satisfaction. In spite of its many shortcomings, the *IESS* represents and summarizes much of the best of the social sciences of the 1960's. The initial doubts were overcome, and editors and contributors were drawn from the group of leaders in the field who had had the greatest hesitation. If we were to do it again we would do many things differently, but we hope that the fact that it was done at all will demonstrate that a scientific encyclopedia can be a relevant publication in the 1960's.

References and Notes

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6. The executive committee for the *IESS* consisted of Edward Shils, Jeremiah Kaplan, Morris Janowitz, and W. Allen Wallis, chairman.
7. The associate editors for the *IESS* were: Heinz Eulau (political science); Lloyd A. Fallers (anthropology); William H. Kruskal (statistics); Gardner Lindzey (psychology); Albert Rees (economics); Albert J. Reiss, Jr. (sociology); and Edward Shils (social thought). The special editors were: Elinor G. Barber [(biographies) the only special editor who worked in New York as a member of the editorial staff]; John G. Darley (applied psychology); Bert F. Hoselitz (economic development); Clifford T. Morgan (experimental psychology); and Robert H. Strotz (econometrics).
8. The full-time editors for the *IESS* were: Elinor G. Barber (biographies); Marjorie A. Bassett (economics); P. G. Bock (political science); Robert M. Coen (econometrics); J. M. B. Edwards (sociology); David S. Gochman (psychology); George Lowy (bibliographies); J. M. Tanur (statistics); and Judith Treistman (anthropology).
9. The assistant editors for the *IESS* were Donna M. Smith and Barbara J. Westergaard.
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13. This paper is based upon work performed at Crowell Collier Macmillan, Inc., New York, and was written while I was a 1967–68 fellow at the Center for Advanced Study in the Behavioral Sciences, Stanford, California. I thank the center and staff for the time, perspective, and facilities provided me. Helpful comments on an earlier draft were furnished by B. Barber, E. Barber, B. Berelson, P. G. Bock, H. J. Jerison, W. H. Kruskal, D. G. MacRae, F. Mosteller, E. A. Rubinstein, J. M. Tanur, and W. A. Wallis.

NEWS AND COMMENT

M.I.T.'s March 4: Scientists Discuss Renouncing Military Research

Cambridge, Massachusetts. "March Fourth is a Movement, Not a Day" buttons here proclaim. At many universities, the day of March Fourth was devoted to discussing how the misuse of scientific knowledge endangered man; the "movement" is an attempt to turn researchers away from military work toward socially constructive activities.

M.I.T. is the "mother" of the March 4 activities which spread to approximately 30 universities around the country. The idea was generated at a November conversation between three physics graduate students—Joel Feigenbaum, Alan Chodos, and Ira Rubenzahl—all of whom later played a major role in organizing the March 4 activities at M.I.T. The idea spread from the physics department to graduate students in biology and then began to attract substantial support from faculty members in theoretical physics and other disciplines.

The M.I.T. plan was not publicly revealed until late January (*Science*, 24 January), and professors and students elsewhere had only a few weeks to organize. At the University of Pennsylvania, Provost David Goddard responded to a faculty petition and called off all classes on March 4, to hold discussions. Programs were reported at Cornell, Rockefeller, Columbia, Yale, Stanford, Carnegie-Mellon, Rutgers, Northwestern, Maryland, Minnesota, Colorado, and the University of California at Irvine and Berkeley, among other universities. The M.I.T. organizers tried to get other universities to schedule March 4 activities, but it was necessarily a rather chaotic organizing attempt. "If our embryonic, naive, kooky proposal could generate such a movement, arousing so many important people, just think what a better planned effort might do!" exclaimed one M.I.T. organizer on the afternoon of March 4. However "naive" in origin, March 4 is likely to be one of the best-remembered events concerned with the politics of science and the universities in recent years.

The original statement in support of the March 4 research halt at M.I.T. was signed by 47 senior faculty members. The statement said that the war in Vietnam had shaken the signers' confidence in the ability of the U.S. Government to make wise decisions; that the response of the scientific community to these events had been "hopelessly fragmented"; that the "concerned majority has been on the sidelines and ineffective"; and that "we feel that it is no longer possible to remain uninvolved."

One of the themes developed at the March 4 discussions at M.I.T. was the need for scientists and engineers to concern themselves more with the uses to which their research and knowledge were put. Howard Zinn of Boston University commented that, while professors might take disinterested attitudes toward their work, the outside world was very much interested in what uses it could make of their research. "When you have a disinterested academy in a very interested world, you have disaster," Zinn said.

One of the original faculty backers of March 4, Victor F. Weisskopf, head of M.I.T.'s physics department, quoted a statement of Winston Churchill's: "the Stone Age may return on the gleaming wings of Science." Weisskopf said there was a feeling that scientists don't do enough and are not concerned enough about the effects of science and technology on the physical and social environment. Weisskopf argued that scientists had a responsibility to see that science is used better and to find out "how and why technology went wrong."

Other speakers criticized the ethical neutrality of scientists and engineers. One of the main faculty organizers of

March 4, M.I.T. linguist Noam Chomsky, asserted that "to the system the technical intelligentsia make a very definite contribution, not only by the design of technology and the implementation of policy, but also at an ideological level—in protecting policy from criticism by investing it with the aura of science." As one example, Chomsky cited a recent article in *Science* on defoliation in Vietnam (21 February, p. 779). "*Science* magazine publishes technical studies of defoliation," Chomsky said, "studies which are unexceptionable, except that they overlook the fact that there is a civilization of human beings living in those millions of acres of defoliated land—individuals who have not been asked whether they are amused by the experiments that we have undertaken with their lives." Chomsky argued that political passivity among scientists means acquiescence in the status quo.

One of the principal questions the first panel of speakers attempted to answer was, "When should the scientist say no to the government?" Weisskopf argued that it was important to have intelligent scientists inside the Department of Defense and that those inside government and those on the outside could help each other. Chomsky said that scientists did have a responsibility to work for the government if they could make their voices heard on decisions. M.I.T. mathematician Elliot H. Lieb speculated that the year 1969 would be a turning point in American science and would see the splitting of the scientific community into two camps, one of which would work for the government, the other of which would refuse to do so.

The students were obviously more disturbed by the world they saw than even those professors who backed the March 4 research halt. Ira Rubenzahl asked if things wouldn't be better if science and technology were stopped entirely. One student said the faculty had a responsibility to create a university atmosphere where students could have a "moral commitment," and warned that many of the brightest students wouldn't be willing to make their careers in the academic community as it is now constituted. The students expressed much more anger than their elders did. Joel Feigenbaum told the opening meeting, "What I begin with is the fact of moral outrage," and he told his listeners that it was their duty to analyze the fact of murder in the world.

One of the professors who communicated best to the students was Harvard biologist George Wald, who spoke about the things that bothered students—the draft, Vietnam, their own preservation. In a witty and passionate address, the Nobel prize-winning biologist argued that, while the purpose of government was to preserve life, "our government has be-

A West Coast Version of the March 4 Protest . . .

Palo Alto. One man's strike is another man's convocation, and by the time M.I.T.'s work stoppage had reached Stanford, it had become not an act of protest but a forum for discussion.

The activities were organized by a committee of graduate students, who, quickly discovering lack of support for the idea of the strike, set out to create a broad coalition in which the whole scientific and engineering complex of the mid-peninsula area could participate, engineers as well as scientists, men from industry as well as men from the university. To a certain extent they were successful: the program had the support and active participation of most of the scientific luminaries on the Stanford campus, as well as an endorsement from President Kenneth Pitzer. On the other hand, local science-oriented firms that were invited to participate—Lockheed, Varian Associates, and Stanford Research Institute, to name only a few—did so either sparingly or not at all.

The major practical consequence of the effort to achieve broad participation was a very traditional orientation in the choice of featured speakers and views presented. The opening remarks by Paul Grobstein, a graduate student in biology, who was one of the organizers of the convocation, took eloquent notice of the restlessness and anxiety of younger scientists that had prompted the gathering: "There is a feeling," Grobstein said, "among most of us that the directions that science and technology are taking are not well considered, that science and technology are having effects on society in ways that are not intended. This feeling takes many forms. Some of the younger of us fear that science has lost any relevance to the critical issues which concern us. Some believe that science and technology have become slaves to a power structure that they do not trust. Others genuinely feel that science is neutral and that it is those who make use of our efforts who need to be educated."

The first major speaker, Nobel prize-winner Joshua Lederberg, attempted to respond to some of the issues suggested by Grobstein, departing from his prepared remarks to deliver a spontaneous lecture on nationalism as a contributing factor to the world's dilemmas. The remaining speakers in the main session followed their prepared text in a manner that somehow seemed to exemplify rather than help resolve some of the concerns of the students. Sidney Drell, a professor at the Stanford Linear Accelerator and a member of the President's Science Advisory Committee (PSAC), gave a detached discussion of the ABM, using the language of overkill that many students have found upsetting—for example: "The one-two punch of Spartan plus Sprint has the advantage of making it possible for Spartans with long-range kill to prevent the offense from putting too many real warheads close together so that they can punch through the terminal system at one point, and at the same time allowing the Sprints to pick up only the true penetrating RV's* in the atmosphere with the second half of a one-two punch." (It later developed that Drell is an opponent of the ABM but was prevented from taking a public position by virtue of his role in PSAC, a moral and practical dilemma which the audience considered briefly at a later session.)

A third key speaker, Leonard Schiff, professor of physics, gave a rather classic presentation of the view

* Reentry vehicles.

come preoccupied with death and the preparation for death." The evangelistic Wald said, "These are the facts of death and I urge you not to accept any of them." He received a standing ovation at the end of his address, as he had before when he said that Senator Richard B. Russell (D–Ga.) was guilty of "criminal insanity" for justifying deployment of the ABM Sentinel system with the statement that, if nuclear war reduced the human race to a new Adam and Eve, he wanted them to be Americans. "We scientists, we opt for life," Wald thundered.

Wald also deplored a trend for scientific organizations to develop large bureaucracies in Washington which build up their associations with the Defense Department to keep occupied. He lambasted the American Institute of Biological Sciences for having sponsored scientific conferences last year at Fort Detrick (the Army's biological warfare research station). Wald, a member of the National Academy of Sciences, said the National Academy was the "worst offender" in this regard and termed it "a shocking thing" for Frederick Seitz to serve simultaneously as Academy president and head of the Defense Science Board.

March 4 was another example of the way in which student activists are forcing some faculty members to reexamine their attitudes toward connections with the military. At M.I.T., graduate students in the natural sciences provided much of the organizing drive behind the March 4 events. These students were shrewd in getting the support of senior professors and the consequent publicity that faculty participation meant. And, a significant number of these faculty members gave generously of their time. But, without the students, March 4 would never have taken place.

The students and their faculty backers maintained a show of unity through the events of March 4, but their alliance had worn a little thin during the preceding weeks. The students had initially expressed their opposition to the draft and to the Vietnam war, but they had been induced by their professorial supporters to expand the spectrum of their protests.

Also, some students called March 4 a research "strike," a word which, when reported in the press, threw many M.I.T. professors, including some of the backers, into a state of alarm. They quickly explained that March 4 was

Erratum

Page 1118B of the 7 March issue of *Science* included an error concerning AAAS membership dues. The rate has been $12 since 1 January 1968.

. . . At Stanford—Convocation, Not Confrontation

that basic research by individual scientists deserves society's "untrammeled sustenance." And the fourth major speaker, professor of electrical engineering John G. Linvill (one of the few engineers who actively participated), discussed some of the socially useful research in which Stanford engineers are engaged. Both Schiff and Linvill argued rather summarily for maintenance of support of basic research by defense agencies, an issue of great interest and concern to many scientists. Linvill's discussion of individual engineering triumphs, in particular a significant new reading aid for the blind, failed to shed light on the structural implications of the flourishing war-related scientific and industrial complex that surrounds Stanford.

There was some protest, at the opening gathering, about the domination of "establishment" views. The explanation, offered by Grobstein, was that the speakers had been selected deliberately, to "place the issues" before the audience. The difficulty—and the source of the frustration felt by some of the audience—was that there was no satisfactory chance to respond; the opening remarks set the tone. There was some discussion in smaller panels that met in the late afternoon and early evening. In one panel, on the "military-industrial-university complex," young dissidents had the initiative, and they used it to beat down arguments such as that of a professor of engineering who maintained that development of a "people-sniffer" (to detect guerrillas) was justified because it might also be used to help find small boys lost in the mountains. "That's like justifying the bomb because it might help make canals," commented a student in the audience. "The purpose of the people-sniffer and the bomb is to kill people. That's what it's all about." (He received warm applause.) In an evening panel on chemical and biological warfare (CBW), however, the initiative was back with what one could call the "conservatives," with an address by Merrill J. Snyder, a microbiologist from the University of Maryland, arguing for the retention of CBW research by the universities and praising Fort Detrick, the Army biological warfare research facility, for its work.

The audience, if unfailingly polite, was plainly restive, and it was, in fact, a bit anomalous that the format favored a sort of old guard when it was in large measure as a response to the anxieties of the young that the gathering had been called. There were a few exceptions. Martin Perl, another SLAC physicist, discussed ways in which grass-roots scientists could affect politics, and he was warmly received. But there was strong feeling that the audience was hungry with concern for a way to make science benign and relevant, and, for the most part, that is not what they were hearing.

The March 4 observance at Stanford was not much of a setback for the military-industrial complex. Perhaps 1200 to 1500 people participated there, and newspapers estimated that more than another thousand took part in related programs elsewhere in the Bay Area (at Berkeley, at the University of California Medical Center in San Francisco, and at San Francisco State). But it was perhaps the first infusion of a comparatively large and public interest into questions of scientific policy-making that had occurred in a long time, and it may be that it is a portent.—ELINOR LANGER

Elinor Langer is a former member of the Science *news staff.*

Florence Cahn

Cornell University physicist Hans A. Bethe speaks on the ABM at the March 4 M.I.T. meeting. Others who spoke, at the evening session, included (seated, left to right) M.I.T. physicist Bernard T. Feld, author Gar Alperovitz, and Harvard biologist Matthew Meselson.

not in any sense a "strike" against M.I.T. and was a purely voluntary effort. A faculty group (Union of Concerned Scientists, or UCS) was formed to complement the original, more militant, Science Action Coordinating Committee (SACC). The UCS and SACC continued their dual existence and statements through the week of March 4.

Similar struggles among the backers of the research halt were reported at some of the other universities holding March 4 programs. M.I.T. provost Jerome B. Wiesner who had seemed willing to appear on the program in a discussion with Chomsky, is reported to have withdrawn from the event rather than become involved in an intra-faculty fracas. M.I.T. administrators never condemned the March 4 activities, but it is safe to say that they were not enthusiastic supporters.

Despite the epidemic of cold feet among M.I.T. professors in the past few weeks, March 4 went off as planned. The attendance at the discussions was respectable though not overwhelming. The whole affair was conducted on a rational level, and there were no disturbances (except when an anti-Semitic, anti-Communist picket from outside M.I.T. tried to lead the audience in singing "God Bless America"—a vocal number that was received in good humor by the audience). In the final March 4 session, a crowd of about 1400 gathered to hear about the ABM, atomic diplomacy, and chemical and biological warfare. The Boston *Globe* called the March 4 meeting at M.I.T. "the most orderly and, perhaps for that reason, the most persuasive anti-war and anti-government policy demonstration yet seen."

There were a few speakers scheduled who were unsympathetic to the aims of March 4, but there were probably not enough of them. The sessions would have benefited from more controversy and a sharper definition of the issues.

March 4 at M.I.T. was longer on talk than on concrete proposals for action. The graduate student organizers proposed that M.I.T. and its affiliated laboratories get rid of all war-related research and of ROTC. Students spoke of M.I.T. as the heart of the "military-industrial complex," and one argued, "If you change M.I.T., you're going to change the nation." Both faculty and student backers resolved to carry on. "March 4 is just a first step," proclaimed Leon Trilling, a professor of electrical engineering.

What has March 4 done for M.I.T.? One faculty backer, physicist Bernard T. Feld, has just returned from a 10-day trip to Europe. In an interview, Feld claimed that March 4 "has done more to enhance M.I.T.'s reputation abroad than anything else; European scientists had formerly regarded M.I.T. as a narrow technological institute."

Feld said that March 4 had served to ameliorate violent differences between students and faculty at M.I.T., a view that is shared by other backers. Linguistics professor Morris Halle explained that he was a political "reactionary" as compared to the students but felt that "the most important thing is to cure the alienation of the students. Something must be done. The old arrangements are no longer adequate. The administration must be told that things are desperate."

The struggle to create new kinds of arrangements to support the activities of scientists was one of the principal points of discussion. Howard Zinn said, "the academic community and the government have gotten along well because we knew our place." Franz Schurman of Berkeley argued that professors should take a more independent view. Because of the lack of alternate sources of large-scale funding, Schurmann admitted, "we're kind of stuck with federal money." Schurmann argued, "We should take their money and give them nothing in return," using it "to work on projects that interest us."

Such an approach would seem foolhardy to many scientists and engineers and improper to others. Some scientists and graduate students at M.I.T. signed petitions of protest against March 4, and scientists at some installations, including the Argonne National Laboratory, staged their counterprotest to March 4 by announcing that they would work double-time on that day. And even some of the faculty supporterse of the M.I.T. research halt singled out some sections of the military—such as the Office of Naval Research and the Air Force Office of Scientific Research—for wise and benevolent support of basic science.

What will come of the March 4 movement? One student speaker said that March 4 was like opening Pandora's box— that once discussion was opened it couldn't be closed. Some said that the scientific community had great but unexploited power, and argued that scientists could and should set their own priorities.

The M.I.T. scientists and engineers are operating on a maxim of John Maynard Keynes', who once wrote that "the power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas." The protesting scientists and students at M.I.T. and other universities are out to prove that ideas can transform the relationship between science and the nation's vested military interests—BRYCE NELSON