluted. The lack of clearly defined research groups, the tendency to judge performance on short-term results, and other institutional pressures would all work together to reinforce the natural tendency to solve immediate problems first and let research lag behind as a lower priority activity.

Also expressed was the fear that many highly qualified scientists would leave the Air Force because of what they considered an atmosphere not conducive to doing research. As a result, the Air Force would be deprived of a technical expertise that, as the self-described most technological of the services, it badly needs, because even the minimum in-house competence needed to intelligently buy technology for the Air Force might not be left. It is said that, even in the past, costly mistakes have been made precisely for this reason; individuals with the technical competence to ask the right questions were not available.

ARL researchers also wondered whether the reliance primarily on university and industrial scientists to develop all new technology was wise, pointing out that only in-house scientists employed by the Air Force would have prime loyalty to and a continuous interest in Air Force problems. Moreover, in an organization of primarily buyers and flyers, there would be no one to translate the new knowledge generated outside into a form usable by the Air Force.

Perhaps the most bitter comments were reserved for what ARL people consider the rather sloppy manner in which the restructuring has been managed. Letting employees learn that they may lose their jobs on a TV newscast smacks of poor personnel relations at best. Even supervisors and laboratory heads did not know much more than their employees at first. And scientists say that a succession of contradictory rumors, memos, and explanations from Washington caused a general state of confusion for weeks. In fact, it was only in May that a group at Wright-Patterson tasked to draw up specific plans for the reorganization there finished its report.

These criticisms may be to some extent self-serving. But equally, there is a conflict between the managerial philosophy now prevalent within the Air Force, which sees research as something you can turn on or off and buy or not as the need arises, and the interests of in-house researchers (or contractors for that matter), who need a relatively stable environment in which to work. The fashionable notion that the Air Force does not need as much in-house research expertise as before may or may not turn out to be true. In the meantime, many scientists are unhappy over their own fate and fearful that the Air Force may take a long time to recover from the mistake of having destroyed its in-house research capability before the alternative has been fully proven.

—ARTHUR L. ROBINSON

Outer Continental Shelf: Congress Weighs Oil Needs and Environment

Ever since early 1974, when President Nixon announced a big program of outer continental shelf (OCS) oil leasing in the Atlantic and Pacific "frontier areas" as a key part of "Project Independence," many in Congress have felt that existing laws are inadequate to cope with a massive development of OCS oil and gas resources. To the extent that recoverable reserves can indeed be found, the extraction of the oil and gas would bring economic benefits, to be sure. But it would also have some severe adverse impacts. From Alaska to California and from Maine to Florida, many state and local officials have become highly concerned at the prospect of such impacts, and they have let their senators and congressmen know it.

Besides the usual worries about oil spills and polluted beaches and estuaries, there has been a fear that the coastal states and communities will be unable to plan for and properly accommodate the expected surge of OCS-related onshore activities, such as the construction of drilling rigs and platforms, the laying of pipelines, and the building of storage tank farms, refineries, and petrochemical complexes. State and local planning processes could be overwhelmed, and the "front-end money" needed to provide new schools, sewers, roads, and the like might often be in desperately short supply.

In response to these concerns, Congress has begun acting on some major new legislation, but whether it will complete its work before the offshore oil rush is well under way is still an open question. In July, the Senate passed two bills. One would amend the Costal Zone Management Act of 1972 to establish a Coastal Energy Facilities Impact Fund. The other bill—and the more controversial—would amend the Outer Continental Shelf Lands Act of 1953 to revise substantially the rules and conditions for OCS development, in part with a view to giving the coastal states and local governments a far better chance to have their say and be heard than is now afforded them. Under the OCS bill, the Ford Administration might well be kept from maintaining the fast pace with which it has been trying to bring on OCS frontier-area production as one of the two new major sources of domestic oil remaining (the other being the North Slope of Alaska).

The House of Representatives has taken no action yet on either of the Senate bills, and its committees will have to move expeditiously if any legislation is to be enacted this year. Meanwhile, the Administration, which has in the main opposed the OCS-related initiatives on Capitol Hill as unwanted and unneeded, has been moving step by step toward the first frontier-area lease sale, now scheduled for October. This sale, embracing 1.6 million acres off southern California, is regarded as recklessly premature by officials such as California Governor Edmund G. Brown, Jr., and Los Angeles Mayor Tom Bradley. Representative John M. Murphy (D–N.Y.), chairman of the two committees having jurisdiction over the Senate-passed bills, has made an urgent appeal to President Ford, asking that the plunge into frontier-area sales be postponed for 90 days to give the Congress time to act.

The California sale may indeed be de-