versity risk consequent restrictions on free inquiry. Likewise, intimidation and violence are repugnant to the spirit of free inquiry. The search for truth becomes the first casualty.

If intellectual freedom is to survive within the university—indeed if the university itself is to survive—there must be a commitment to intellectual openness and a respect for the dignity of the individual. Only thus can the integrity of the academy be maintained.

References and Notes

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3. L. L. Shadwell, *Enactments in Parliament* (Clarendon, Oxford, 1912), vol. 4, pp. 14–17.
4. R. Brustein, "The case for professionalism," *New Republic*, 26 April 1969, p. 17.
5. B. Bettelheim, in a speech delivered before the House Subcommittee on Education, 20 March 1969; in *Change* 1, No. 3, 18 (1969).
6. In many universities, criticism has been directed toward both individual and institute research on the basis of the nature of the research—particularly if it is of defense-related character—the source of its funding and whether it is conducted in secret or not. There is little doubt that such criticism can result in a real infringement of a faculty member's right to choose his area of study. I personally do not believe that research should be condemned either on the basis of its nature (although there is some research that I would refuse to involve myself in) or for the source of its funding. For example, Department of Defense funds have been a major factor in significant advances made in medicine. I am, however, opposed to secret research being conducted on the campus. Such secrecy means limitation of access to information and limitation of freedom of discussion; it also requires government clearance of faculty, graduate students, and administrators. Several universities have adopted, by democratic means, regulations that do not permit the use of university facilities for research when the results are not freely publishable (though the confidentiality of data supplied by an outside source can be honored) or when an outside agency passes on who may be employed in the research. Though this may be a restriction on individual freedom, it is one that may be essential to the freedom of the institution.
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NEWS AND COMMENT

Decision on 2,4,5-T: Leaked Reports Compel Regulatory Responsibility

The decision to maintain the existing restrictions on the use of the herbicide 2,4,5-T, announced this week by Environmental Protection Agency (EPA) Administrator William D. Ruckelshaus, was made in direct contradiction to the advice trundled out by the decision-making machinery Ruckelshaus has inherited. In the 5 years since 2,4,5-T was first suspected of causing fetal deformities, the government regulatory machinery has taken almost no initiative to safeguard the public health —except in response to external pressure caused by the release of secret reports.

The use of 2,4,5-T on crops, near water, and around the home was canceled on 15 April last year. Two of the manufacturers, Dow Chemical Company and Hercules Incorporated, exercised their right to petition for a scientific advisory committee to review the decision as it applied to crops. A committee duly set up with the help of the National Academy of Sciences turned in a report this May which advised the administrator to lift all restrictions on the use of the herbicide, including the home and water uses, which the manufacturers were not contesting.

This week Ruckelshaus repudiated the committee's recommendations by announcing that the cancellation order for the use of 2,4,5-T on food crops will remain in force until the next and final stage in the appeals process—a public hearing to be held in the fall. (The "cancellation" order does not prevent the use of the herbicide on food crops while the appeals process is still in motion. But, since they were not challenged by the manufacturers, the cancellation orders on the home and water uses of 2,4,5-T became effective last year).

Ruckelshaus's rejection of the committee's advice is also a rejection of the system that produced the advice. Ruckelshaus has already instituted an important change in the system by ordering that the reports of scientific advisory committees on pesticides shall be made public as soon as they are completed. The old policy, which was followed when pesticide affairs were handled by the Department of Agriculture, was to suppress the reports, even after an official decision on their recommendations had been taken. Aides say that Ruckelshaus never knew the 2,4,5-T report was meant to be secret.

Ruckelshaus might have had little cause to seek independent advice on the 2,4,5-T issue had not the report of his advisory committee been leaked to the scientific press in June. Independent scientists joined a member of the committee who had contributed a dissenting minority report in severely criticizing the committee's attitude, methodology, and conclusions.

These criticisms seem first to have penetrated to the upper echelons of the EPA after a press conference held last month by the Committee for Environmental Information, publisher of *Environment*, and Ralph Nader's Center for the Study of Responsive Law. After the appearance of newspaper accounts of the conference, the two principals, Samuel S. Epstein of the Boston Children's Cancer Research Foundation and Harrison Wellford of the Nader Center, were thanked for their criticisms by staff in the office of David D. Dominick, one of EPA's assistant administrators. Dominick's office thereupon set about soliciting outside advice from the Surgeon General and other individuals to whom copies of the advisory committee's report were mailed.

The request to the Surgeon General brought in advice from Food and Drug Administration (FDA) scientists who had not been consulted by the advisory committee and whose extensive experiments on the teratogenicity of 2,4,5-T had been, in their opinion, either ignored or distorted by the advisory committee. A report signed by Leo Friedman, head of the division of toxicology, and by other FDA scientists, detailed some of the major omissions of the EPA advisory committee's report and recommended that the present re-

2,4,5-T Committee: Bias Untested, Academy Embarrassed

Members of the Environmental Protection Agency (EPA) advisory committee on 2,4,5-T differed among themselves and with their critics not so much on the scientific facts—everyone agrees that 2,4,5-T and its dioxin contaminant are toxic and teratogenic at some dose level—but on the political and moral issue of whether to expose the public to 2,4,5-T before or after the necessary additional experiments have been done. The scientific credentials of the committee's members are not in question. But what procedures were there in the selection process to ensure that the committee would not be unduly biased either toward or against the manufacturers' point of view or the environmentalists'?

The answer, in brief, is none. The 2,4,5-T committee was selected by the United States Department of Agriculture (USDA), whose responsibility for pesticide regulation has now been transferred to the EPA, from lists of names provided by the National Academy of Sciences. In furnishing the names, John S. Coleman, executive officer of the Academy, stated clearly in a covering letter that the individuals had not been screened for any conflict of interest. (This, in fact, was clear enough—the list contained one candidate from Dow Chemical and one from Monsanto, two of the chief manufacturers of 2,4,5-T.) The members eventually selected were screened by a three-man conflict-of-interest committee of the Agricultural Research Service (ARS). This committee, acting on records of financial holdings and consultant fees supplied by the candidates, found that the only question of a possible conflict arose with J. G. Wilson, the proposed chairman of the 2,4,5-T committee, because of his association with the Hoechst Pharmaceutical Company, McNeil Laboratories, and Procter and Gamble. Since none of these firms manufactures a herbicide, the ARS committee decided that no conflict was involved.

A member of the ARS committee, John McAuley, told *Science* that their only concern was to rule out candidates with a financial interest in either the companies involved or their competitors. "The question of environmental or chemical industry biases was never discussed. The people were referred to us by the National Academy of Sciences; we only screened to see if they had financial interests," McAuley explains.

Balance Not Sought

It would be unreasonable and probably impossible to exclude from a pesticides committee any scientist with industrial connections. But with the USDA screening the members just for financial interests, the only chance of securing a balance between the industrial and environmental viewpoints lay in a balanced selection of candidates by the Academy. But the Academy—or rather its operating arm, the National Research Council (NRC)—does not seem to have striven for a balance.

Officials of NRC even allowed the Academy's independence to be compromised by discussing individual candidates with colleagues in the USDA, which selected the committee. Memoranda in the USDA files, now transferred to the EPA, indicate that the USDA staff discussed, and maybe proposed, at least four individual candidates in conversations with a member of the NRC before those names appeared in the formal lists presented by the Academy to the USDA. (The Academy provided three separate lists of candidates in all, because the USDA was dissatisfied with the lack of pharmacologists and oncologists in the first list.)

A member of the NRC told *Science* that it would be "completely out of order" for committee candidates to be discussed with the USDA prior to the Academy's formally submitting their names. "The formulation of the list is done completely independently and without any consultation," he said. But a staff member of the Academy remarked that he saw nothing wrong in informal prior discussions as long as the Academy maintained its independence of judgment.

NAS Prestige

The selection of the 2,4,5-T committee and others like it is nevertheless an embarrassment to the Academy because the Academy exercises no control over the committees, yet it inevitably has its name and prestige associated with them. In this case the USDA not only selected the 2,4,5-T committee but also had some say in choosing the candidates. Nor was the committee's report made subject to the Academy's procedure for reviewing reports. Nevertheless, the 2,4,5-T committee is often referred to as a National Academy committee. It was so described by the National Agricultural Chemicals Association in hearings this May before the Massachusetts pesticide board, and even press releases from the EPA refer to similarly constituted committees as "committees of the National Academy of Sciences."

The Academy is anchored in this false position by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), which in notably diffuse language stipulates that the advisory committees "shall be composed of experts . . . selected by the National Academy of Sciences." In discussions between the Academy and the USDA, this language was interpreted to mean that the Academy would supply the names and the department would choose the committee. The Academy is creditably trying to wriggle off this hook; its president, Philip Handler, has written to the House and Senate agriculture committees, which are in the process of drafting new pesticide legislation, to beg that the Academy not be assigned any statutory role in providing committees. The pesticides industry is equally keen that the Academy should remain in the act, and its furious lobbying on this and other issues has kept the legislation bottled in committee. The industry has a warm regard for the 12 advisory committees that the Academy has been called upon to furnish under FIFRA. "They have done an excellent job," says J. G. Copeland, a board director of Hercules Incorporated and of the National Agricultural Chemicals Association. With verdicts like that of the 2,4,5-T committee, the pesticide manufacturers' satisfaction with the status quo is no more surprising than the Academy's discomfiture.—N.W.

strictions on 2,4,5-T remain in force. These and other comments were passed on by the Surgeon General to Ruckelshaus's office.

Another input into Ruckelshaus's decision was a review of the advisory committee report, conducted in the EPA's Office of Pesticides by a body known as the special pesticides review group. This represented the EPA's major internal scientific review of the advisory committee's report, and its deliberations seem to have inclined toward the casual. The balance of disciplines in the group was six toxicologists, one chemist, one biologist, and one lawyer. O. G. Fitzhugh, the chairman of the group and an old FDA hand, said that the group had not consulted with independent scientists or considered other data in reviewing the advisory committee's report on 2,4,5-T. Fitzhugh said he had heard of criticisms of the report made by Epstein but had neither seen a copy of Epstein's critique nor asked Epstein for a copy. He added that he did not consider Epstein a toxicologist. (Epstein, a trained pathologist, is chief of the Laboratories of Carcinogenesis and Toxicology at the Children's Cancer Research Foundation and winner of an achievement award from the Society of Toxicology.)

Fitzhugh's own attitude to toxicology is refreshingly simple. "As a scientist," he told *Science*, "I believe that anything is safe if you go low enough, and anything is toxic if you go high enough." He indicated that his review group made recommendations that "may have confirmed" those of the advisory committee.

Fitzhugh has been acquainted longer than almost anyone else with the teratogenic hazards of 2,4,5-T. A draft report of the Bionetics Research Laboratories experiments, which first pointed to the teratogenicity of 2,4,5-T, was given to Fitzhugh, then FDA toxicology adviser, on 24 October 1968. The present restrictions on the herbicide were imposed 1½ years later, on 15 April 1970, largely as a result of the Bionetics report having been leaked from the FDA.

At the apex of the EPA, the converging stream of comments on the advisory committee's report was handled by Marshall Miller, a Ruckelshaus aide appointed only a few weeks ago. Miller, who was landed with the assignment of pulling the comments together and writing recommendations for Ruckelshaus, says that there was no set procedure in the EPA for arriving at a decision on 2,4,5-T. "As each report comes in, everybody takes a look at it and holds meetings with everyone else."

Both Ruckelshaus and Miller have said they were surprised to find that scientists could disagree among themselves as much as lawyers do. Miller found helpful the criticisms of outsiders such as Epstein, although he thought that they were a "small group of people making a lot of noise." Several high-ranking members of the EPA staff seem to be grateful to this small group, however; "I'm glad the report was leaked," said one. "After Daniel Ellsberg, isn't that a terrible thing to say?"

A Matter of Statistics

Why did the EPA advisory committee on 2,4,5-T fail so badly to reach a verdict that would be generally acceptable to the scientific community? There is no question of the scientific credentials or devotion to duty of individual members of the committee. J. G. Wilson, chairman of the committee and professor of research pediatrics and anatomy at the University of Cincinnati, is a well-known and distinguished teratologist. In preparing his report, he took the unusually conscientious step of performing certain experiments that he believed needed to be done on the teratology of 2,4,5-T. But Wilson and the other distinguished members of the advisory committee nevertheless managed to put together a scientifically undistinguished report.

In essence, the committee implicitly assumed that there exists some dosage below which both 2,4,5-T and its unavoidable dioxin contaminant do not produce deformities in animal fetuses. The committee explicitly stated that it is "highly unlikely" and "virtually impossible" that enough 2,4,5-T or dioxin could accumulate in the environment to enter the human diet and injure health. From these two assumptions, the committee concluded that it would be safe to scrap the present "cancellations," which seek to restrict the use of 2,4,5-T around the home, on water, and on food crops. Somewhat paradoxically, in view of their second assumption, the committee also recommended that further research be undertaken (by unspecified parties) to remedy the "existing deficiencies" in data about the possible accumulation of dioxin in food chains.

It has been remarked of the 19th century English moralists that they argued from premises that were largely false to conclusions that were in harmony with the interests of the middle classes. Substitute manufacturers for middle classes and the same description—together of course with the same lofty purpose—seems applicable to the thought processes of the EPA advisory committee on 2,4,5-T. The two premises on which their recommendations are based—that there is a "no effect" level for 2,4,5-T and dioxin and that the substances do not accumulate in the environment and in food chains—are to a remarkable extent left unproved by the committee and, in the opinion of its critics, are quite possibly false.

The airiness of the committee's assumptions was pointed out in a one-man minority report composed by the committee's only nonbiologist, Theodor D. Sterling. An applied mathematician at Washington University, St. Louis, Sterling brought to the committee a knowledge of statistics that caused him to look askance at the available toxicological data on 2,4,5-T and dioxin. In his minority statement, Sterling complains of the impression given in the main report that 2,4,5-T is teratogenic only at high dose levels. One reason for this impression, he says, is the bad design of the relevant experiments, many of which either fail to study the effects of small doses (less than 100 milligrams per kilogram) of 2,4,5-T or use too few animals to show an effect.

"The experiments which provide the basic animal data and the analysis of these data unfortunately were not done with the sophistication necessary to throw light on the effect of 2,4,5-T and TCDD [the relevant dioxin compound] at very low doses. . . ." Even the experiments undertaken by the committee chairman were performed without proper controls, Sterling says. Despite the lack of reliable data the main report "presumes to lecture the scientific community on the wisdom of instituting a 'permissible residue' of substances thought to be teratogenic."

The concern that Sterling and other critics felt about the committee's sanguine attitude toward 2,4,5-T stems largely from the extreme toxicity of its principal dioxin contaminant (known chemically as tetrachlorodibenzoparadioxin, TCDD). Dioxin ranks second only to the neurotoxins as a poison; when fed to female guinea pigs at a dose-to-body-weight ratio of 0.6 part per billion, it kills 80 percent of the animals. In rats—more hardy animals than man—a dosage ratio of 0.125 part

of dioxin per billion is toxic to the fetus. Dioxin is present in commercial preparations of 2,4,5-T in amounts ranging from 1 to 5 parts per million (ppm). Should dioxin show any propensity for accumulating in food chains, as do the organochlorine pesticides like DDT, it will present a perhaps uniquely insidious threat to health.

Yet in his minority report Sterling points out the absence of data for the committee's "speculation" that dioxin does not accumulate in food chains. "After recent experience with DDT and mercury," the minority report states, "it would be reckless to leave such questions in abeyance while approving the unrestricted use of 2,4,5-T. . . . A great deal of damage may be created if the committee restores 2,4,5-T to its normal use while hoping that further research will justify our confidence in having made a correct guess."

Why was the majority of the committee so confident in its own guesswork about the possible accumulation of dioxin? According to Harrison Wellford of the Nader Center, the subject of 2,4,5-T:*

> . . . has become a battleground of opposing philosophies about the relationship between technological risk and human safety. Arrayed on one side . . . are typically . . . the classical toxicologists, food technologists and agri-chemical engineers, who are trained to look for the short-term effects of pesticides, both in their impact on the human body and on the pests in the field. On the other side are typically the microbiologists and geneticists, the specialists in the causes of cancer, birth defects and mutations, who are professionally concerned with the long-term effects of chemical contaminants on human health. At stake is the question of who is to set the standards upon which the proposed safety of a pesticide (or any chemical) is to be judged.

The 2,4,5-T committee, Sterling apart, has placed itself in the first of Wellford's two categories, not only by its conclusions, but also by its approach to the subject at hand. For example, the list of witnesses who appeared before the committee is composed almost entirely of administrators, not active scientists. The committee chairman also declined to hear evidence from environmentalists, despite what one member recalls as a general agreement to hear environmentalist witnesses, as well as the petitioning manufacturers.

Another perhaps unnecessary favor to the industry side was the committee's failure to mention in its report an error in some important data presented by Hercules, one of the two petitioners. Hercules had commissioned the Bionetics Research Laboratories to repeat the experiment that precipitated the current restrictions on 2,4,5-T. This was the finding by the National Institute of Environmental Health Sciences that even "pure" 2,4,5-T, containing less than 0.5 part of dioxin per million, produces birth defects in rats, an indication that 2,4,5-T is teratogenic in its own right. Hercules informed the advisory committee that Bionetics had been unable to confirm the teratogenic properties found by the NIEHS. The committee sent the Hercules-Bionetics data out for review and learned that Bionetics had made a mistake with a decimal point; they had fed their rats with one tenth of the dose of 2,4,5-T used in the NIEHS study. When Bionetics repeated the experiment with the correct dose of 2,4,5-T, they confirmed the NIEHS results. The advisory committee's report, however, makes no mention of the original mistake.

Another indication of a predetermined attitude on the committee's part is its treatment of the study of herbicides and birth defects in Vietnam, carried out by the Herbicide Assessment Commission (HAC) of the American Association for the Advancement of Science. The commission, headed by Matthew S. Meselson of Harvard University, found that the records of South Vietnamese hospitals included some indications—though they were far from proof—of a possible association between birth defects and the exposure of the Vietnamese population to 2,4,5-T and other herbicides (see *Science*, 8 January 1971). The advisory committee devotes much space to describing the unreliability of the data with which the HAC had to work—earning from its minority member the rebuke that "it is unseemly to spend page after page denying the reality of the Vietnam observation in the face of the careful report by the [HAC]." The committee concludes its discussion of the Vietnam data with the liturgical incantation that "any attempt to relate birth defects or stillbirths to herbicide exposure is predestined to failure." While this may accurately express the committee's hopes, it seems gratuitously unempirical to prejudge not only the uncompleted work of the HAC but also the similar study now being undertaken by a National Academy committee for the Department of Defense.

"The questions which have been raised recently concerning the hazards of 2,4,5-T and related chemicals may in the end appear to be much ado about very little indeed," said Senator Philip A. Hart (D—Mich.) in opening his hearings on the herbicide in April last year. "On the other hand," he added, "they may ultimately be regarded as portending the most horrible tragedy ever known to mankind."

Awareness of this latter possibility, maybe, combined with the usual industry pressure and the interminable delays built into the process of pesticides regulation, has sufficed to paralyze for some 5 years the government machinery responsible for resolving the issues raised about 2,4,5-T. Developed in World War II as an anticrop agent, 2,4,5-T was first marketed as a domestic herbicide in 1948. The first indications of its teratogenicity came to light in June 1966 as the result of a general pesticide screening program carried out by the Bionetics Research Laboratories under contract to the National Cancer Institute. Follow-up experiments were delayed for 2 years, and a first draft of the Bionetics report on the teratogenicity of 2,4,5-T was not delivered to the National Cancer Institute until September 1968. Copies were also made available to officials in the Food and Drug Administration and, early in 1969, to others in the Departments of Agriculture and Defense. None of these officials took any steps to protect the populations in the United States and Vietnam from the herbicide.

DuBridge Ignored

The Bionetics report might have been stalled indefinitely in the federal bureaucracy had not a copy been leaked by an FDA official to a Nader investigator in July 1969. Through her, existence of the report was made known in October to Meselson at Harvard, who then informed officials of the White House staff. On 29 October, Lee DuBridge, who was then the President's science adviser, made the first official announcement of the Bionetics findings and said that the Department of Agriculture would cancel the use of 2,4,5-T over food crops in January 1970 and that the Department of Defense would forthwith restrict the use of the herbicide in Vietnam to areas remote from the population.

Neither department took any notice of DuBridge's announcement. More than 5 months later, in April 1970, the USDA told Senator Hart that

* *Sowing the Wind*, will be available next November.

2,4-5-T was safe, citing the argument by the Dow Chemical Company that the 2,4,5-T samples used by Bionetics had contained far more dioxin—nearly 30 ppm—than that of the currently produced commercial grade, and that it was the dioxin which was responsible for the birth defects. This argument was disposed of by the NIEHS repeat of the Bionetics experiment using "pure" 2,4,5-T. On 15 April 1970, nearly 4 years after the first indications of teratogenicity, and after some 20,000 tons of 2,4,5-T had been dropped over Vietnam, the government took its first steps to curtail the use of the herbicide. The Department of Defense announced that the use of 2,4,5-T in Vietnam would be suspended and the Department of Agriculture "canceled" the use of the herbicide on food crops, near water, and around the home.

The history of the 2,4,5-T episode is cogent evidence of the shambles into which the official decision-making machinery has lapsed. At two crucial points—the springing of the suppressed Bionetics report and the exposé of the EPA advisory committee's whitewash—the intervention of outside scientists has been essential in keeping the government machinery on the rails and in motion. And only through by-passing the existing machinery of the advisory committee's report and the review of it by the EPA Office of Pesticides did Ruckelshaus and his aides arrive at the correct decision to maintain the existing restrictions. In short, the established machinery for protecting the public health has failed, and failed ignominiously.—NICHOLAS WADE

Chinese Science: What the China Watchers Watch

An announcement that Mainland China will begin publication of a new monthly magazine, *Scientific Experiment*, appeared on the back pages of the *People's Daily* on 30 April. This announcement is considered *bona fide* by Western observers and is the first indication since 1966 that China intends to publish science news in a systematic way.

The *People's Daily* announcement said that *Scientific Experiment* would be "a monthly comprehensive publication of science and technique addressed to workers-peasants-soldiers. Its main content will be how workers, peasants, and soldiers are engaged in living study and living use of the Thoughts of Mao Tse-Tung and in scientific experiment and technical innovation." The announcement was important because, in the upheavals of the Cultural Revolution which broke out in 1966, China's numerous specialized journals of science and medicine, which had previously been available in the West, were shut down and not resumed. *Scientific Experiment*, then, will be the first break in this 5-year hiatus.

American scientists have become increasingly interested of late in Chinese science and technology—termed by the Chinese "technique"—(see *Science*, 30 April 1971). Their curiosity was whetted this spring when, for the first time in years, two American scientists were admitted to China, M.I.T. microbiologist Ethan Signer and Yale biologist Arthur W. Galston.

Observers say that *Scientific Experiment* will almost surely become available in the West either through regular channels or "as fish wrapping." Either way, interested American scientists will eventually learn of its contents.

In the meantime, however, China specialists have been keeping fairly close track of scientific and technical developments on the mainland. This is the art of China watching, and it has been raised to such heights that one observer, Leo A. Orleans, of the Library of Congress, said that the accounts published so far of the Signer-Galston visit offered little information about Chinese science that was not already known.

Mostly, China watching consists of interpreting Chinese publications or their translations. But China watchers also keep an eye on each other. For there are almost as many interpretations of what is going on as there are analysts. The interpretations are drawn from many bits and pieces of information, and, Orleans says, "You can find quotations to support any opinion, no matter what side you take."

The not-too-surprising result is that there are many different perspectives on what is happening in Chinese science and to Chinese scientists. The Chinese Academy of Sciences, which is the present-day Communist incarnation of the old Academia Sinica, of pre-Mao days, can be interpreted either as a hot center of continuing strife between scientists and the military, or as an arm of the government—no more or no less repressive than any other—carrying out a fairly practical program of applied research suited to China's needs.

A recent article, for example, in *China News Analysis* (CNA), a biweekly journal of interpretation published since 1953 in Hong Kong, gave the recent history of the Academy from the former point of view.* Orleans, on the other hand, disagrees with CNA's "tone" and its implication that, in effect, the army runs science in China.

The Academy itself is the most important single center for scientific research and development. It is divided into five departments that oversee more than 100 research institutes, each specializing in a different discipline. In addition, there are regional branch institutes. Research, particularly the production-oriented type of research that now predominates in China, is probably still carried out by numerous educational and industrial institutions (the universities themselves have been closed down since 1966), and also by the Academy of Medical Sciences, the Academy of Agricultural Sciences, and the Military Science Academy.† The CNA piece dealt only with the Chinese Academy of Sciences.

Perhaps the most important aspect of recent history at the Academy is the changeover in administration since the 1966 Cultural Revolution. During the early 1960's, the Academy en-

* "Life in the Academy of Science," *China News Analysis*, Hong Kong, No. 843, 4 June 1971, pp. 1–7.

† L. A. Orleans, *Science*, 28 July 1967, pp. 392–399.