fact that the infrared spectrum of the nitric acid solution is very similar to that reported for "polywater" (*8*).

76. The quantum mechanical method used in (*9–12*) is the CNDO/2 method, or its successor INDO. Other calculations by the CNDO or CNDO/2 methods, for similar models of "anomalous water," are reported by Azman *et al.* (*44*) and by A. Goel, A. S. N. Murthy, and C. N. R. Rao [*Chem. Commun.* **1970**, 423 (1970)]. In a recently reported calculation by a somewhat different method (IEHT), no indication of stability for H-bonds shorter than 2.6 angstroms was found in puckered hexamers, planar hexamers, or planar pentamers [A. P. Minton, *Nature* **226**, 151 (1970)]. The reason for this serious discrepancy with the results of (*9–12*) is not clear. It is possible that the shortness of the symmetric bond length (2.32 angstroms) obtained by Allen and Kollman (*12*) results from the tendency of the CNDO/2 method to underestimate bond distances (*12*, p. 1446). Evidence to support this hypothesis is the very short O · · · O distance of 2.53 angstroms calculated for an asymmetrically bonded pentamer (*12*, p. 1446). Allen and Kollman (*12*) do not give calculated energies for structures with intermediate bond asymmetries which would permit one to check whether the symmetric structure is theoretically stable against a distortion toward the asymmetric structure. Such a calculation is crucial to a theoretical discussion of the possible energy barrier for interconversion of symmetric and asymmetric structures.

76a. However, Allen and Kollman have recently concluded from further quantum mechanical calculations that "polywater" does not exist (L. C. Allen and P. A. Kollman, unpublished manuscript kindly supplied by the authors, 1971). The newer, more accurate (*ab initio*) calculations, for cyclic $(H_2O)_6$ hexamers, give a bond energy that is lower by about 5 kilocalories per mole for symmetric bonds than for asymmetric bonds. The more accurate calculations do not consider molecular arrangements as complex as those treated in the earlier work (*12*).

77. Another instance is the calculated energy comparison between structure C and structures A and B (*12*, table 4 and figure 3). In structure C the protons in the between-sheet bonds are only 2.32 angstroms apart, whereas in structures A and B they are 4.02 angstroms apart. This substantial increase in a distance corresponding to an important repulsive energy contribution should cause structures A and B to be substantially more stable than structure C. However, the calculated energies [quantities *E* in the footnotes to table 4 (*12*)] show the molecular group representing structure C (*12*, figure 3a) as more stable by 1.4 to 2.2 kilocalories per mole of H-bonds than the groups representing structures A and B (*12*, figure 3, b and c).

78. The H-bond energy quoted does not include a correction for the greater van der Waals energy due to interactions between nonbonded neighbors in the dense phases This correction could be calculated for an "anomalous" phase if its structure were known in detail.

79. P. W. Bridgman [*Proc. Amer. Acad. Arts Sci.* **47**, 441 (1912)] sometimes incorporated powdered glass in water samples carried to high pressure, for the specific and successful purpose of causing H_2O phases to nucleate, and yet he never obtained a phase attributable to the "anomalous" form of water, even though high pressure should tend to stabilize such a phase. This lack of success reflects either on the assumed mechanism of catalysis or on the stability of "anomalous water."

80. Discussions of these fundamental ideas about catalysis are numerous in the literature; for example, P. G. Ashmore, *Catalysis and Inhibition of Chemical Reactions* (Butterworth, London, 1963), pp. 3–10; S. J. Thomson and G. Webb, *Heterogeneous Catalysis* (Wiley, New York, 1969), p. 1.

81. Confusion is introduced by use of the term "microcrystallites" (*12*, p. 1450) to describe the symmetrically H-bonded molecular grouping visualized as separating from the adsorbed layer and entering the nonadsorbed medium in the capillary. Either these "microcrystallites" are molecular species subject to the laws of chemical mixtures, or else they are crystals that constitute in themselves separate phases. In neither case is the average free energy of the whole system a pertinent quantity. Linnett (*5*, p. 1720) visualizes polywater as containing individual structural units which are called "micelles," and to which a colloidal character is attributed; he does not specify the size of these "micelles," nor does he indicate whether they constitute a separate phase in the thermodynamic sense. Their internal structure, according to the description given (*5*), is that of a crystalline solid.

82. N. K. Adam, *The Physics and Chemistry of Surfaces* (Dover, New York, ed. 3, 1968), pp. 107, 404; A. W. Adamson, *Physical Chemistry of Surfaces* (Interscience, New York, ed. 2, 1967), pp. 78, 414; W. J. Moore, *Physical Chemistry* (Prentice-Hall, Englewood Cliffs, N.J., ed. 3, 1962), p. 737; E. A. Moelwyn-Hughes, *Physical Chemistry* (Pergamon, London, ed. 2, 1961), p. 939.

83. I was encouraged to write this article by discussions with L. Pauling. I acknowledge National Science Foundation support of a program of research on the phases of ice, which provided the background for the present discussion. Contribution No. 1817 from the Division of Geological and Planetary Sciences, California Institute of Technology.

NEWS AND COMMENT

National Research Council: And How It Got That Way

In the last week of April the members of the National Academy of Sciences (NAS) will make their annual migration to Washington. They will spend much of their time in the agreeable ceremonial labors of electing new members to perpetuate their society, bestowing honors, and attending scientific sessions. But this year, on and off the agenda, the members must confront the question of how better to carry out their congressionally chartered responsibilities of providing advisory services to the government.

The NAS meets from 26 April through 29 April, and the National Academy of Engineering (NAE) will follow with its own annual meeting in the Academy's marbled halls on 29 and 30 April. The order and timing of the meetings might be taken as symbolic of the separate but equal status accorded NAE when it was organized in 1964 under the NAS charter. The NAE program will be similar to that of the NAS, but the engineers' mood is likely to be that of an exasperated younger brother who feels his talents and energy are misused in the family business.

A major topic of concern at both meetings will inevitably be the National Research Council (NRC), the operating arm of the NAS and NAE, through which the Academy performs its advisory functions. The NRC has a staff of about 1000 and an operating budget of roughly $30 million this year. NRC performs no laboratory research, of course, but is essentially a vast, *sui generis* committee system drawing on the voluntary services of as many as 9000 American scientists, engineers, and other professionals—which makes it, all in all, the biggest consulting firm in the world.

NAS-NAE-NRC, to use its full, not very brief abbreviation, is replete with paradox. The parent NAS is a unique hybrid, a congressionally chartered, private, nonprofit organization incorporated in the District of Columbia. The government provides no direct subsidy and exercises no oversight authority, but 80 percent of the Academy budget comes from government sources. Perhaps the richest paradox involves the honorary aspects of the Academy. For the individual, membership in the Academy certainly signifies making it in American science. But it is really the NRC which discharges the advisory obligations imposed by the charter. There is nothing in it about the Academy being an honorary society.

Nevertheless, although a minority of Academy members are extensively engaged in NRC activities, it is the prestige of Academy members that gives the organization its unique standing. And, significantly, "Academy" is the generic term commonly used for NAS-NAE-NRC and all its works. If the Academy is not above suspicion or beyond reproach, it remains the court of last resort on scientific and technical questions.*

Since World War II, however, as the

* Three articles by D. S. Greenberg in *Science* (14, 21, and 28 April 1967) provide extensive background on Academy problems and politics, and, more recently, two articles in the *National Journal* (16 and 30 January 1970) by Claude E. Barfield marshal considerable detail on the operations of NAS-NAE-NRC.

activities, budget, and staff of the NRC expanded, some Academy members began to question the appropriateness and the quality of work done by NRC committees in the name of the Academy. Uneasiness centered on the growth and what appeared to be the increasing independence of the NRC bureaucracy.

In the 1960's, as a result of American involvement in the Vietnam war and the emergence of environmental and consumer-protection issues, it became more difficult to separate the technical content of some problems from their social and political aspects. Critics inside and outside the Academy argued that, by responding to narrowly defined requests for advice without commenting on the broader implications of the issues involved, the Academy was sometimes being used to lend respectability to socially dubious activities.

The most biting public criticism of the Academy to date came in remarks by former Interior Secretary Stewart L. Udall at the AAAS meeting in December. Udall's comments at a panel session were directed at scientists in general. He said, "At worst, many men of science are allowing their findings to be used as buttresses for status quo thinking, and unnecessarily accepting a backseat 'technician's' role in which their larger opinions about the American future are not even sought."

Udall then focused his attack on the Academy directly, charging that "By confining itself to a clientele almost exclusively made up of government agencies—and by permitting its clients to phrase the questions it will study—the Academy has all too often become a mere adjunct of established institutions."

NAS president Philip Handler counters with an *ad hominem* retort to Udall's criticism, saying that if, while he was still at Interior, "Mr. Udall had implemented the reports to him from here, he would have been a great hero." But Handler, who has sustained a reformist image since he took over the Academy's top office in July 1969, does not dismiss the criticism of Udall or others out of hand. "As a generality it won't do," he insists. "You'd have to have an extensive appraisal of multiple engagements of the Academy. The extent of the involvement is greater than the critics and even the membership know. But that still leaves truth in the accusation that we haven't led the pack."

Philip Handler

Other officials of the organization feel that the critics ignore what has been happening at the Academy in the way of changes in attitudes and specific reforms, including the beginning of a restructuring of NRC.

Perhaps the chief difficulty in evaluating criticism of the Academy lies in the nature and diversity of its work. NRC's product is advice, and it has no responsibility for implementing that advice. Furthermore, with its eminence, the question that arises with the Academy is, Who is to judge the judge?

The problem is compounded by the sheer volume of NRC activity—between 400 and 500 committees—the great diversity in styles and the degree of decentralization and authority that exists in an operation depending so heavily on volunteers. Like many loosely structured organizations, NRC is governed more by habits and attitudes than by rules, and it is important to understand how these habits and attitudes developed.

NRC was created in 1916 when it became clear that the Academy was too narrowly based to respond adequately to the wartime emergency. NRC's performance was sufficiently creditable to win it permanent status, and between the wars it was moderately active on the advisory front and at the same time attempted with some success to bolster the welfare of science, principally through soliciting support from private sources.

With the coming of World War II, Academy luminaries such as Bush, Conant, Compton, Tolman, and Jewett took prominent parts in the great wartime mobilization of scientists and engineers, but the NRC was relegated to a secondary role by the rise of the National Defense Research Committee and then the Office of Scientific Research and Development.

After the war the scientific leadership, their influence considerably strengthened, clearly saw a place for the NRC on the "endless frontier" which seemed to be opening for science. The leadership had sour memories of the lean years for science before the war. Now, the government needed scientific counsel and had money. The scientists had expertise and needed support. And so a mutually advantageous *quid pro quo* was worked out. And, because the scientists' relationship with the government during the war had been regarded as both productive and patriotic, not many questions were asked.

The demand for advisory services multiplied in the postwar years as new agencies like the Atomic Energy Commission and later the National Aeronautics and Space Administration were established to do the government's work in new fields. And the requests for help from old-line agencies with new technical and scientific problems also increased. At the same time the NRC grew increasingly active as advocate, agent, and broker for the scientific enterprise at home and abroad.

A key role in the period of growth went to Detlev W. Bronk, who was active in the wartime Air Force medical research board and went on in the 1950's and 1960's to the presidency first of Johns Hopkins and then of the Rockefeller University. Bronk became chairman of the NRC after the war and then in 1950 was elected to the Academy presidency. Partly in an effort to exert stronger Academy control over the NRC, the NRC chairmanship and NAS presidency were combined for the first time. Under Bronk, the NAS-NRC went through an expansionary period: it played a central role in international scientific affairs, epitomized by the organizing of the International Geophysical Year; it established the Academy's presence in new fields, as with the creation of the Space Sciences Board; and it encouraged new scientific enterprises, as when the Academy played the role of godfather to the American Institute of Biological Sciences.

During the years of growth the basic

NEWS IN BRIEF

• **ACCELERATOR PULLED FROM BRINK**: The Princeton-Pennsylvania Accelerator, scheduled to close July 1 when funds from the Atomic Energy Commission run out, has received an additional 2 months' lease on life in the form of $230,000 from the Fannie E. Rippel Foundation of Newark, New Jersey. The 3-Gev machine is being converted from a proton accelerator to an accelerator of high energy, heavy ions for use in cancer therapy. The accelerator, which is managed jointly by Princeton University and the University of Pennsylvania, began operation in 1963. Its staff is being reduced to 26, from a high of 360 in 1967.

• **NO TUITION REFUND**: The New York Appellate Court has ruled that New York University does not have to refund tuition money for 19 days of classes a student missed when the university closed during campus disorders last May. A Queens fireman whose son is a student at NYU had won a settlement of $277.40 in Small Claims Court, but the Appellate Court reversed the ruling. The higher court said the closing of the school was not significant enough to constitute a breach of contract, and maintained that private institutions are "free to a large degree from judicial restraints."

• **M.I.T. CORPORATION GETS YOUNGER LOOK**: Membership in the M.I.T. Corporation, the governing body of the Massachusetts Institute of Technology, will be expanded to include five recent alumni, who will hold staggered 5-year terms. Students in their final year of study and members of the past 2 years' graduating classes will be eligible for nomination to the new positions and will participate in the selection process.

• **AIRBORNE LABORATORY**: The National Aeronautics and Space Administration is buying a large Lockheed C141J jet cargo transport for use as an astronomical observatory. NASA is buying the plane for $3.4 million and will spend about $600,000 to modify it and furnish it with scientific instruments, including a 36-inch infrared telescope. The flying laboratory will be operated by NASA's Ames Research Center in Mountain View, California.

• **STEAM AUTO UNDER DEVELOPMENT**: The air pollution control section of the Environmental Protection Agency has awarded a $570,000 contract to a Massachusetts firm for a design and feasibility study of a steam-powered automobile. Steam Engine Systems Corporation, a new company that describes itself as "closely allied with the M.I.T. community," has been studying the steam engine system field for 3 years, and recently announced the first operation of its prototype 100-horsepower steam engine.

• **CANADIAN - AMERICAN OBSERVATORY**: Scientists of Canada and the United States are planning to build a $12- to $15-million upper atmosphere observatory to study relations of space energy to weather, radio communications, and other phenomena on earth. A transmitter and four receivers will be built in the vicinity of the Great Lakes, where the earth's magnetic field causes ionized layers of the upper atmosphere to form a low-density "trough." Preliminary engineering studies for the observatory, which is scheduled for completion in 1974, are being conducted under a $99,950 National Science Foundation grant.

• **TOBACCO FINANCES CANCER STUDY**: Washington University in St. Louis has been awarded a $2-million grant from seven tobacco firms and a tobacco growers association for a basic research program on the immunologic properties of cancer. The studies, to be conducted by Lauren V. Ackerman and Paul E. Lacy, will concentrate on antigens and antibody production in cancers of the colon and lung. The grant is the largest research grant the tobacco industry has made to a single institution.

• **NEW PUBLICATION**: The Education Commission of the States has come out with Report 4 of its National Assessment of Educational Progress. The report assesses the scientific knowledge of teen-agers according to sex, region, and size of community. It is one of a series of reports surveying the knowledge and skills of young Americans in ten categories. The document is available from the Education Commission of the States, 822 Lincoln Tower, 1860 Lincoln Street, Denver, Colorado 80203.

structure of the NRC altered very little. NRC was originally organized on the basis of divisions related directly to the disciplinary sections to which NAS members are elected. There are divisions of behavioral sciences, biology and agriculture, chemistry and chemical technology, earth sciences, engineering, mathematical sciences, medical sciences, and physical sciences. There are also two specialized "offices"—the Office of the Foreign Secretary (headed by the Academy's elected Foreign Secretary, Harrison Brown of Caltech), which handles the Academy's relations with foreign academies and international cooperative programs, and also an Office of Scientific Personnel, which deals with manpower problems and administers fellowship and grant programs.

As a matter of principle, NRC avoids entanglements with operating programs, but exceptions seem to keep exerting heavy pressure on rules in the NRC, and two big budget items at least bend the principle. The Highway Research Board (HRB), created after World War I, has been a favorite target of Academy critics. It is argued that most of the work done through the board, which controls a budget of some $5 million a year, is routine and "applied" rather than of a type which only the NRC is competent to perform. It is also suggested that the board has developed strong ties with the highway lobby and that the existence of the board, operating under the prestigious wing of the Academy, has actually retarded serious work on alternative forms of transportation. Defenders of the board say it has facilitated cooperation between state highway authorities, which would otherwise have been impossible, and not only has raised the level of highway technology but has done much to educate state and industry officials to the deleterious side effects of unbridled highway building.

A reappraisal of the NRC role in this sector is, in fact, under way, since plans are afoot for the creation of a new Division of Transportation which would incorporate the $3 million National Cooperative Highway Research Program and other HRB functions into a division designed to take a balanced approach to transportation problems. The new division would be the first to be organized on "functional" rather than disciplinary lines, and NRC officials say that other functional divisions will follow.

Another big budget item imposed on

the Academy by historical circumstance is the Atomic Bomb Casualty Commission (ABCC). The commission was formed after World War II to make a longitudinal study of victims of atomic bombing in Japan in cooperation with the Japanese. In the atmosphere that prevailed, the prestige and nongovernment status of the Academy made it a desirable administrator of the commission. The question has been reviewed frequently, but the involvement has proved difficult to end (*Science*, 8 May 1970).

To outsiders, the typical NRC product is a report of a committee on a technical or science policy issue, which appears in a tasteful format bearing the Academy imprimatur. Academy activities, however, can't be stereotyped. Sometimes a single meeting will be called to discuss a problem. Sometimes a committee will go on for years and years discussing an abstruse, technical subject in meetings a couple of weekends a year conducted in the leisurely fashion that is one facet of the Academy style. Sometimes no report appears at all and sometimes, as in the case of the Drug Efficacy Study carried through under the aegis of the Division of Medical Sciences, hundreds of scientists will be enlisted in a large-scale, tightly organized review effort.

NRC's main relationships with the Department of Defense were, of course, established during World War II and its aftermath and are now the subject of increasingly critical attention. The proportion of the NRC total budget derived from military sources has declined over the years, so that contracts from the military services amounted to about $2.7 million of the total $25 million income from federal sources in the 1969–70 fiscal year. NRC officials estimate that classified work represents about $582,000, or roughly 2 percent of the NRC budget.

Since NRC committee chairmen and members are part-timers and volunteers, the influence of the staff on the quality of the NRC output is obviously crucial. Again generalizations are difficult. Differences between divisions seem to be wide, and the abilities and responsibilities of staff members appear to cover a full range. Some staff men seem to do little more than handle bookkeeping and correspondence, while, at the other extreme, some secretaries of committees participate as equals in a committee's deliberations, shape the agenda, and even write the reports.

Table 1. NAS-NAE-NRC income from contracts. These figures from the 1969–70 treasurer's report show income used under contracts and grants from federal agencies.*

Federal agency	Income
Department of Agriculture	$ 150,681
Department of Commerce	626,648
Department of Defense	
Department of the Air Force	484,444
Department of the Army	1,608,123
Department of the Navy	1,619,452
Department of Health, Education, and Welfare	1,941,990
Department of Housing and Urban Development	363,637
Department of the Interior	229,022
Department of State	1,117,702
Department of Transportation	3,294,411
Department of the Treasury	107,366
Executive Office of the President	315,001
Agency for International Development	758,853
Arms Control and Disarmament Agency	75,440
Atomic Energy Commission	4,150,511
Federal Communications Commission	27,456
Federal Radiation Council	17,179
General Services Administration	64,914
National Aeronautics and Space Administration	4,810,192
National Science Foundation	3,314,648
Smithsonian Institution	56,502
Veterans Administration	300,367
Total	$25,434,539

* Funds from private nonfederal sources amounted to $2,670,104, including $954,001 from state governments.

By the most recent count, the staff numbers 913 people. Of these, 357 are classified as professional and managerial, and roughly 90 of them hold degrees at the doctoral level. The professionals fall into two major categories. The smaller group is made up of people brought in on a temporary basis from academic life, government agencies, or industry to staff a particuluar project. Normally they stay a year or two and then return to their point of origin or, often, to a better job. A fair number like the atmosphere, are assigned to work on a new contract, and stay on. The aim is to have "transient" staff members constitute about a third of the total, but the proportion now is well under that.

In the larger group of professionals in the "career" category, a fairly high proportion come from military or civil agency backgrounds. NAS salaries these days are roughly competitive with federal agency salaries and the NRC budget has continued to rise modestly during the current "recession" in science, but, since the NRC's mode of financing can imply job insecurity, the Academy staff has traditionally been congenial to military and government men who retired early and had pensions to supplement their incomes. Observers say the staff has tended to be older and habituated to an orderly, bureaucratic life, but they also say that there are now signs that the Academy's involvement in socially and politically sensitive issues is attracting younger, more activist staff members.

NRC lives on grants and contracts, and observers sometimes suggest that the staff spends a good deal of time out beating the bushes for work and that some develop a mutually beneficial and protective relationship with their opposite numbers in federal agencies.

Nobody this reporter talked to at the NRC pretended that most proposals from agencies are spontaneously generated and arrive as a surprise to the Academy. A formal letter request does ultimately appear addressed to the president, but usually discussions have gone on with NRC staff members involved to some degree. Often a staff member originates the idea and sometimes even drafts the agency letter.

To the question of whether some NRC staff members have developed ties with federal agencies, NAS president Philip Handler acknowledges that a "buddy system" does exist, with some staff members working with "counterparts" in client agencies. Handler notes that this is "true in universities equally." The important thing, says Handler, is that the proposals are subjected to adequate scrutiny before work is accepted. The primary guardian is the executive committee of the division made up of

professionally competent outsiders. If a proposal is approved, the project must get the blessing of the Academy council, which is made up of Academy members and is the governing board and conscience of the Academy.

Handler says when he assumed the presidency of the Academy he found a number of members who were concerned about the growth of the NRC and "didn't know what it did." The exercise of control by the Academy of the NRC has been an issue almost from the creation of NRC. Concern about this was an element in the decision to combine the office of NAS president and NRC chairman when Bronk took over in 1950. It was a strong factor in the move to make Frederick Seitz, Bronk's successor, the first full-time president. And Handler was elected to the presidency with an implicit mandate to modify the structure and management of the NRC.

The problems facing Handler in carrying out his mandate are formidable. The "trustees" of the NRC are the 840 plus members of the Academy. A group of that size is, of course, too unwieldy to serve as a policy-making body, even if the range of its members' opinions and prejudices are ignored. Only an estimated 225 Academy members currently serve on NRC committees, so that membership as a whole is far from perfectly informed.

The Academy council, which is elected by the membership, by and large is made up of men who combine professional distinction with a fair familiarity with the corridors of power. But the council meets for 2 days every 2 months, whereas the staff is there every day and has the civil servant's edge of a knowledge of detail.

In the last decade, the officers and council have taken steps to improve the lines of communications into the NRC and its powers of quality control. Most notably, as the broader public consequences of scientific and technical decisions became apparent, the Academy established outside NRC a Committee on Science and Public Policy (COSPUP), and the NAE was to create a parallel Committee on Public Engineering Policy (COPEP). A second article will discuss these efforts at exerting quality control and moves made toward a restructuring of NRC and also the major obstacles to change, particularly that created by the failure of the NAS and NAE to find a satisfactory modus vivendi.

Some of the problems are imposed by the congenital reliance of the NRC on part-time talent. There is a real question as to whether the increasingly complex work of the NRC can be done on the basis of gentlemanly volunteer work. Institutionally, there are also critical questions about the way committee chairmen and members are chosen and about handling of conflict-of-interest problems that arise in some areas.

Inevitably, when there is so much discussion about the various categories of contemporary "consciousness," the attitudes of an organization whose dominant majority is on the far side of the generation gap becomes a legitimate issue. Academy members are predominantly physical and life scientists devoted to their disciplines through long careers and at least mildly suspicious of the "soft sciences." They tend to be genuinely dedicated to maintaining the standards of the Academy and are appalled at the prospect of value judgments having a part in Academy studies.

Much is being made of Academy weaknesses these days, but it would be unwise to ignore its strengths. At its best, the committee system works superbly, with men of the highest competence giving disinterested advice as a public service. Unfortunately, the system works best on straightforward technical issues. And as Handler concedes, the NRC record is least impressive in the arena of the environment.

It is in this area that the greatest public sensitivity has developed. And the Academy finds itself with a new constituency—and the new experience of being judged. (Udall concluded his remarks at the AAAS meeting by urging consumer advocate Ralph Nader to conduct a study of "the Academy and the whole scientific enterprise in this country." Nader and his associates decided to undertake the project and Philip M. Boffey is leaving the *Science* news department to head the study.)

NRC was shaped in an expansionary era of American science and still reflects the spirit of that era when, in effect, it was considered as important for national scientific institutions to serve the needs of science as the needs of society. But now the Academy, like other American institutions and particularly institutions occupying monopoly positions, is having its authority questioned and is under pressure to redefine the ways in which it is to be responsive and responsible.

—JOHN WALSH

CBW Ban: Nixon Would Exclude Tear Gas and Herbicides

Forty-five years ago the Senate refused to ratify the 1925 Geneva protocol banning chemical and biological warfare—and this year it is likely to refuse again.

The American chemical industry and the Army Chemical Corps brought sufficient pressure on senators to halt U.S. acceptance of the treaty in 1926. This year, however, the difficulty stems from the Nixon Administration's insistence that the protocol exclude herbicides and tear gas.

Between 5 March and 26 March, the Senate Foreign Relations Committee held 6 days of hearings* on possible Senate approval of the protocol. Following the hearings, committee Chairman J. William Fulbright (D–Ark.) announced that he would lay the protocol aside "for awhile" to give the Administration a chance to reconsider its position. Fulbright and some other members of the committee apparently fear that the treaty might fail to obtain the necessary two-thirds approval on the Senate floor, due to the controversy over herbicides and tear gas. The treaty is one of the world's oldest and most successful arms control agreements. And critics of the Administration's position contend that U.S. ratification with the reservation that nonlethal chemicals are excluded would

* The published hearings may be obtained free of charge after 1 May from Senate Foreign Relations Committee, United States Senate, Washington, D.C. 20510.