graph which gives researchers considerable leeway in the kinds of studies they can conduct. The law does not regulate diagnostic or remedial research but it relates to it nevertheless, making scientists legally accountable for clear-cut violations.

On 26 June, Massachusetts Governor Francis W. Sargent signed the bill which had passed both houses of the legislature without debate.

Delahunt, who calls the fetal research law as it currently stands a "modern statute," is the first to admit that his original version of the bill would have been disastrous for research. And Smith says, "Most doctors in fetal research see it as a benefit rather than a burden. It gives them assurance to go on without fear of criminal charges."

The lawmaker and the lawyer overstate the case somewhat—virtually no one in the scientific community is completely happy with the present law—but there is no doubt that, because of their willingness to listen to what Nathan and his conferees had to say, the law is more enlightened than it might have been. Nevertheless, the law is restrictive in ways that scientists find hard to live with, and efforts are under way to amend it.

For Delahunt the experience with the fetal research law has been broadening, instructing him in the ways of science and scientists. His relationship with the scientific community is one he intends to continue, and he has established a state advisory commission to work with the legislature on bills that would affect researchers. Nathan is a member.

The confrontation between the scientists and the lawmakers has been equally illuminating for the scientists who, as Delahunt puts it, "have learned that we in the Statehouse do not have horns." In fact, the individuals involved in the struggle to save fetal research consistently say, still with surprise in their tone, that Delahunt is a very "reasonable, rational" fellow, as are the other public officials they got to know. But the process was a trying one.

Nathan, like many researchers, is jealous of his time in the laboratory and clinic, and he quickly found out from experience what he knew to be true anyway; involvement in controversial political issues is a full-time job. And, like many researchers, especially those in medicine, Nathan was trained to respect authority. He did not regard himself as a rebel and found it hard to go against the dean. He wonders whether he would have had the nerve to do so had he not had the security he does as a tenured professor and researcher of established reputation. But, looking back on the most trying of days, he is satisfied. "We have a better Act, and we have Bill Delahunt and people in the Speaker's office on our side. I'm glad I did what I did, but now I keep waiting for someone to take my place so I can go back to research."

From a scientist's point of view, this is a story with a reasonably happy ending. The Massachusetts law is regarded as more liberal than those of some other states. If efforts to amend the law succeed, it may have an even happier epilogue. But it was a close call.—BARBARA J. CULLITON

Air Force R&D Policy: More for Basic Research, Universities

Last June, Barry Goldwater, Senator from Arizona and Air Force Reserve Major General (Ret.), wrote a "Dear Jim" letter to Defense Secretary James R. Schlesinger expressing the view that a "steady erosion of Defense sponsored research may already have affected our future." At the same time Goldwater made it known that he was shocked because the Air Force had cut back on research even more than the other services.

Goldwater's complaint was not an isolated one. On Capitol Hill there has been growing criticism of the Pentagon for paring the R & D budget, including barbs on reducing support of basic research carried out in the universities. In recent months, Defense Department (DOD) policy-makers have taken steps to reverse the trends, and the question of basic research performed in the universities seems to be getting special attention from the Air Force officials.

The problems of military R & D (RDT & E is Pentagonese for research, development, testing, and engineering) are multiple. Inflation is a major and obvious factor. In the basic research sector, where contracts with university researchers have traditionally played an important role, the effects of antimilitary feeling generated in the universities by U.S. involvement in Vietnam linger on, although basic research funded by the military continued at a relatively high level even during the peak periods of campus opposition to the war.

Since 1969, the so-called Mansfield amendment (*Science*, 13 March 1970), which requires that basic research funded by defense agencies have a direct and demonstrable link to military missions, has exerted a drag on basic research funding, although some qualified observers argue that the caveat has had much less practical effect than budgetary factors.

Within the defense establishment, as the competition for funds sharpened, there were shifts within the RDT & E budget generally benefiting applied research and exploratory development at the expense of basic research, and, in the basic research category, favoring DOD, in-house R & D laboratories over outside research institutions—universities and nonprofit labs. These trends applied generally to DOD and were specifically true of the Air Force.

In October, Air Force Secretary John L. McLucas sent a memo to the Air Force chief of staff setting guidelines for research policy in coming years. The memo itself has not been made public but its contents have been discussed fairly widely. The McLucas memo declared that research funding should be protected from encroachment from development and procurement programs. He said that priority in the Air Force research program should be given to preserving and increasing university contributions both to knowledge useful to the Air Force and to the training of young scientists in fields crucial to the Air Force. Specifically, he asked that research fund-

ing in the coming 1976 fiscal year be held at least at the percentage level of the current fiscal year. And he concluded by indicating that Air Force support of basic research over a reasonable period should be shifted to "predominantly" university support.

Air Force funds allocated for basic research amount to some $74 million for the current fiscal year. (The comparable figure for the Army is $62 million and for the Navy, $105 million.) This is very close to the precise dollar figure for the same Air Force budget item in 1964. In between, the

Congress Strengthens Freedom of Information Act

The 8-year-old Freedom of Information Act (FOIA), which was enacted to facilitate the public's access to nonclassified information held by the federal government, has been subjected to a good deal of attention lately by both the Congress and the courts. Newsmen and others have found the act of limited use as a lever for obtaining information because reluctant bureaucrats could often delay compliance interminably, and the expenses of bringing such cases to court have discouraged many from seeking judicial remedies.

Some of these problems may now be ameliorated. Last 21 November, Congress overturned a presidential veto of amendments to the FOIA. New procedural requirements now on the books should enable information-seekers to get faster and more complete access to government documents, and the burden of proof has been shifted slightly to the government in cases where it believes information should be withheld.

The FOIA has been the basis for two pieces of litigation that are of particular interest to scientists. One, which has not yet gone to court, involves the efforts of a group called the Public Interest Campaign to remove some of the secrecy from deliberations by committees of the National Academy of Sciences (NAS). The group has attempted without success to obtain information developed by the Committee on Motor Vehicle Emissions (CMVE) for a report contracted by the Environmental Protection Agency (EPA). The group holds that the NAS is an "agency" for the purposes of the FOIA and that therefore the meetings of its committees and their minutes and working papers should be open to the public. The plaintiffs' second line of argument is that the CMVE is an "advisory committee" within the meaning of the Federal Advisory Committee Act because it was, by implication, created by statute—namely the provision in the Clean Air Act that tells the EPA to perform emission studies with the aid of the NAS.

Both parties in the suit agree that the issues are swimming around in a gray area in which there are, because of the unique "quasi public" status of the NAS, few precedents. The NAS, a private corporation chartered by Congress, is not an "agency" under any accepted definition, but it has been argued that its advice is so influential within government that deliberations by its committees should be open to the same kind of scrutiny the law requires of federal advisory committees.

The NAS has filed a motion to dismiss the case, but what happens next won't be known until federal district court Judge John J. Sirica returns from his post-Watergate trial vacation next month. An NAS official notes that this suit might well contribute to increased openness on the part of the academy. But the NAS will stop at nothing to avoid being accorded federal "agency" status, a change that, as it says in its brief, would mean "its character as an institution would be drastically altered or destroyed."

In the other case (*Science*, 15 November), a private group, the Washington Research Project, has obtained a ruling from the D.C. Court of Appeals that could compel the National Institutes of Health (NIH) to reveal the contents of research grant applications. NIH officials are in a dither about it and are trying to figure out ways of narrowing the effects of the ruling because they think research designs deserve to be treated as trade secrets. Meanwhile, the plaintiffs are pressing on to seek a Supreme Court ruling that would compel NIH also to open "pink sheets," or preliminary evaluations of grant applications, to public scrutiny.

The new amendments to the FOIA have no substantive impact on either of the above cases, although the prevailing anti-secrecy climate they reflect could affect future judicial decisions. Pressure to amend the act increased in 1972 when Representative Patsy Mink (D–Hawaii) sued for the release of classified documents relating to the atomic test the Atomic Energy Commission staged on the Alaskan island of Amchitka. At that time, the Supreme Court ruled against Mink on the grounds the court had no power under the act to determine whether the documents in question ought to be classified. It could only rule on whether or not they were.

The amendments settle this problem with a provision that courts be allowed in camera to determine whether requested information is in fact justifiably classified. The amendments make one additional inroad in the act's exemptions: selected portions of law enforcement files may be made public where such disclosure does not jeopardize law enforcement activities. It is on the above grounds that Ford vetoed the act. In the first case, he said in camera review would, in effect, give a district judge the power to overrule a decision by the Secretary of Defense. In the second case, he said the burden of proof that certain material should not be aired would be wrongly laid on the government. The ease with which Ford's veto was overridden would seem to indicate his fears are not widely shared.

At any rate, framers of the amendments feel that the most important changes are procedural ones that will make it much more difficult for government officials to withhold information they would rather not release. The act allows the government 10 days to respond to requests for information and 30 days to respond to complaints by seekers of information. The act is also designed to ameliorate costs of litigation by giving courts discretion to decide who pays attorneys' fees. What's more, the amendments require government agencies to submit annual reports to Congress detailing instances in which requested information has been withheld, and why.—C.H.

research budget rose and fell, reaching a peak of $90.8 million in 1969, declining to $81 million in 1970, and leveling off at about its present level in 1973. The effects of inflation in this period are hard to estimate accurately, but McLucas recently was quoted as saying that in terms of constant dollars there has been a decrease of more than 50 percent in the basic research budget since 1967.

Within the budget there has been a significant shift of basic research funds from the Air Force's in-house, developmental labs to outside research institutions, notably the universities. Through the middle 1960's the ratio was about 60 percent outside to 40 percent inside. Now the percentage is reversed.

The issues in the present discussion on basic research for the military are perennial ones dating back at least to the World War II period, but there are some special factors that are important in the present situation. First, inflation is having the most erosive effect on the research budget in three decades.

Second, the Air Force is in the midst of an intense modernization program ascribed to a lag in developing new equipment during the Vietnam war. The Air Force, for example, is now trying to persuade Congress to provide funds for the development and procurement of the B-1 bomber, the F-15 fighter, and the new lightweight fighter which has been in the news in recent weeks. The Air Force argues that the Soviet Union—still regarded as the natural adversary of the United States despite détente—has been methodically upgrading its armaments during recent years and that this country is faced with the loss of the technological lead it has held since World War II.

The third factor cited is the effect of Congress earmarking more of the money going into the RDT & E budget, with the result that the traditional RDT & E category has been expanded. An example offered is the engine improvement program, formerly in the procurement category, which has been shifted into RDT & E. Within the RDT & E budget, the definition of fundamental research has been relaxed, and some funds earmarked for this category are being spent on work which actually falls into applied-research or exploratory-development categories.

In dealing with the universities on basic research, the Air Force's chief agent has been the Air Force Office of Scientific Research (OSR), which has filled the same role as the Office of Naval Research and the Army Research Office do for their respective services. Over the years there has been some tension between OSR and the Air Force in-house laboratories, such as the Cambridge Research Laboratory and the development labs at Wright-Patterson Air Force Base at Dayton, Ohio. The in-house labs have also supported some basic research contracts in universities. Of the $74 million research budget, about $20 million goes into "exploratory" research which is deemed more applied than basic. Of the roughly $54 million remaining, about $30 million goes to outside contractors. OSR administers about $23 million of this, with $20 million going to universities and the rest to non-university, outside contractors.

The new policies call for OSR, under its new director, William L. Lehmann, to become the Air Force's single manager for basic research and OSR will thus coordinate all basic research.

Other changes seem likely. Interviews with Air Force and DOD officials indicate that the following shifts in policy and organization appear to be in prospect.

Holding the Line

The Air Force seems committed at least to holding level the percentage of the budget going to basic research, while increasing the dollar amounts. In view of budget strictures it may take two or more years to make significant changes in the RDT & E budget, but it seems a reasonable bet that funds for Air Force basic research will go up to $80 million in the forthcoming fiscal year 1976 budget. The ultimate aim seems to be to restore the ratio in basic research contracting to 40 percent inside, 60 percent outside, with three-quarters of the latter funds going to universities. Efforts will also be made to halt the encroachment of more-applied kinds of research on less-applied categories.

The Air Force developmental labs seem to be in for structural changes. The word is that work will be concentrated in three main complexes in the Boston area, Dayton, and the West Coast, and that the labs will be expected to forge closer links to procurement groups.

More initiative and ingenuity will go into cultivating ties with the universities. An example is a Summer Research Faculty Program sponsored by the Air Force Systems Command (AFSC) in cooperation with the American Society for Engineering Education. The program provides a participant 10 weeks experience at one of the systems command's labs that are concentrated at Wright-Patterson. Aimed at young engineering faculty, the program provides a stipend of $325 a week and offers work on projects of mutual interest to the participants and the Air Force. Among the explicit objectives of the program are "To stimulate continuing relations among participating faculty members and their professional peers in the AFSC laboratories" and "To form the basis for continuing research of interest to the Air Force at the participant's institution."

Underlying these changes is a policy reappraisal begun in the upper echelons of DOD at about the time that Malcolm R. Currie moved into the post of Director of Defense Research and Engineering (*Science*, 5 July 1974). (The assistant secretaries for research and development of the three services are all relatively new to their jobs—including Air Force assistant secretary Walter B. La Berge—and are regarded as attuned to the new policies.)

A survey of Defense Department labs was prescribed, with the Army taking the lead and the other services following. In the case of the Air Force, the study was directed by assistant deputy chief of staff for R & D Kenneth Chapman. The results of this study are said to have been much the same as those produced in a summer study by the Air Force's Scientific Advisory Board, and the conclusions of the two studies are said to be strongly reflected in the McLucas memo.

How rapidly and how fully the new blueprint will be carried out depends on budget developments and on "institutional restraints," which translates in almost any institution to territorial infighting. The assumption that university researchers will welcome future opportunities for increased military support of research seems to be founded on realistic assessments of current attitudes, but if the United States should again put its military technology to active use in Southeast Asia or elsewhere, the attitudes could change.

This year basic research is likely to benefit from further congressional prodding. The Goldwater letter to Schlesinger was read into the *Congressional Record* during a Senate de-

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bate on the military appropriations bill on 21 August. Goldwater is known as a consistent advocate of ample military budgets who does not confine his enthusiasm to the R & D sector, but during the debate he teamed with Senator Thomas J. McIntyre (D–N.H.) in a colloquy which reflected McIntyre's quite different rationale for opposing cuts in R & D funds.

McIntyre for 6 years has headed the Senate Armed Services Committee's subcommittee on research and development and has generally been an advocate of economy in the defense budget. He has opposed cuts in research funds, arguing that it is important for the United States to avoid technological surprise and thus make it feasible to reduce spending in other sectors of the budget.

This view is shared by a number of legislators who favor cuts in the overall defense spending. And since the Administration's impending military budget request has already been identified by some congressional critics as a big and debatable one, the case for R & D is likely to be given more prominence than usual.—JOHN WALSH

RECENT DEATHS

Richard G. Bader, 54; director, sea grant program, University of Miami; 31 October.

Raymond D. Bennett, 89; professor emeritus of education, Ohio State University; 21 October.

Walter E. Blackburn, 66; dean, College of Environmental Sciences, Murray State University; 20 September.

Ernest C. Colwell, 73; former president, University of Chicago; 12 September.

Frederick A. Conrad, 89; professor emeritus of sociology, University of Arizona; 27 September.

Edward H. Dusham, 87; professor emeritus of entomology, Pennsylvania State University; 25 September.

Robert S. Evans, 62; professor of medicine, University of Washington; 25 September.

Alfred O. Hallowell, 81; professor emeritus of anthropology, University of Pennsylvania; 10 October.

Glenn L. Jepsen, 71; retired professor of vertebrate paleontology, Princeton University; 15 October.

James A. Johnson, 91; former professor of surgery, University of Minnesota; 24 September.

Anselm M. Keefe, 79; professor emeritus of biology, St. Norbert College; 14 October.

William O. Kenyon, 69; retired head, chemistry division, Kodak Research Laboratories; 27 October.

Edward Larson, 76; professor emeritus of zoology, University of Miami; 5 October.

Aleksandr Letov, 62; deputy director, International Institute of Applied Systems Analysis, Austria; 29 September.

Frederick N. Miller, 81; former professor of chemistry, John Carroll University; 30 September.

Robert L. Moore, 91; professor emeritus of mathematics, University of Texas, Austin; 4 October.

Henry J. Sallach, 52; professor of physiological chemistry, University of Wisconsin, Madison; 14 September.

Paul R. Saunders, 58; professor of physiology, School of Medicine, University of Southern California; 31 October.

Charles J. Willard, 85; professor emeritus of agronomy, Ohio State University; 13 September.

Oliver S. Willham, 73; president emeritus, Oklahoma State University; 29 September.