

CBW campaign that has been going on in the scientific community here for the past 2 years. In many respects that campaign has been remarkably successful. It embarrassed the government into opening to public inspection the Porton Microbiological Research Establishment, where the Defense Ministry does its biological weapons research. And the campaign can also be credited with having pushed the government into asking the Geneva disarmament con-

ference to consider a ban on the production of biological weapons. Thus, the founders of BSSRS start out with the experience of having made themselves felt on an issue they deemed important. And, as a consequence of having been involved with this issue, there was a network of personal relationships that made it relatively easy to use the anti-CBW leadership as a nucleus for the new organization.

Present plans call for a monthly

meeting of a London chapter of BSSRS, as well as for the formation of chapters in other parts of the country. Past experience does not provide good odds for the success of the newborn organization, but its founders are banking on the belief that the political activism of today's youth, coupled with widespread disenchantment with science and technology, provide a promising basis for this attempt to bring their profession into public affairs.—D. S. GREENBERG

Stanford Research Institute: Campus Turmoil Spurs Transition

A decision by Stanford University trustees to cut the university's ties with the Stanford Research Institute (SRI) was met last week by a renewal of the militant student action which in April induced a tightening of policies against classified research within the university (*Science*, 2 May).

The trustees set no deadline for disengagement from SRI, nor did they specify the future form of SRI organization. The trustees at the same time "wholeheartedly" endorsed a ban on the development of chemical and biological warfare (CBW) weapons recently imposed by an SRI executive committee. But the decision to divest the university of SRI ran counter to a principal demand of student critics. Militants had first concentrated their protests on work on CBW and counterinsurgency projects at SRI, but they had broadened their demands, insisting that SRI be converted to more "socially constructive" work. The militants argued that this could be achieved only if SRI were tied more closely to the university, so that its policies and operations could be tightly controlled.

Opposition to the severing of ties with SRI last week was at first expressed in a boycott of classes, which principally affected the arts and sciences faculty of the university. Then, last Friday, occurred the first real collision with police of the current campaign. Demonstrators sought to block access to an SRI branch located in the Stanford Industrial Park adjacent to the campus, and a clash developed

during which police used tear gas and made a number of arrests.

SRI is a chief West Coast outpost of the postwar "knowledge" industry. The independent, nonprofit research institute was set up after World War II to give western industry access to advances in applied-research, economic-analysis, and management techniques made during the war. Stanford University served as a sponsor and financial backstop during SRI's formative years, and Stanford's trustees are the "owners" of record of SRI. By 1950 SRI was paying its way, and then federal contracting for applied research in the 1950's—the Korean War and Sputnik I were major milestones—was to provide the key to growth, change, and solvency.

SRI grew into the second largest of the independent research institutes, surpassed only by Battelle Memorial Institute. In recent years SRI, in both budget and staff, has been approximately half Battelle's size. (The SRI budget last year was about \$65 million, and staff numbered 3000; half of them professionals.) After SRI in size came Arthur D. Little, Inc., a profit-making firm; Illinois Institute of Technology Research Institute (IITRI); and the RAND Corporation.

In 1968 SRI ranked fifth in total worth of contracts among nonprofit institutions performing research for the Department of Defense. The top four, in order of rank, were M.I.T., Aerospace Corporation, Johns Hopkins, and the MITRE Corporation.

SRI's two decades can be divided very roughly into three phases. In the early years the institute worked almost exclusively for industry, and the disciplines deployed were most characteristically engineering and economics. Crowning examples of the work of that era were the projects for the Bank of America, which produced the prototype of the computerized records system in banking of which the ubiquitous magnetically encoded check is the symbol. In SRI's second phase, the increase of federal contract work brought an expansion of SRI competence in the physical sciences.

The beginning of the third and current phase was less clearly demarcated. In the 1960's SRI has reacted to the greatly increased opportunities to perform applied research on education and urban problems. Federal money became available in unprecedented quantities with the legislating of massive education programs and the Johnson war on poverty. Not only the federal government but state and local bodies have turned to institutions like SRI for help in the design and evaluation of pioneering social programs. The evolution of U.S. involvement in Southeast Asia also unquestionably increased the government's demand for help, not only in devising new weapons and tactics but also in counterinsurgency and economic programs. To meet the demand, SRI has had to increase the size of its staff specializing in social and behavioral sciences.

The major point, perhaps, is that SRI has always been responsive to events in the marketplace. As one member of the SRI administrative staff said, "SRI work is an indicator of shifts in national priorities." SRI is a nonprofit organization chartered to serve the public interest. To survive, however, it must stay in the black, and that means operating where the action

is. And, in the postwar period, the big customer for SRI's skills has been the federal government.

Organizationally, SRI, until now at least, seems to have fitted the description of one veteran staff member who called it "a loose confederation of entrepreneurs." There is no equivalent of academic tenure at SRI. And there has been no marketing branch out beating the bushes for contracts. It is assumed that senior professionals will cultivate relations with prospective sponsors and formulate proposals which will lead to viable projects. The concept of "sold time" is a fundamental one at SRI. It makes for self-reliance among the staff members who stay, and it makes SRI, as one staff member says, "a fairly pragmatic sort of place."

The making of broad policy for SRI seems to have reflected the general spirit of decentralization. The proportion of government to nongovernment work done at SRI appears to have been allowed to reach some sort of natural level, not to have been set by the administration. In recent years federal contracts have amounted to about 70 percent of the total SRI budget, with perhaps 50 percent of all SRI work being sponsored by the Department of Defense. The private-industry portion, amounting to about a quarter of the budget, has not changed markedly in recent years, but the work financed by state and local governments and by nonmilitary federal agencies has been the growth sector.

A Natural Target

Opposition to the Vietnam war has been particularly vehement and well organized in the San Francisco Bay area, and SRI, with its proximity to Stanford, its work on Southeast Asia projects, and its field offices in such places as Bangkok and Saigon, was an almost inevitable objective for the militants.

It is not simply because SRI works on military and counterinsurgency projects that protesters seem to find it an inviting target. In the New Left's world view, U.S. industry views the developing countries as providing sources of raw materials, markets for surplus goods, and outlets for investment capital. In this analysis, industry's strategy is to counter nationalist revolutionary movements which might threaten U.S. business operations, and SRI is portrayed as working to make the world safe for American business.

In this view, one man's economic

development project is another man's counterinsurgency scheme. And a land reform plan or establishment of a business school in a developing country can be interpreted as part of an imperialist grand design.

SRI says that about \$6.2 million of its \$65 million budget for 1968 represents work on projects affecting Southeast Asia. The value of SRI contracts involving CBW is said to be about \$400,000, although the level of support of such work is said to have been much higher in the past.

There are difficulties in appraising the depth of SRI involvement in war work, since the dialogue between SRI and its critics has been rather one-sided. The critics, obviously with some help from sympathizers inside SRI, have published details of SRI work which clearly surprised many Stanford students and faculty.

Part of the impact seems to have been achieved because of SRI's inhibitions, at least until recently, about discussing classified work at all. The SRI tradition of silence has roots in the necessity to keep proprietary secrets for its industrial clients. And military agencies generally insist that "no comment" is the best policy where sensitive military projects are concerned.

The militants, in recent months, have made a considerable impression with their portrayal of SRI and have developed substantial support among students and faculty for their demand that the university "control SRI," as the buttons insist, rather than sever ties. A recent poll taken by a student-faculty committee and answered by about 44 percent of Stanford's 12,775 students and 671 of its 1224 faculty members showed that two-thirds of the students and a third of the faculty favored bringing SRI under closer university control. Heavy majorities of both faculty and students favored directing research emphasis away from CBW and counterinsurgency warfare.

A student-faculty-administration committee which began work last October to make recommendations on the Stanford-SRI relations brought in a split verdict last month. A majority favored divestiture under a covenant which would bar types of war research objectionable to the university community, and favored continuing SRI's independent nonprofit status and letting the institute purchase itself over an extended period. A dissenting minority argued strongly for integration.

Virtually ignored during the prelimi-

nary debate over the fate of SRI were the views of the SRI staff. Up to the time of the student occupation of the Applied Electronics Laboratory on the Stanford campus last month there had been remarkably little effort by SRI staff or administrators to influence the fate of SRI. This passivity is attributed by some to decentralization at SRI; there has been no really effective staff organization.

Consensus on Separation

A consensus favoring separation of SRI, however, developed inside the institute quite rapidly in late April, so that SRI president Charles A. Anderson was able to say emphatically that a majority of the institute staff would walk out if outside control was imposed on SRI research.

Beneath the surface is a residual tension between university and research institute faculty, reflected, perhaps, in the following passage from the Stanford-SRI Study Committee report:

The confusion between the identity of SRI and the identity of the university itself can and does lead to adverse publicity in and out of scholarly circles whenever SRI does work of questionable quality. This is not to suggest that SRI's performance as a research institute is not of high quality; there is considerable evidence that some of it has been excellent. . . . However, the quality of a significant part of SRI activities has been questioned and criticized. From faculty responses to a questionnaire, this appears to be more prevalent in the case of social science and applied management science work than of work in the physical and biological sciences. But whether the result to the university of outside attribution of SRI's work and activities to it is credit or discredit, it is unearned and mistaken credit or discredit and hard to justify.

If there has been a faintly patronizing tinge in the faculty attitude toward SRI, the consideration which increasingly has swung the faculty behind the separationists is the realization that integration of SRI would require the university to accommodate large projects of contract research which might have little or no educational value, would create complex problems of status and pay for SRI staff members, and could, with the contemplated restrictions on research, result in a severe drain on university resources.

SRI staff, for their part, not only bridle at the pretensions of students and faculty to a right to settle SRI's fate but resent the assumption that SRI's value, appraised as high as \$40 million, should automatically accrue to the university. The university, they

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point out, put a modest sum into SRI and was paid back fully, with some \$800,000 added in SRI contributions to the university; it was the skill and hard work of the SRI staff, they maintain, that multiplied SRI's worth.

The Stanford name makes it easier to attract staff and customers but is probably less important than it was in earlier days. Library privileges at Stanford and the joint use of some equipment and facilities make life personally and professionally more agreeable for SRI staff. But while there would no doubt be regrets and, in some cases, real losses, there is general confidence that SRI can make it on its own.

Many feel that not much will change because SRI has not really had a symbiotic relationship with Stanford. The direct Stanford involvement, by SRI reckoning, comes to 53 Stanford faculty members listed as SRI consultants, 14 SRI staff members teaching at the university, and some 67 Stanford undergraduates working at SRI.

More significant, SRI's ties to Stanford's engineering and science departments are really less intimate than are those of the high-technology companies which have grown up within the Stanford pale. Former Stanford provost F. E. Terman was the central force in making Stanford engineering the pater familias of electronics and aerospace subcontracting firms in the Stanford area. The pattern was set before World War II, with Terman students establishing firms such as Hewlett-Packard and Varian Associates. After the war Stanford continued to spin off new enterprises, and the roster of executives of the local high-technology industry reads like the membership list of a Stanford alumni club.

SRI, on the other hand, was the brainchild of two Stanford chemistry professors and a Stanford alumnus, but many of its early officers happen not to have been Stanford men. They brought in their own friends and colleagues from elsewhere and developed a national clientele, so the interests of the university actually mesh more closely with local industry than with the research institute.

The militant effort to control SRI, if radical literature portrays militant priorities accurately, is simply an intermediate objective. As one statement of the campus April 3 Movement puts it, "The important question is whether the members of the Stanford-Midpeninsula community treat their opposition to Stanford and SRI's war research as a

● **NAS TO REVIEW ARMY PLAN TO DUMP GAS:** The National Academy of Sciences (NAS) has been asked by the Defense Department to review an Army plan to dump 27,000 tons of surplus war gas in the Atlantic Ocean about 250 miles east of Atlantic City, N.J. The Army has agreed to halt its disposal plans until NAS has conducted a full review of the safety aspects of transporting the poisonous gas across country and the ecological effects of dumping the gas in the deep-sea ocean. The Army, which contends that dumping in the ocean is the safest and most expedient method of disposal, consented to allow civilian scientists to review its plan after congressmen, led by Representatives Richard McCarthy (D-N.Y.) and Cornelius Gallagher (D-N.J.), opposed the move and prompted a congressional investigation. In hearings recently before the House Foreign Affairs Committee, the Interior Department announced its opposition to the plan because of possible unknown hazards to sealife. Other critics opposed the sea-burial proposal on the grounds that the Army's selected dumping site is clearly beyond U.S. territorial jurisdiction. A group of six Washington University scientists, led by biologist Barry Commoner, have urged that alternate methods of disposal be considered.

● **ATOMS FOR PEACE AWARDS:** This year seven scientists—an unusually large number—have been named to receive Atoms for Peace Awards in what may be the last year in which prizes are given. In announcing the award, Atoms for Peace, Inc. officials said that unless additional funds are received, this will be the last set of awards granted through the nearly depleted \$1 million memorial fund, established 14 years ago by the Ford Motor Company. This year's Atoms for Peace awards are accompanied by a \$15,000 honorarium for each recipient. The scientists honored for their contributions in developing peaceful uses for the atom are Floyd L. Culler, Jr., assistant director of Oak Ridge National Laboratory; Henry S. Kaplan, head of the Radiology Department, Stanford University School of Medicine; Anthony L. Turkevich, professor of chemistry, University of Chicago; Aage N. Bohr, director of

the Nordic Institute for Theoretical Atomic Physics in Copenhagen; Ben R. Mottelson, also of the Nordic Institute; M. S. Ioffe of the I. V. Kurchatov Institute of Atomic Energy in Moscow; and Compton A. Rennie, former head of the High Temperature Reactor Project of the Organization for European Cooperation and Development. A \$50,000 award has also been presented in honor of the late Dwight D. Eisenhower. M.I.T. Corporation chairman James R. Killian, Jr., is chairman of the trustees for the Atoms for Peace, Inc.

● **MIT FACULTY REFUSES TO ABOLISH ROTC:** The faculty of Massachusetts Institute of Technology on 14 May soundly defeated a proposal to abolish MIT's Reserve Officers Training Program (ROTC), but has agreed to consider a series of proposals to study ROTC, some of which would redirect its structure with respect to academic credit and other matters.

● **PANEL ON SANTA BARBARA OIL SPILL:** Presidential Science Adviser Lee A. DuBridge has appointed a special panel to make recommendations on the future of the Union Oil Company lease in the Santa Barbara channel. A blowout in a Union Company well in the channel in January caused serious oil pollution of the surrounding waters and coastal areas. The panel, which includes experts in geology, petroleum engineering, and reservoir management, are to assess the technical situation. The 11-member panel is chaired by John Calhoun, Jr., who is vice president of Texas A&M University.

● **GAO REPORT:** The General Accounting Office (GAO) has issued a report charging that Defense Department contractors have apparently been using government procurement funds for research and development (R&D) activities. Noting congressional interest in the funding of R&D and of the possible harmful effects on the management and control of R&D activities, the GAO singled out Air Force contracts for MINUTEMAN missile motors that may have involved a misuse of nearly \$22.5 million in funds, and then proposed that full disclosures be made in program budget submissions to show how funds are being used.

one-shot issue or as a first step toward reorienting the Midpeninsula research and industrial apparatus toward socially constructive work."

Present signs indicate that the radicals will have some difficulty in mounting a sustained offensive against SRI itself beyond the campus boundaries. On the other hand, faculty observers feel that the core of radicalized students and sympathetic moderates at Stanford has grown sizably and that the trustees' decision to separate rather than integrate SRI could lend impetus to the radicals' drive to compel the trustees to "share power."

The militant assault on SRI has forced the SRI staff and administration to examine its policies and future prospects more carefully, perhaps, than ever before.

The view of SRI executives seems to be that, well before the trustees decided to cut SRI loose and the students started breaking windows, the institution was making changes in the way it conducts its affairs.

Last year a serious effort was begun to exploit the multidisciplinary capabilities of SRI in "institute-wide research programs." A major part of research financed out of SRI's own purse is going into exploratory projects in

education, health, communications, transportation, pollution, public safety, and urban development. These are research areas in which, even 5 years ago, research funds were meager. Now the demand for this sort of research has increased. SRI, for example, was one of five pilot research centers established in 1967, each with annual funding of over \$100,000, to study future educational needs and resources in the light of current and prospective changes in society.

Inside the SRI staff, attitudes are changing. One executive says SRI researchers "are no longer willing to ignore the social implications of their tasks." During the April crisis, an elected staff "senate" to provide policy guidance for SRI programs was seriously advocated. The SRI administration has been giving attention to an "attempt to generate long-term plans as to what the role of the institute should be." And ways are being sought to find permanent sources of income, such as a share of income from patents developed for clients by SRI, to give SRI more policy freedom, since, as one vice-president said, "We need a new basis of independence."

SRI and the other successful think tanks are a significant postwar phenom-

enon, institutions for a postindustrial society produced by crossing the university with the business firm. As an independent nonprofit organization, SRI has equated the public interest with government demands expressed in terms of applied research contracts, many of them in the military field. With the escalation of the Vietnam conflict this concept of the public interest has been challenged, primarily from within the university.

SRI researchers and administrators reject the picture of their work which the militants draw. They feel that research in support of national security is necessary and justified, and they believe that broader public opinion supports them. SRI is likely to continue to do work which the government is unable to do and the university unwilling to do.

But the old ad hoc rules under which SRI has done business are being examined. SRI people pride themselves on being "realists," but a lot of them are pondering the question of how independent SRI really has been and should be. And SRI in transition could find it less difficult to weather the cutting of its bond to Stanford than to answer some of the basic questions about its own identity.—JOHN WALSH

DDT: Criticism, Curbs Are on the Upswing

The seizure of quantities of Lake Michigan coho salmon, found to have high concentrations of DDT, and a strong personal statement by an Interior Department official calling for a nationwide phase-out of the use of DDT are among the most substantial signs that federal and state governments are giving the use of DDT a harder look.

- The FDA has seized, since 28 March, about 35,000 pounds of DDT-contaminated Lake Michigan coho salmon. This was the first time that the FDA has ever moved to set tolerance levels for fish sold in interstate commerce.

- An Interior Department assistant secretary, in one of the strongest warnings against agricultural pesticide dangers made by a government official to

date, has advocated that DDT be prohibited throughout the nation within 3 to 5 years in order to protect the environment for fish, wildlife, and human safety. Leslie L. Glasgow, who is assistant secretary for Fish and Wildlife, Parks, and Marine Resources, said before a Commerce subcommittee, "It is time to replace DDT with less hazardous pesticides. Continued use should not be permitted where environmental contamination occurs." Glasgow made it clear, however, that this was his personal opinion, not an official departmental position. In other developments relating to the use of DDT:

- Robert Finch, Secretary of Health, Education, and Welfare (HEW) has named an 11-member commission, which has National Academy of Sciences support, to conduct a broad gen-

eral study of the relationship of pesticides to the environment. In addition, he has announced that the Food and Drug Administration (FDA) will undertake a specific review of pesticide residues in fish in order to establish permanent tolerance levels. Finch authorized the FDA to set temporary tolerance levels, limiting to 5 parts per million the amount of DDT residues permitted in fish shipped across state lines.

- Senator Philip A. Hart (D-Mich.), chairman of the newly created Energy, Natural Resources, and Environment subcommittee, says he plans to conduct hearings on pesticide problems of the Great Lakes. The hearings were scheduled to begin on 19 May in Washington and at a later date in Michigan.

- Recent federal action has its counterpart in state activities. Some states, including Michigan, have moved to bar or limit the uses of DDT. In March Sweden banned the use of DDT for 2 years, becoming the first country to do so.

There are signs that a counterattack by pro-DDT forces is also developing.