Nonlethal Weapons: Kennedy Prods NSF into Law and Order Territory

The National Science Foundation has made its first incursion into the strange territory of weapons research, although the weapons in question are the nonlethal variety applicable to law enforcement. A report issued by the NSF last month advocates the development of chemical and electrical weapons for such purposes as the apprehension of fleeing felons and crowd control. The NSF has thus entered the debate between those who argue that putting nonlethal weapons in the hands of the police would mean fewer deaths and those who claim that such weapons have always been put to excessive and punitive use.

Law and order is a theme the Nixon Administration has not played down, and there might be occasion for surprise that the opportunity to boost the armamentaria of the police by science and technology has been so long neglected. Strangely enough, it was not the White House, but Senator Edward M. Kennedy (D–Mass.) who pushed the NSF into the field of nonlethal weapons. Last spring, Kennedy was impressed by a conversation with Milton S. Eisenhower, who chaired one of President Johnson's frequent commissions on societal disorders; Eisenhower's commission suggested, among other things, that government and industry should join to "speed the development of an effective nonlethal weapon." Hence, in May 1971 there came to arrive on the desk of the NSF director a letter from Kennedy urging that the NSF sponsor a research program in the field. Noting the foundation's increasing focus on socially relevant science, Kennedy observed that it would be appropriate to mount a nonlethal weapons project within the NSF's RANN (research applied to national needs) program.

It so happens that the staff of the RANN program includes a leading authority on nonlethal weapons, Joseph F. Coates. In 1967, while at the Institute for Defense Analyses, a think tank attached to the Office of the Secretary of Defense, Coates carried out a survey on nonlethal weapons for police use that is still the standard work in the field.* Coates's survey was sponsored by a 1966 commission on crime that had as a staff member Arnold Sagalyn. Sagalyn is now president of a small consulting firm, Security Planning Corporation, that specializes in crime prevention and security systems. Following Kennedy's request, the NSF contracted with Sagalyn's firm for it to compile a survey of the literature and organize a conference of experts and interested parties in the field of nonlethal weapons. The report and recommendations of the conference, as compiled by the Security Planning Corporation, were issued by the NSF last month.†

The types of nonlethal weapons considered in the report range from variants of the simple billy to gadgets such as dart guns, sound curdlers, "instant cocoon," and the "taser." The taser is an instrument that fires a cluster of electrified barbs which become snagged in the victim's clothing and paralyze him until the current is switched off. ("Public reaction to use unclear," the NSF report notes.) The sound curdler, designed for crowd control, emits high-intensity sound "to create discomfort and precipitate dispersion." Instant cocoon is an adaptation of surgical adhesives used in sealing wounds. It consists of globs of adhesive strings that, when played on a crowd, would cause individuals to stick together and would thereby slow their movement. If a glob hit someone's face, it might temporarily seal the eyes, plug the nose, and, in either case, distract the individual from his aggressive mission. Other implements considered include the rubber baton (a crowd control device extensively used in Northern Ireland), the broomstick round (a wooden cylinder shot from a gun), and the cold brine projector, which delivers an incapacitating slug of freezing liquid.

The report prepared by the Security Planning Corporation does not gloss over the obvious problems raised by such weapons, for example, adequate testing and public acceptance, and it gives fair play to the objections of civil libertarians. But the recommendations of the report address the question of which, not whether, nonlethal weapons should be developed. It urges that weapons for one-to-one encounters be given first priority for development, with a lesser need for improved crowd control devices. The federal government should set up programs to test and spread news of such weapons to police departments, the report says. This opens the way for the NSF to become further involved in the field. Probably the most controversial aspect of the report is that, by force of circumstance as much as by design, it represents a particular viewpoint on nonlethal weapons—that of those who take it for granted that the development of such items is desirable.

Two Views of Nonlethal Weapons

Proponents of this view, such as Coates and Sagalyn, believe that the availability of effective nonlethal weapons will reduce the number of people shot by the police and will increase police efficiency. (Coates, as NSF contract officer, had no part in drawing up the report, but staff members of the Security Planning Corporation say that they relied heavily on Coates's monograph.)

Opposing what may be called the Coates-Sagalyn view are civil rights activists such as the American Civil Liberties Union (ACLU). "It's hard to oppose nonlethal weapons in principle, but in fact they have been used almost exclusively abusively," says Ralph J. Temple, chief of the District of Columbia branch of the ACLU. Police forces, he says, tend to use chemical mace punitively, spraying it on sitting demonstrators, for example. Nonlethal weapons, according to an ACLU statement printed in the NSF report, "have merely proved to be an additional means of police inflicted punishment. We know of no significant and reliable evidence that the use of chemical sprays has cut

* J. F. Coates, *Nonlethal Weapons for Use by U.S. Law Enforcement Officers* (available from National Technical Information Service, Springfield, Va., for $6).

† *Nonlethal Weapons for Law Enforcement* (Security Planning Corporation, 1225 19th St., NW, Washington, D.C. 20036).

down the use of either the police pistol or billy-club. . . . The National Guard had tear gas at Kent State and that did not prevent the wanton and unnecessary killing of four students."

Coates is well aware of the ACLU position, but believes their objections can be met in practice. "There is no question that the individual policeman is liable to use a nonlethal weapon as a punitive tool," Coates told *Science*. "But the ACLU people don't realize the opportunity for technology to moderate technology." Coates gives as an example the police station practice of weighing the cans of chemical spray at the end of each day and requiring the patrolman to account for the quantity used. In his 1967 monograph on nonlethal weapons, Coates states that technology cannot substitute for police training and that "the search for new improved weaponry probably will create further problems of training and practice and increase the opportunity for misuse."

Coates and the ACLU represent the optimistic and pessimistic poles, respectively, of the academic view on nonlethal weapons. Less disinterested parties are the police departments and the manufacturers. Police departments have traditionally opposed nonlethal weapons, seeing them as the first step in a plot to deprive the police of their lethal weapons. The apprehension of police departments, combined with the objections of civil libertarians to the cruel and unusual effects of new weapons, account for the fact that so few have passed into common use. This has not stopped manufacturers from developing a constant stream of new devices, many of which are largely untested or the subject of exaggerated claims. "People like Sagalyn are honestly searching for alternatives to force," says Temple of the ACLU, "but the forces that promulgate these weapons are not primarily interested in the benefit of our society." The manufacturers realize enormous profits by "recklessly advertising" in police journals and appealing to the "cowboy instinct" of the policeman to sell their wares, Temple says.

Although manufacturers seem to be the chief source of new devices, many of the ideas seem to originate with military departments such as the U.S. Army Land Warfare Laboratory and the Army Materiel Command. CS gas was originally developed for military use (the transfer to civilian use took some 30 years); instant cocoon, another fruit of military ingenuity, was first designed to secure prisoners prone to commit suicide.

A more favorable estimate of manu-

Biologics Division To Be Transferred from NIH to FDA

The Division of Biologics Standards, which has come under attack lately for botching its job of guaranteeing the potency of vaccines, is being dismantled. Health, Education, and Welfare Secretary Elliot Richardson declared last week that he will relieve the DBS of its responsibility for regulating vaccines, blood products, and human organs for transplants and give the job to the Food and Drug Administration. The DBS has been charged with approving millions of doses of subpotent influenza vaccine that were on the market between 1966 and 1968, with failure to remove 32 ineffective vaccines, and with internal incompetence and mismanagement (*Science*, 3 and 17 March).

The transfer of the DBS, which is part of the National Institutes of Health, has not been a cause for celebration either at NIH or at FDA. At present, it is not clear just how the switch will take place, in part because no one has defined what constitutes DBS regulatory activities.

According to an NIH spokesman, an inventory of the DBS is now under way, "We have to figure out just what everyone does. We decided that there is no way to approach the problem in the abstract, so we're going to count noses." When NIH officials have completed their analysis of the DBS, a task they hope to complete within a week, they'll draw a line between what they consider regulatory work and pure research and present their plan to the FDA. Although it is unclear how many persons will have to be handed over, it seems that some scientists involved in control testing and other laboratory activities will have to be included in the package. "Charles Edwards [FDA commissioner] is accepting this reluctantly," one official noted, "and he certainly isn't going to accept this transfer if adequate resources don't go with it." (The entire DBS budget is $9 million.)

Negotiation between the NIH and FDA over the details of the move are expected to begin this month, and the transfer may be completed by the beginning of the fiscal year in July.

Richardson announced his intention of breaking up the DBS during hearings before the Senate Government Operations subcommittee. Abraham Ribicoff (D–Conn.), chairman of the subcommittee, is among members of Congress who have proposed that consumer protection be transferred from DBS, FDA, and other HEW agencies to a new Consumer Protection Agency. Richardson said of that idea: "It is regressive, will deal the consumer a crushing setback, and will sell him a phony bill of goods by moving away from, rather than toward, greater product safety. I cannot urge you strongly enough not to reorganize solely for the sake of reorganizing under the banner of consumerism." Most observers feel that his reorganization of the DBS and FDA with regard to biologics is intended to answer DBS's critics and put off any more sweeping changes.

Whether the transfer of the DBS regulatory function to FDA will really help matters any is moot. Ribicoff, for example, has as many gripes with the FDA as with the DBS and was quick to question the FDA's effectiveness as a consumer protector. Citing a government report attacking FDA's enforcement of safety and cleanliness standards in food preparation plants, he wondered how one can have any confidence in HEW regulatory agencies. Ribicoff was particularly unhappy about FDA standards that allow certain quantities of insect hairs and fragments in food; 150 insect hairs per 250 grams of certain foods, for example.

Other persons are no more certain than Ribicoff that the DBS-to-FDA transfer will be more than reorganization for reorganization's sake. Quipped one veteran agency observer on hearing of the plan, "It is like giving a blind man a blind dog."

—BARBARA J. CULLITON

facturers' intentions is taken by Martin Danziger, assistant administrator of the Law Enforcement Assistance Administration (LEAA). Asked if there were a real need for nonlethal weapons, Danziger observed that "the business community has taken substantial interest in them and I have faith in their judgment." But the LEAA, through the National Institute of Law Enforcement and Criminal Justice, of which Danziger is director, is also conducting its own analysis of police needs for new equipment, including nonlethal weapons. In addition, Danziger plans to let a multimillion dollar contract for the development of new nonlethal weapons. Last week Danziger's institute awarded a $250,000 contract to the U.S. Army Land Warfare Laboratory to test and evaluate existing nonlethal weapons proposed for police use. The weapons to be tested include kinetic weapons such as beanbags and the stun-gun, chemical weapons, the taser, and miscellaneous devices such as instant cocoon and instant banana peel. The newfound interest of the LEAA in nonlethal weapons postdates the initiation of the Security Planning Corporation Study by the NSF.

With the LEAA now pressing ahead on nonlethal weapons, the future involvement of the NSF is unclear. Coates told *Science* that the social context in which a policeman might need to use a nonlethal weapon—the "behavior day" of the policeman—might be a suitable subject of study for the NSF's RANN program to fund.

Staff aides to Senator Kennedy—who is chairman of the Senate committee that authorizes appropriations for the NSF—indicate that Kennedy is interested in seeing the foundation actively involved in the area. One staff aide criticized the NSF for having produced a report with too narrow a scope: "There was no awareness that this is fundamentally a sociological problem—that was made clear in our original request but doesn't seem to have penetrated . . . ," he said. Kennedy's May 1971 letter to the NSF director states that, besides technical knowledge, there is also a need "for increasing our knowledge of the sociological and psychological aspects of police use of nonlethal weapons."

But the NSF seems to have had in mind the specific charge in his letter, which was "to develop a research program that would produce effective and reliable nonlethal devices for police and other protective and defense purposes." The report prepared by the Security Planning Corporation, which concentrates on the specific types of nonlethal weapons that should be developed, represents the first step toward fulfilling this directive.

While the NSF does not endorse the report, its sponsorship of the project in obedience to Kennedy's behest has invited criticism from those who question the need to develop nonlethal weapons in the first place. According to Joseph Page, a law professor at Georgetown University who attended the conference held by the Security

DOD Research Stony Brook Issue

On 25 April the faculty senate of the State University of New York at Stony Brook voted to end Department of Defense (DOD) sponsored research at the university. Stony Brook president John S. Toll responded by declaring that before he comments publicly on the matter some procedural issues have to be clarified and, at least until then, there will be no change in university policy on research.

The amount of DOD-sponsored research has declined at Stony Brook in recent years; DOD research grants and contracts now amount to about $200,000 of a total of about $17 million in federally sponsored research at the university.

Wording of the motion passed at the meeting was as follows: "We demand an end to university complicity, both explicit and implicit, with the military: specifically, we call for the prohibition of any applications for new or renewed DOD grants and contracts." The motion carried 70 to 31.

A procedural question arose because the motion was proposed from the floor as an amendment to a resolution urging immediate withdrawal of all U.S. military forces from Southeast Asia. The objection was that the motion on DOD-sponsored research was not included in the agenda circulated before the meeting, as required by faculty senate rules. Partisans of the motion argued that the meeting was called to discuss issues raised by a student strike in protest against the war and that the motion was therefore within the boundaries set for the meeting.

Some faculty members have noted that only about 100 of the approximately 850 faculty members eligible to vote in the faculty senate actually did vote on the question, and they express doubt that so important an issue should be decided by such a small vote. Those backing the motion reply that senate rules require a quorum of 75 and that, until such time as the rules are altered, actions of the senate should stand. Under the rules that govern the state university system in New York, the president of the individual university campus wields ultimate authority over matters such as research policy.

The motion to phase out military-sponsored research at Stony Brook has a history going back to the spring of 1970. The U.S. incursion into Laos and Cambodia occasioned a faculty senate vote to discontinue DOD research. That summer, when the question of renewal of DOD work arose, Toll consulted the graduate council, a subgroup of the senate, and was advised to proceed as usual. That autumn, the ban on DOD-sponsored research was rejected in a mail vote by 270 to 188.

This time proponents of the ban appear to be better organized to bring pressure on Toll to implement the ban. A letter was sent asking him to make public his decision by 4 May. When he declined to do so, a petition backing the ban was circulated and is now said to have some 225 faculty signatures.

Toll at this point has indicated that he will consult university groups, including the Stony Brook council, which acts as a local board of trustees, on the matter. But it is clear that at issue at Stony Brook is not only the future of DOD-sponsored research there, but the thorny question of the power of the faculty to influence operating policy.—J.W.

Planning Corporation in October last year, the conference was "a loaded deck to begin with. The corporation got together a group of mainly like-minded people with one or two token dissenters."

Another dissenter who attended the October conference, Sidney Wolfe of the Medical Committee on Human Rights, says that the conclusions of the conference had been decided beforehand. "The NSF should think through very carefully what they are getting into," says Wolfe. "They have already wound up getting to a stage that presupposes more weapons should be developed."

Most parties to the debate on nonlethal weapons, including Coates, the ACLU, and the staff of the Security Planning Corporation, agree that inadequate training and control of police is a major cause of excessive violence and that to introduce nonlethal weapons without improving training would invite abuse. It would be unfortunate if Kennedy's specific directive to the NSF to develop new nonlethal weapons should have this result.

—NICHOLAS WADE

Unionization: Scientists, Engineers Mull over One Alternative

The trade unions are the legitimate outgrowth of modern societary and industrial conditions. . . . They were born of the necessity of the workers to protect and defend themselves from encroachment, injustice, and wrong. . . .

—SAMUEL GOMPERS, 1898

That poor working conditions, insecurity, and discontent are the seedbed of unionization is one of the prime tenets of labor organizers. Yet, although the United State's 1.1 million engineers and 500,000 scientists have suffered sudden and acute economic hardship in the last 3 years, no strong union movement has yet emerged. Some observers say a union movement is inevitable; others violently disagree, saying that scientists and engineers are congenitally hostile to unionization.

Whichever is true, the lack of strong organizations based on economic self-interest has hindered the winning of pensions, gaining of adequate or ample severence pay, and other measures that the engineers and scientists want. But there are also wider implications. Other unionized groups, such as those of the teachers, have gone one step further and used their organizations to attain political power. By contrast, the technical professionals as an economic group have no comparable influence. Thus, they have missed opportunities for leadership on national technology policies, aerospace spending, funding for basic science, and other key issues. As one Washington lobbyist has said in describing his frustrations in rallying science and engineering groups to help with legislation now in Congress, "We've been knocking, but there's no one at home."

The reason why strong unions or unionlike groups have failed to emerge seems to be that there is a complete lack of consensus on what needs to be done.

Apparently there are two camps: the unionizers on one hand and the professional purists on the other—the joiners and the nonjoiners—or, to put it another way, those who think that job security will be won only through tough, eyeball-to-eyeball bargaining, and those who think that individuals will be able to handle these matters alone.

Science talked with a number of representatives of major unions, independent associations, and professional societies about the issues of economic self-defense and unionization. What emerged was that not only is there no agreement on how to organize for the present crisis, but also there are widely different views on just what the present crisis is.*

If the situation is ripe for unionization anywhere, it is on the West Coast. There, in some areas, unemployment is about twice as high as the national rate and is frequently attributed to the aerospace recession. The principal organizers are the AFL-CIO affiliate, the Marine Engineers Beneficial Association (MEBA), and the United Auto Workers (UAW), which is one of the two largest unions in the nation. In addition, many high-technology and aerospace plants around the country have independent employee associations; many of these are now affiliating with the major unions, while others are considering forming independent collective bargaining units.

At North American Rockwell Corporation's five divisions in the Los Angeles area, the UAW and MEBA are competing for the votes of 7000 professional employees—most of whom are engineers. A vote will soon be held on which of these unions, if either, the North American engineers will join.

At the Vertol Division of Boeing in Philadelphia, Pa., the independent Vertol Professional Engineers Association, voted earlier this year to affiliate its 5000 members with another independent Boeing group, the Seattle Professional Engineers and Employees Association (SPEEA), which already has 7700 members. SPEEA is one of the largest and oldest plant associations, and it has not yet joined any major union. Competing with SPEEA at Vertol were the American Federation of Technical Employees and the International Association of Machinists.

MEBA is the most active union in organizing professionals. It originated during the late nineteenth century steamship boom to ensure that shipboard engineers were adequately fed and bedded while at sea. Today, however, only 10,000 of MEBA's members are ship engineers; the remaining 30,000 are landlubbing engineers and scientists. In 1970, the Association of Industrial Scientists (AIS) at the Emeryville Research Center of Shell Oil Co., voted to affiliate with MEBA. (In 1971 Shell announced the phase-out of the Emeryville station.) Since 1968, MEBA has also added the Engineers and Scientists

* In this article the unionization movement among scientists and engineers and its potential, as viewed by advocates and opponents, is examined. In a second article the professional technical societies and their role in meeting economic needs of members will be discussed.