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.

of Florida, based at Cape Kennedy; the 2000 Engineers and Scientists of California; Engineers and Scientists, Lockheed Missile and Space Co., Sunnyvale, Calif.; and Research Engineers and Professional Employees Association (REPEA) at the Standard Oil Company (Indiana). MEBA has been said to envision a "universe" of 800,000 to 900,000 professional technical people who might join up. If MEBA ever attains that scale of membership, it will rank alongside the UAW and the teamsters as one of the major U.S. unions.

Henry P. Dooley, MEBA vice president for organizing, says, "People are beginning to see that professionalism is compatible with unionism." He says that MEBA's portable pension plan, which permits an employee to retire after 20 years, even if he has worked for several companies, is a special attraction to the aerospace professionals. Like most union leaders, Dooley hesitates to disclose the amounts of staff time and money MEBA is devoting to enlarging its "universe."

MEBA's rival in the drive at the North American Rockwell plants and elsewhere is the UAW. Hubert Emerick, assistant director of the technical, office, and professional employees' organizing division, says that 85,000 of UAW's 1.5 million members are white collar workers, and less than 2000 of these are engineers or scientists. UAW does not at present offer a portable pension plan comparable to MEBA's nor can it offer an affiliated union as much autonomy as the independent-minded engineers are likely to desire. However, Emerick says UAW is trying to overcome these drawbacks to appeal to more professionals. At their Atlantic City convention, UAW took preliminary steps which might offer affiliated unions more freedom in local dues allocation and related matters. "Let's face it," he says, "engineers want to run their own affairs. We want to be able to say to them, 'We can lend you the strength of our total organization although we recognize you want to run your own affairs.' "

Less well known than the major unions are the numerous independent employee associations—which for the most part are not certified bargaining units. A partial list of these includes SPEEA at Boeing, already mentioned, as well as the Engineers and Scientists Guild at Lockheed-California Co., in Burbank; the Southern California Professional Engineers Association at McDonnell Douglas Corp.; and the Westinghouse Engineers Association, representing five Westinghouse plants.

General Electric Co. engineers have an association. At the Bell Laboratories there is a group titled the Conference of Professional Employees. Radio Corporation of America (RCA), Camden, N.J., has an Association of Scientists and Professional Engineers.

While the independents make some claim to status, their actual power is small. The experience of AIS, before its affiliation, is an example of the independents' ambiguous status. As an independent, AIS had little effect on management's decision to close down the California lab and expand the one in Houston, Texas. In addition, says an AIS spokesman, even since affiliating with AFL-CIO's MEBA, there are still many problems. "Companies don't like unions because, by definition, they want to take away some of the managers' power," says the spokesman.

"There are many ways a company can make it very unpleasant for people who join a union to work. You can get transferred. You can get an unusual number of performance reviews. You find you've received no raise in 3 years while inflation has been pushing upward at 5 percent per year. Without doing anything illegal, they can make you very unhappy."

There are two ways in which a group of professional employees, whether already in an association or not, can become recognized by their employers as certified bargaining units, and hence can become protected by the National Labor Relations Act. One way is for the

Kisty Quits Muskie Camp

The Edmund Muskie bandwagon, which hasn't fared too well lately, appears, as far as the scientific community is concerned, to have gone over the cliff. None other than George B. Kistiakowsky, former science adviser to President Eisenhower, recently gave up on the Muskie outfit in a fit of pique, after several months of trying to organize scientific input to the Muskie campaign.

In a 13 April letter to those scientists who had participated in the informal effort, Kistiakowsky explained why he and Muskie were washed up. " . . . [W]hat we were trying to do was of no interest to the Muskie organization which preferred instead an 'in house' Washington operation by swarms of junior lawyers mainly from Arnold & Porter and Covington & Burling law firms. Repeatedly I was told, in effect, that our task was to recruit and that they would know best how to use the results. But actually, they did virtually nothing with the scientists whose names I gave to them." Kistiakowsky added that he had written a letter to Muskie in February, and, after 2 months of silence, received a telephone call from a Muskie staffer urging him to "continue my efforts." The Harvard chemist replied that he would not continue.

"I decided and shall probably wait until after the Democratic convention before offering my services in the cause of retiring Mr. Nixon to almost anybody that the convention might nominate. It has been a disheartening experience. . . . Sincerely, George."

With the Muskie forces thus disarrayed, the McGovern troops seem to be gathering. There is a fund-raising and science advisory group for McGovern, whose co-chairmen are Herbert F. York, science chief of the Department of Defense under President Eisenhower, and Harry Palevsky, a Brookhaven National Laboratory nuclear physicist who worked for Eugene McCarthy in 1968. Mary I. Bunting, president of Radcliffe, (who attended a January dinner at the Harvard Faculty Club which Kistiakowsky gave to gather Muskie interest), and Salvador E. Luria, Nobel prize-winning biologist, have both been elected delegates to the Democratic convention in July pledged to McGovern. As for the other Democratic front-runner, in April, a National Committee of Professors for Humphrey was formed, and among their number is another prominent Cambridge academic, Seymour M. Lipset, who is a professor of government and social relations at Harvard.—D.S.

Rauscher Named NCI Chief

President Nixon last week named Frank J. Rauscher, Jr., to succeed Carl Baker as director of the National Cancer Institute. The official announcement, which had been anticipated for several weeks (*Science*, 21 April), apparently was held up while Rauscher's security clearance moved through FBI channels.

Speaking to the press after meeting with the President, Rauscher said that Nixon had emphasized his desire to see the cancer program get under way without "bottlenecks"to slow things down.

Baker, who directed the NCI for 3 years, has been named special assistant to the director of NIH for technology implementation, a job that will keep him within the NIH hierarchy.—B.J.C.

employer to voluntarily recognize an organization of employees and certify their acceptance to the local National Labor Relations Board (NLRB), an independent agency with authority to police labor negotiations in private industry.

More commonly, however, a group of employees, deciding they want to become recognized, may circulate a petition among themselves. When 30 percent of the group have signed, the petition goes to the local NLRB (there are 31 around the country). NLRB then holds a hearing to determine whether the group bringing the petition is in fact a coherent economic interest group. The NLRB looks for common work tasks, required skills, salary scales, and so forth. If the board approves the petition, an election is held among the group of employees. If a simple majority votes a go-ahead, the whole group automatically becomes a certified bargaining unit. Then, under the National Labor Relations Act of 1935, as amended, the employer must sit down at the bargaining table with unit representatives, whether he likes it or not.

Organizing thousands of engineers or scientists is expensive and difficult. In addition, a union representative must cope with the inevitable snobbism of the better educated engineer or chemist toward the blue collar connotations of unionization. Organizing is made even more difficult by the fact that, under federal law, people whom the NLRB defines as professionals must specifically chose if they are to join with a group of nonprofessionals. This means that the professionals at a plant which is otherwise unionized must take separate steps to join with the production and maintenance staff, and a separate organizing procedure is followed.

Hence, it is no surprise that the major unions, until a short time ago, have shown little interest in the plight of this better educated and rather snooty segment of the labor force. As the UAW's Emerick observes, "We don't organize anybody. The employers provide the motivation of the employees to organize. We just capitalize on it." However, the West Coast drives seem to indicate that this hands-off attitude is changing. Most union spokesmen appear to be convinced that some form of unionization would inevitably permeate the engineering and scientific professions.

Potential Disputed

However, there is wide disagreement on the potential benefits of unionization. One critic is the new head of the American Chemical Society, Alan C. Nixon, who was also the first president of Shell's AIS many years ago. "Unionization is no panacea," he warns. "Unions have publicity value, but a company is not much more likely to act when there is a union with no clout than when there is a group like the ACS speaking for members. Professionals don't have a hell of a lot of clout anyway."

One principal criticism of unions for scientists is that the idea of scientists on strike simply sounds absurd to many. One physicist said, "What good would it do for us to strike, anyway? No one would miss us. I mean in 10 years there wouldn't be any new products. Of course you wouldn't have a space program either." And a disgruntled physicist who follows employment issues closely also said that a strike by basic researchers would be ineffective. "I would organize with the computer scientists. By letting the computers go to hell they could wreak havoc in America. They really do have some leverage. I wouldn't join up with chemistry or biology." But, typical of the lack of experience the scientists display in thinking about unionization, the physicist confessed that he didn't know the name of any computer professionals' society which the physicists could contact.

A spokesman familiar with both the problems of unionization and the hang-ups of the scientists and engineers is Jack Golodner, the executive secretary of the Council of AFL-CIO Unions for Scientific, Professional, and Cultural Employees. Golodner believes that unionization is inevitable, because the country's research and development establishment has become "highly corporatized." Before World War II, he says, the engineer still could walk away from his company and start his own firm—the way lawyers still can. Now, however, the engineer is part of a bureaucracy, and his chances of having face-to-face contact with his boss are "vitiated."

Unions can do two things for scientists at their place of work, he says. They can assist them in the layoff situation with operative standards, supplementary unemployment benefits, and relocation rights (so that if a company shuts down a plant in one state and expands the plant in another state, the professionals at the closed plant must be offered work at the new site). Sometimes, a union contract can include work-sharing arrangements, which enable a team to keep working together, part time, instead of having some team members laid off.

A second role of engineers' and scientists' unions could be to implement consumer advocate Ralph Nader's concept of whistle blowing. "The engineer is losing his professionalism by not organizing," says Golodner, who is a lawyer by training. "In the law, there is a sense of the obligation to the court, to a higher loyalty. So if a client asks you to do something illegal, you have an obligation to tell the court.

"If I am employed as an engineer to provide a professional service, I should not be forced to forego my obligation to serve the public in order to satisfy my employer. Through a union, I could insist that my voice in professional standards was heard by writing into the contract a grievance procedure. In this way the contract could define standards of professional conduct. Thus if the employer asks the engineer to do something unprofessional, like approving the design of an unsafe car, the en-

gineer has a mechanism to question that decision in a procedure ending in peer arbitration. Now that engineer either stays on the job and builds the death trap or he gives up his job. That's a terrible thing to do to a person."

On the basis of several interviews, it appears that many scientists and engineers believe that union organizing is a radical, even corrupt, activity, which conjure up the specter of George Meany, AFL-CIO president, laughing at President Nixon, or of labor-backed city pols passing out free Thanksgiving turkeys and half a ton of winter coal in return for votes. Neither picture is something the technical professionals care to identify with.

However, in the last 3 years these professions have been faced with the most ominous economic situations—fund cuts, inaccessible pensions, and plant shutdowns—since before World War II. These perilous conditions may yet have the effect of driving scientists down from their ivory towers and to the bargaining tables.—DEBORAH SHAPLEY

French University Reorganization: Voilà, Thirteen Universities of Paris

The University of Paris after World War II was a splendid anachronism. Its immense prestige, the brilliance of many of its graduates, even its medieval origins and Left Bank setting made it particularly resistant to change. Paris, in fact, was a university very much as Napoleon had conceived it. The traditional *facultés*—letters, law, medicine, pharmacy, science—coexisted as essentially independent entities. In each *faculté*, the dean and senior professors exercised nearly absolute control and negotiated directly with officials of the Ministry of National Education on major policy issues and budgets.

Paris and the provincial universities continued to give rather narrow professional training as physicians, lawyers, scientists, and teachers to students who emerged from the rigorously competitive national school system. That system emphasized the amassing of factual information and the development of reasoning, verbal, and literary skills. It was heavily biased toward classics—that is, mathematics, Greek, Latin, and French philology, literature, and history. Science and technology were treated as being of secondary importance. After World War II, it became increasingly evident that the goals of French educational institutions were incongruent with the needs of a technological society.

It is true that higher education since Napoleon has had a dual structure. Top managers for industry and administrators for government have been drawn primarily from among the graduates of the *grandes écoles*, elite professional schools that evolved from the engineering schools established to produce technically trained officers for the armies of Revolutionary France. In fact, in the era of the technocrat, alumni of the *grandes écoles* have, if anything, increased their ascendancy over graduates of the universities. The *grandes écoles* themselves have had their weaknesses, notably lack of a research tradition. But the universities failed even more conspicuously to evolve patterns of teaching and research like those appearing in other countries. France lagged, for example, in establishing a strong link between basic science and medical education.

The French were acutely aware of the shortcomings of higher education in the 1950's, but it was not until the De Gaulle regime began to solve deep political and financial problems that serious efforts to alter the education system were possible. Between 1956–57 and the present, enrollment in higher education rose from about 150,000 to nearly 700,000.

By the late 1960's, enrollment at Paris was higher than it had been in the entire university system at the beginning of the period. For centuries, of course, Paris had exerted such a powerful centripetal force on scholars, students, and money that, figuratively in the university system, as almost literally with the highways, all roads led to Paris. Under De Gaulle, an attempt was made to build up the provincial universities and deemphasize Paris, but the attractions of the capital and biases in the system prevailed, and Paris continued to grow.

The result for the old University of Paris was a bad case of overstress. If anything could have been worse than the huge, overflow lecture classes in antiquated buildings, it was that curriculum and teaching methods had changed hardly at all. An attempt was made to relieve the pressure on the Latin Quarter *facultés* by establishing new university "centers" on the fringes of Paris at places like Orsay and Nanterre. Orsay acquired a reputation as a rather successful transplant of a science campus; Nanterre, established primarily as an outpost for law and the social sciences, gained notice for other reasons. It was students from Nanterre who ignited the explosion of May 1968 when they rallied the Latin Quarter students in the streets of central Paris.

The May outbreak was the catalyst for a major effort at reform of the university system. A reform movement had gained momentum through the early 1960's and in 1966, at a colloquium at the university at Caen, had reached a consensus on main principles. In the summer of 1968, the government backed a concerted effort to fashion a reform package in which students, graduate students, and younger faculty members, as well as senior professors and ministry officials, participated. In the autumn of 1968, an orientation law for higher education was enacted, codifying the reforms. Under the law, universities would be autonomous, which meant that they would be self-governing, with students, teachers, and staff given a share of authority. They would also be "pluridisciplinary," which meant, in the language of the law, that the universities would "associate wherever possible arts and letters with sciences and technics." Size was set at between 8,000 and 15,000 in each university.

The real key to the reorganization was to be the replacement of the *facultés* with *unités d'enseignement et de recherche*, or units of teaching and research (UER). Groupings of these