David Bazelon, chief judge of the Washington, D.C., Federal Court of Appeals, has played a major role in this undertaking, as chairman of the center. In a summer pilot program, 15 graduate students from Boston University, Brandeis, Harvard, and M.I.T. were divided into four interdisciplinary teams. Each team confronted a complex health problem: genetic counseling, health insurance reform, multiple-service health centers, and the training of mental health professionals. Each team contained a law student, medical student, economist, or urban planner and a student from a discipline particularly relevant to the problem—for example, bioengineering. Twelve faculty members, representing a number of disciplines, served as a general resource to the students at scheduled meetings and informal sessions.

Interdisciplinary education presents a number of organizational problems and a number of unique educational benefits. Much was learned from the summer pilot program, and the academic year program is now being implemented. Problem orientation has proven to be an important aspect of the interdisciplinary program, in that it forces students to learn, synthesize, and then apply their knowledge. At the same time, students are able to exercise considerable initiative in defining and working on problems in a context of competing values. The center hopes thereby to enrich the graduate education of a number of students and enable them to function effectively in health-related careers.

The social control of science and technology, through the training of new kinds of professionals, is one of the most important tasks at hand for law schools, schools of science and engineering, and other programs of higher education. This task must become an ongoing process, and it needs interdisciplinary cooperation and public support. Faculty in schools of professional training in medicine, law, and other fields, are needed to help build and implement these new programs of public service and must rejoin the university. In addition, these new programs must be related to the social system and values, for only through individual and collective wisdom and temperance, induced by an appreciation of the values of others, will we control science and technology in a coherent and humane fashion (*10*).

References and Notes

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7. 42 U.S.C. 4331 *et seq.* A full review of the National Environment Policy Act is presented in an article by R. C. Peterson of Yale Law School (*Title I of the National Environmental Policy Act of 1969*). It is available from the Environmental Law Institute, 1346 Connecticut Ave., NW, Washington, D.C.
8. 5 U.S.C. 552.
9. Soucie *v.* DuBridge, U.S. District Court, District of Columbia (1970).
10. Further information on the programs discussed above is available from the author, Room 1-376, M.I.T., Cambridge, Mass. 02139.

NEWS AND COMMENT

National Academy of Sciences: Awkward Moments at the Meeting

The *Government Organization Manual* classifies the National Academy of Sciences (NAS), along with the Red Cross, as a "quasi-official" agency. And it has been suggested that the Academy stresses whichever side of its split, public/private personality is more advantageous in a given situation. But at its annual meeting last week the Academy and particularly a few Academy members were much more open than usual about what happened in the organization's closed sessions.

The most significant piece of internal business transacted was the vote to raise the limits on the annual intake of new members so that total membership will rise from the present 900 to about 1200 over the next 5 years. The added increments above the prevailing limit of 50 members a year will be recruited from the clinical sciences and the social and behavioral sciences.

The strengthening of the Academy in these disciplines is regarded as a move to make the organization better able to discharge its congressionally chartered responsibilities to advise the government. Critics have charged that the membership has been weighted too heavily toward the classical disciplines to deal effectively with societal problems which require interdisciplinary efforts.

Expansion of the Academy was accepted gracefully; other events at the usually placid business session agitated the membership more.

● The Academy grappled again with the controversial subject of "behavioral genetics" and voted by a decisive margin not to encourage expanded federal research on the effects on intelligence of genetic differences. At the same time the members turned down a committee recommendation that the Academy form an internal working group to study the feasibility of long-term research on the subject. The Academy members did, however, approve a recommendation favoring cooperation to put research in behavioral genetics in a broader scientific context.

● The membership killed a motion designed to end Academy projects involving classified work for the military and then saw Richard C. Lewontin, professor of biological sciences at the University of Chicago, resign his membership in protest.

● A rare glimpse into the Academy's involuted election process was afforded when some members objected because the name of a scientist well known in the environmental movement was apparently cut from a list of nominees by the Academy's governing council.

● A petition from reporters who cover science affairs in Washington asking that more of the Academy's operations be opened to the press was received but not acted on by Academy officials.

Greater public ventilation of occurrences at the Academy's business ses-

sion this year resulted from the willingness of Lewontin and a few other members to discuss hitherto "privileged" subjects and also from Academy president Philip Handler's appearance at briefing sessions after the two business sessions to answer reporters' queries. No questions were off limits at the sessions, although Handler's answers on several matters were highly circumspect.

Academy action on the behavioral genetics issue came in response to persistent efforts by William Shockley, co-developer of the transistor, to persuade the Academy to back research to establish the scientific basis of what he has called the "racial genetic intellectual disadvantages of the nation's black minority." A paper prepared for the Academy's fall meeting last year reiterated Shockley's warning against "dysgenics—retrogressive evolution through disproportionate reproduction of the genetically disadvantaged."

A Shockley proposal for Academy action in 1969 led to formation of a blue-ribbon Academy study group headed by Kingsley Davis of the University of California at Berkeley. The report of the Davis committee was circulated to the Academy membership in advance of this year's meeting and last Wednesday was accepted by the members after the second and third of three recommendations had been rejected.

The original recommendations were phrased as follows:

1. We recommend exploration of means for closer cooperation among those concerned with research and training in psychology, education, behavioral genetics, and neurobiology. Such cooperation will be especially valuable to the extent that it contributes to broader training and the extension of competent research that combines the insights and techniques of behavioral genetics with those of other fields.

2. We recommend that the National Science Foundation consult with other Federal agencies with respect to the possible educational implications of human behavioral genetics and the appropriate contributions that each agency can make, separately and together, in collating existing but disparate knowledge and adding new knowledge in this area.

3. We recommend that the Academy seek funds for, and establish, a body of distinguished scientists in relevant fields to constitute a working group to study the feasibility of an effective, long-range program of coordinated research into the interaction of genetic and environmental factors in the development of individual human capacities, and to outline such a program if one is found feasible.

Handler said the second recommendation was rejected mainly because it gave the impression that enough was known of behavioral genetics in man to provide a body of knowledge that could be applied in the educational system. Handler said the Academy felt this was not the case and that members of the committee said they had not intended to give this impression.

The third recommendation was

NAS Elects New Members

The National Academy of Sciences has announced the election of 50 new members in "recognition of their distinguished and continuing achievements in original research." The Academy, established in 1863 by a congressional charter, is a private organization of scientists and engineers concerned with the furtherance of science and its use for human welfare.

Allen V. Astin, retired director of the National Bureau of Standards, was elected to a 4-year term as Home Secretary of the NAS. Elected to 3-year terms as members of Council were Konrad E. Bloch, Harvard University; Robert E. Marshak, City College of New York; John R. Pierce, Bell Telephone Laboratories, Inc., and Harrison Shull, Indiana University. The retiring members of Council are Philip H. Abelson, Clement L. Markert, Kenneth V. Thimann, and John W. Tukey.

The new members, bringing the total membership to 900, are:

Edward A. Adelberg, Yale University
Julius Axelrod, National Institute of Mental Health
Lawrence Bogorad, Harvard University
William F. Brace, Massachusetts Institute of Technology
Arthur M. Bueche, General Electric Company
Allan McC. Campbell, Stanford University
Marvin Chodorow, Stanford University
Arthur D. Code, University of Wisconsin
Philip P. Cohen, University of Wisconsin
Mildred Cohn, University of Pennsylvania School of Medicine
George B. Dantzig, Stanford University
Don U. Deere, University of Illinois
Frank J. Dixon, Scripps Clinic and Research Foundation, California
Kenneth O. Emery, Woods Hole Oceanographic Institution
Josef Fried, University of Chicago
Alan Garen, Yale University
Riccardo Giacconi, American Science and Engineering, Inc.
Eleanor J. Gibson, Cornell University
Ward H. Goodenough, University of Pennsylvania
Luigi C. Gorini, Harvard University Medical School
Harry B. Gray, California Institute of Technology
Ernest M. Grunwald, Brandeis University
Arie J. Haagen-Smit, California Institute of Technology
Norman Hackerman, Rice University
Vladimir Haensel, Universal Oil Products Company
David S. Heeschen, National Radio Astronomy Observatory
David H. Hubel, Harvard University Medical School
William P. Jencks, Brandeis University
Michael Kasha, Florida State University
Robert P. Kraft, University of California, Santa Cruz
Hans W. Liepmann, California Institute of Technology
Irving M. London, Albert Einstein College of Medicine
Peter R. Marler, Rockefeller University
Philip Morrison, Massachusetts Institute of Technology
Jürgen K. Moser, New York University
Earl L. Muetterties, E. I. du Pont de Nemours & Company
Edward P. Ney, University of Minnesota
William A. Nierenberg, University of California, San Diego
Irvine H. Page, Cleveland Clinic Foundation
William D. Phillips, E. I. du Pont de Nemours & Company
Frederic M. Richards, Yale University
Robert G. Sachs, Argonne National Laboratory
John R. Schrieffer, University of Pennsylvania
Richard E. Schultes, Harvard University
Nevin S. Scrimshaw, Massachusetts Institute of Technology
Oliver Smithies, University of Wisconsin
Hewson H. Swift, University of Chicago
John G. Thompson, Cambridge University
Sidney Udenfriend, Roche Institute of Molecular Biology, New Jersey
Gerald J. Wasserburg, California Institute of Technology.

Otto Laporte, University of Michigan, was elected posthumously.

turned down, said Handler, because of a feeling that substantial research is already under way in the field and, under such circumstances, the Academy rarely undertakes a role such as that recommended.

The first recommendation, which the membership approved, is, according to Handler, addressed "to the academic world in a general way." Despite its vagueness, the recommendation appears to go somewhat further than previous Academy statements on the issue (*Science*, 8 May 1970), and Shockley has been quoted as saying he feels the action indicates the Academy has "faced down the road" toward further action.

In the body of its brief report, the committee stresses that "the genetic aspects of behavioral characteristics in men are very inadequately known." And Handler in commenting on the report said "the important aspects of human behavioral genetics have to do with individual differences rather than differences between groups." Knowledgeable observers say the Academy faced the dilemma on the behavioral genetics issue of appearing to limit scientific inquiry on the one hand or of backing research with implied racist bias on the other and sought to steer between the two shoals.

Lewontin's resignation on political grounds is apparently unique in Academy annals. A radical by staid Academy standards, Lewontin has been active not only in opposing secrecy in projects the Academy undertakes but also in seeking to democratize the election of Academy officers and council members. Ironically, perhaps, the Academy at its meeting this year adopted changes in its bylaws along lines proposed by Lewontin. Perhaps the most important feature of the change is that nominations to most offices and the council can be made by groups of members as well as by the nominating committee.

Lewontin, 41, who was elected to the Academy in 1968, this year pressed his motion that the National Research Council not accept work which prohibits the council from disclosing results to members of the Academy. When a motion for adjournment was passed, effectively killing Lewontin's proposal, Lewontin submitted his letter of resignation, in which he said it was an "intolerable contradiction" for scientists to be asked to bear responsibility for work they are not allowed to know about. He charged also that secret work is allowed at the Academy in the interest of a "small group of Academy and National Research Council functionaries who have a personal interest in playing an important role in government."

At the press briefing, chemist George Kistiakowsky of Harvard, who is vice-president of the Academy, commented that the Academy was created at the time of the Civil War for the specific purpose of advising the government, and the National Research Council during World War I to give military advice, and that it would be "very questionable" to reject requests for advice from the military. It was pointed out that the Academy does not do work in the "top secret" category.

Kistiakowsky, who served in the late 1950's as President Eisenhower's science adviser, noted that he ended his own connection with military advisory panels in 1967 because of his opposition to the Vietnam war and added that he believed "the military has too much power." He said, however, that he could see it as the "duty of a citizen" for a scientist to work to contribute to the defense of the country "in an imperfect world."

Lewontin also played a role in the discussion of the council's action in omitting from the final list of nominees for membership the name of Lamont C. Cole, professor of zoology at Cornell and a well-known ecologist. The Academy elects members through a complicated, multiphase process. Names are put forward by the disciplinary sections into which the membership is divided and by other internal nominating groups. A list of 75 candidates, from which 50 will be named to the Academy, is ultimately circulated to members along with descriptions of work and other information. Some adjustments are made to maintain quotas for "classes" representing the physical and mathematical sciences, biological and social and behavioral sciences, and the engineering and applied sciences. The top 46 in the voting are named to membership in order of preference according to the number of votes received. Under Academy rules, the remaining openings are filled at the discretion of the council. In some years the council considers services rendered to science as well as scientific accomplishment in filling some or all of these openings. When this is not done, it is customary for the council to complete the roster of 50 new members by naming those on the general list in order of votes received from the membership. This year, apparently, the council skipped Cole, whose name topped the remaining nominees on the list, but picked the succeeding names in order for the unfilled spots.

The council's action was questioned from the floor in the Tuesday business session. Lewontin, for example, inquired which members of the council were ecologists qualified to judge Cole's work in his field. There was no response. It developed that the council's objections centered on Cole's public pronouncements, particularly a statement which appeared in a popular magazine saying that we were in danger of lowering the supply of oxygen

NAE Reelects Linder

The National Academy of Engineering, established to share with the National Academy of Sciences the responsibility of advising the federal government on matters of science and technology, has announced the reelection of Clarence H. Linder as president. Linder has served 1 year as full-time president and was reelected to serve the remaining 3 years of a full, 4-year term. Six new Council members were elected to replace Eric Walker, Leo L. Beranek, Henri G. Busignies, T. Keith Glennan, Patrick E. Haggerty, and Edward Wenk.

The new council members are:

Raymond L. Bisplinghoff, deputy director, National Science Foundation

Francis L. Clauser, chairman, engineering and applied science division, California Institute of Technology

Frederic A. L. Holloway, coordinator of corporate planning and economics, Standard Oil Co. (New Jersey)

James Hillier, executive vice president, research and engineering, RCA Corporation

J. Ross Macdonald, vice president, corporate research and engineering, Texas Instruments, Incorporated

Kenneth G. McKay, vice president of engineering, American Telephone & Telegraph.

in the atmosphere to dangerous levels.

At a press briefing that followed the business session, Handler was questioned about the incident, and one reporter asked if the council were making scientific work or public activities the criteria for membership. In his reply Handler indicated it was the council's view that it "behooves a scientist to be even more sure of his facts when speaking before the public than before a scientific body."

During the closed business session Cole's work was defended vigorously, but, when the matter came to a vote, the issue was drawn on the council's right to exercise discretion and the council's recommendations on membership were carried, apparently by an overwhelming margin.

Handler was asked at the briefing to comment on the petition signed by many of the reporters covering the NAS meeting asking that the Academy open more of its operations to the press. Access to reports and other documents that are not now available was requested, and press admission to more of the Academy's meetings was sought. It was assumed that sessions dealing with internal Academy affairs such as elections rather than with public-policy issues would remain closed. Handler said the petition would be discussed by the council and noted wryly that this year's discussion of Academy affairs with the press had been broader than in the past.

Under the new schedule for the intake of new members the limit will rise from 50 this year to 75 next year, peak at 100 in 1973, and decline to 95 in 1974, 85 in 1975, 75 in 1976, and level off at 60 in 1977, where it is expected to remain.

Handler said that because of special circumstances the intake of new members in the medical sciences and social and behavioral sciences must be done "judiciously." He indicated that, although there might be a backlog of distinguished elders in these fields who deserve recognition through Academy membership, the Academy had to avoid excessive honoring of graybeards not capable of doing work for the organization.

Any thought of a rampant youth movement in the Academy was laid to rest, however, by a decisive vote of the members against a motion that members assume emeritus status when they reach the age of 75.—JOHN WALSH

AAAS (II): What It Is and What It Tries to Do

The AAAS today, according to one former staffer, is like the LaBrea tar pits, that gooey mass of oil and tar in Los Angeles which is filled with the bones of long-extinct animals. "Every now and then a bubble goes 'blup' and you might get spattered by it," says William T. Kabisch, who served as a key administrative officer of the AAAS for 9 years. "But it doesn't really amount to much of anything."

Kabisch hastens to add that the AAAS does perform some useful functions. In particular, he believes it publishes "a fine magazine" and has done some important educational work. But the point he was making is that the AAAS is in some ways a collection of uncoordinated activities that bubble up in random fashion and that all too often have little or no measurable impact. Whether the organization can, or indeed should, have more cohesion and greater impact is a subject on which there is currently considerable debate. This article will attempt to describe just what the AAAS does today, and a subsequent article will discuss plans for the future.

What is the AAAS? Unfortunately, a fundamental ambiguity in the organization's structure makes that question a bit difficult to answer. The AAAS proudly proclaims that it is "the world's largest federation of scientific organizations," yet it is not really much of a federation at all. The AAAS does indeed have a loose relationship with some 300 affiliated societies and academies, and these affiliates, thanks to a long-standing provision in the constitution, actually control a majority of votes on the AAAS Council, the organization's highest governing body. Yet the affiliates themselves are not members of the AAAS, and their representatives on the Council almost always vote as individuals rather than as true representatives of their societies.

So loose is the connection between the affiliates and the AAAS that an affiliate has occasionally expired without the AAAS's learning of it until considerably later. Thus it is probably more accurate to think of the AAAS as a collection of individuals, many of whom also belong to other scientific groups. The AAAS currently has some 133,000 members, a figure which some officials claim makes the AAAS "the nation's largest general scientific organization." This means that it is smaller than the American Medical Association but larger than such other scientific giants as the American Chemical Society.

The AAAS still accepts into membership anyone willing to pay his dues, so it tends to have a more broadly based and diverse membership than most scientific societies. A AAAS handbook claims there are "historians, clergymen, farmers and philosophers" on the membership rolls, which is probably true. But it is also true that the membership is weighted heavily in certain directions.

No detailed profile of the membership exists, but it is clear that the association tends to attract scientists as opposed to engineers, and academics as opposed to industrialists. Surveys taken by the association's advertising agency indicate that about half of the members work in universities, while one-fourth are in industry. The rest are scattered among government agencies, hospitals, and foundations or are self-employed. The academics not only dominate in total numbers, but also traditionally hold the reins of authority in the association. Few industrialists have served on the board of directors and fewer still have served as president. Oddly enough, the AAAS can't readily determine how many scientists—as opposed to teachers, laymen, or others—are included in its membership, but the assumption is that the great majority of all members can be considered practicing scientists.

The membership appears to be split fairly evenly among representatives of the biomedical sciences and represen-