SCIENCE FOR THE PEOPLE

50¢

VOL. III
NO. 4

BIOLOGICAL SCIENCE IN CHINA

WHY I RESIGNED FROM THE NATIONAL ACADEMY OF SCIENCES

ENGINEERS IN THE WORKING CLASS

FIGHTING THE POLICE COMPUTER SYSTEM

FOOD ADDITIVES OR 1+1+1...MAKES MANY

BI-MONTHLY PUBLICATION OF SCIENTISTS AND ENGINEERS FOR SOCIAL AND POLITICAL ACTION · SESPA SEPT. 1971

ABOUT THIS ISSUE AND OTHERS

The magazine *Science for the People* which succeeded *SESPA Newsletter* has now appeared for a full year. So this is perhaps a good time to describe the process by which the magazine is produced.

Most of the members of editorial collectives are full-time employed scientists, technicians, secretaries and engineers, some are unemployed and some are students. During the eight weeks of screening, editing, and typesetting articles for this issue we have held three-hour meetings every week during the first half and as more work accumulated we met twice a week and spent our weekends at the IBM composer at the Media Center in Cambridge. That is about normal for other collectives as well. Most of our meeting time is spent in reading and discussing articles that have been submitted or that we solicited. Major rewrites are discussed with the author. Such discussions have once again reminded us of the desirability of articles written by collectives. We would like to urge people to get together in study groups at their places of work or around a particular project or topic, to write the result and to send it to us.

Science for the People has become incorporated as protection from costly legal hassles (should there be such).

Printing, postage and design (the last is done at submovement cost by Alphabet) are the only things that are paid for ($1500 every other month); all else is volunteer work. So for the magazine to continue we need more subscriptions, more people to distribute it to bookstores and, of course, articles.

CONTENTS

CONTRIBUTORS: Pete Barrer, John Harris, Steve Hollis, Al Huebner, Richard C. Lewontin, David Nichols, Office Collective Boston, George Pallrand, Stan Robinson, Jeff Stokes, Ethan Signer, Sid Smith, Alan Steinbach, David Wuchinich

EDITORIAL COLLECTIVE: Sandra Brick, Roger Cascante, Steve Cavrak, Britta Fischer, Jan Handke, Colleen Meier, Jim Moore, Ginny Pierce, Judy Strasser

DESIGN AND LAYOUT: Alphabet

EDITORIAL PRACTICE

Each issue of *Science for the People* is prepared by a collective assembled from volunteers by a committee made up of the collectives of the past calendar year. A collective carries out all editorial, production, and distribution functions for one issue. The following is a distillation of the actual practice of past collectives. **Due dates**: Articles received by the first week of an odd-numbered month can generally be considered for the magazine to be issued on the 15th of the next month. **Form**: One of the ways you can help is to submit double-spaced typewritten manuscripts with ample margins. If you can send six copies, that helps even more. One of the few founding principles of SESPA is that articles must be signed (a pseudonym is acceptable). **Criteria for acceptance**: *SESPA Newsletter*, predecessor to *Science for the People*, was pledged to print everything submitted. It is no longer feasible to continue this policy, although the practice thus far has been to print all articles descriptive of SESPA/Science for the People activities. Considerably more discrimination is applied to analytical articles. These are expected to reflect the general political outlook of *Science for the People*. All articles are judged on the basis of length, style, subject and content. **Editorial procedure**: The content of each issue is determined by unanimous consent of the collective. Where extensive rewriting of an article is required, the preference of the collective is to discuss the changes with the author. If this is not practical, reasons for rejection are sent to the author. An attempt is made to convey suggestions for improvement. If an article is late or excluded for lack of space or if it has non-unanimous support, it is generally passed on to the next collective. **Editorial statements**: Unsigned articles are statements of the editorial collective. **Opportunities for participation**: Volunteers for editorial collectives should be aware that each issue requires a substantial contribution of time and energy for an eight-week period. Help is always appreciated and provides an opportunity for the helper to learn and for the collective to get to know a prospective member. There are presently plans to move the magazine production to other cities. This will increase the opportunity forparticipation. For legal protection *Science for the People* has become incorporated.

BIOLOGICAL SCIENCE IN CHINA

Last May, Arthur Galston and I spent two weeks in the Peoples Republic of China, visiting various scientific establishments, talking with Chinese scientists and seeing the country in general. We obtained visas to visit China at the Chinese embassy in Hanoi, where we had gone to exchange information with North Vietnamese scientists and give several lectures. Like others who have done so (see Ptashne's article in *Science for the People*, May 1971), we found the Viet-Namese to be quite aware of and interested in foreign scientific developments and to have a very deep and serious commitment to scientific research, much more so than one might have expected possible in the present conditions. We were particularly impressed with the effort they were able to spare from their obvious preoccupation with military affairs to build up their society, both in science and in such fundamental areas as education and public health.

We found that, under the impetus of the Cultural Revolution, the Chinese are experimenting with new ways of organizing science and medicine. They seemed to be trying to integrate scientific research more closely with the immediate needs of industry and agriculture; to broaden the scope of medical care so that it reaches as much of the population as possible; and to do away with institutional and social customs that made intellectuals and professionals elite classes culturally distinct from ordinary people.

Begun in late 1965, the Great Proletarian Cultural Revolution seems to have been a struggle, not only for power between Chairman Mao Tze-tung and former Chief of State Liu Shao-chi, but also for the control of the development of Chinese society, between two conflicting ideologies. Mao's philosophy stresses development of self-reliance among the Chinese people; striving for ambitious goals, as in the (largely unsuccessful) Great Leap Forward in 1958; egalitarianism and reliance on ordinary people; and moral incentives for labor. In contrast, Liu's philosophy ("the revisionist Soviet line"), now discredited, is said to have stressed the use of foreign technology where possible ("being foreign slaves"); cautious setting of goals within reach ("advancing at a snail's pace"); establishment of privileged intellectual and expert elite classes ("divorced from the masses"); and material incentives for labor("following the capitalist road").

The defeat of the Liu forces about 1967, and the subsequent struggles between moderate and extreme factions of the victorious Mao forces, were apparently very bitter and involved numerous excesses. But the climate now seemed quite calm. The moderate faction, now in control, denounces past excesses and blames them on "bad elements" in the extremist faction, although, whereas the Liu forces are considered revisionist class enemies, the former extremists are treated as temporarily misguided comrades. The Cultural Revolution is still in progress, say the Chinese, but now the final phase of transformation is following the earlier phases of struggle and criticism.

The main result of the Cultural Revolution seems to be the firm establishment of Mao's philosophy as the dominant ideology in China. This seems to have led in turn to many profound changes, particularly is social values, ostensibly to rectify errors of the revisionists. It was in this context that we were shown Chungsan University (Canton), Peking University, and Futan University (Shanghai); the Academia Sinica research Institutes of Botany and Microbiology in Peking, and Biochemistry and Botany in Shanghai; an Affiliated Hospital of Peking Medical College; factories, a commune, the Forbidden City, and so on.

Scientific Research

In 1965, scientists at the Biochemical Institute in Shanghai announced the total chemical synthesis of biologically active insulin, a protein hormone, slightly ahead of West

German and American groups. When I asked Hu Shi-chuan, in charge of research, what made the group decide to undertake this project, he replied, "Our great leader Engels said that protein is a form of life. By synthesizing it from simple chemicals we proved the correctness of materialism and discredited idealism, which holds that biological substances can only be obtained from living matter." (A rather unexpected answer, but on the other hand, one that shares much of the attitude of American scientists who have recently synthesized biologically active nucleic acid molecules.) "Also," he continued, "we wanted ultimately to be able to synthesize insulins with amino acid substitutions in order to study the relationship of protein structure and function." His answer was typical of many we received, both in science and elsewhere, in giving a practical reason together with an ideological framework and justification.

But when I asked if they were still working on insulin, he said there was really no urgent need, and instead they are now developing similar methodology to synthesize industrially the small peptide hormones oxytocin and angiotensin for medical uses. In this way they have essentially reoriented their work from basic to applied research. Likewise, all the other groups we saw who were formerly doing basic research are now participating in production. Fossil and evolutionary botanists are now working on the geobotany of pollen grains, useful in petroleum prospecting; taxonomists are now concentrating on industrially useful bacterial and medically useful plant strains; bacterial geneticists formerly doing pure research are now developing new strains with better growth characteristics and higher yield for industry; entomologists have switched from formal entomology to combating plant pests; and botanists who were studying plant physiology are now trying to increase agricultural production.

This shift from basic to applied research often involves working closely with a specific factory or agricultural commune. Thus the insulin group began their shift by first going to the factory that was to synthesize the peptide hormones in order to coordinate the joint effort, and have maintained the contact since. Groups at the Microbiological Institute in Peking studying microbial synthesis of glutamic acid (from *Corynebacterium glutamicum*) for production of monosodium glutamate (MSG), and enzymic conversion of corn starch to glucose for intravenous feeding, also work closely with the appropriate factories, and scientists at the Botanical Institute in Peking purifying a novel growth hormone from water chestnuts cooperate with an agricultural commune where it will hopefully be used to increase grain yield. Entomologists at Chungsan University, having developed a way way of fighting a lychee wasp (*Tessaritoma* spp.) with insect parasites (*Anastatus* spp.), are raising the parasites at 40 different communes. And a group at the Botanical Institute in Shanghai, formerly studying the mechanism of action of the hormone giberellin, has moved to a commune outside the city to develop the agricultural use of the hormone.

Conversely, factory workers and peasants have begun spending a few weeks or months in the appropriate research laboratory to learn techniques. At the Department of Biology in Chungsan University, we met the head of a 10 man factory team that has come to study extraction of pharmacologically active substances from medicinal plants. After research and development at the University, they plan to return to the factory to begin large scale production. In another laboratory, workers from an iron refinery were collaborating with micro biologists in studying the use of sulfur metabolizing bacteria (*Thiobacillus mixoxidans*) to remove sulfur from low grade iron ore.

Workers and peasants, particularly in agricultural communes, are being encouraged to set up their own simple laboratory facilities. At the 27,500 member Malu People's Commune in Shanghai, a small factory was turning out a crude water extract preparation of the hormone giberellin from fungal mycelia. The fungus was grown on agricultural waste (wheat bran and rice chaff, with corn flour added), and nearly all the equipment was primitive and homemade —the constant temperature room for growing the fungus, for example, was heated by a hot plate nailed up in each corner of the ceiling. Next door was a thatch roofed hut containing a white tiled laboratory for microbiological work and for quality testing of sodium sulfite, made for sale by the commune from sodium carbonate and flowers of sulfur bought outside. And in the back room of the pharmacy at the small clinic in the housing project of the Number Three Cotton Textile Mill in Peking, we were surprised to find, among the stocks of traditional and Western medicines, a large ion exchange column being used to purify the anesthetic procaine.

The Chinese drive for self reliance was reflected in the abundant jars of chemicals, all Chinese manufacture, lining the shelves of all the laboratories. The biochemistry group in Shanghai, having decided to synthesize insulin, said they chose first to start a new factory for chemically synthesizing the component amino acids rather than buying them from abroad. And although we saw some foreign items (dating mostly from before 1949), most of the equipment – pH meters, photometers, electron and light microscopes, clinical and refrigerated centrifuges, and electrophoresis apparatus, microbiological incubators, and all the hospital operating room equipment –was made in China, and appeared to be of high quality. The laboratories themselves, scrupulously clean and neat, were furnished modestly, and resembled very much photographs of biology and chemistry laboratories in the U.S. in the 1920's and 30's – even the laboratory where insulin was synthesized.

Much of the Chinese taxonomy is apparently being done according to their own system rather than foreign ones, and their industrial plant species and microorganisms are local strains as far as possible. Self reliance, we were told, also means that, although the Chinese are prepared to learn from foreigners, since the Cultural Revolution few, if any, Chinese scientists have gone abroad for training. The ones who had previously done so– at the Microbiological Institute in Peking about 20 out of 300, both group leaders and ordinary scientists– had generally gone to the U.S. and Europe before 1949, but after 1949 to the Soviet Union. In response to our question, we were told that the Chinese are prepared to participate in international scientific meetings, but not if scientists from Taiwan are also present.

Libraries seemed extensive in the institutions we visited, with many foreign books in English, French, Russian, and German. The joint library of the Biochemical and Botanical Institutes in Shanghai was particularly impressive, with a very large number of books and literally every journal we could think of complete to early 1971–and also a special reading room for studying the works of Chairman Mao–and the University libraries seemed fairly well stocked, too. Individual laboratories all had a number of Chinese books and usually also several foreign texts, often quite up to date, interspersed with copies of the red book of quotations from Chairman Mao.

During the early part of the Cultural Revolution publication of Chinese journals apparently dwindled and then stopped altogether (3), but we were told it would soon resume. Research seminars and discussion of the literature are said still to be held, often with the invited participation of production workers, although not quite so regularly since the Cultural Revolution started. There is also communication among the different research institutes, such as the Botanical Institutes in Shanghai and Peking.

Our offer to lecture on our specialties was taken up in, of all places, small reception rooms on the sixth floor of the Peking Hotel, just off the Tien An Men square where all the large public demonstrations are held. Before a large picture of Chairman Mao on the wall and a miniscule black painted board propped on a cloth covered table, with the late afternoon sun slanting in through the windows and a panorama of Peking outside, I spoke for about an hour and a half on bacteriophage genetics to about 75 scientists and students, mostly from the Microbiological Institute. The interpreter, Prof. S. I. Lu, who learned his excellent English while studying in the U.S. during the thirties, surprised me by using Chinese words for even the most abstruse technical terms – 'ribosome', or 'aneuploid', or 'heterozygote'– presumably another instance of self reliance. The older scientists seemed somewhat bemused by the rather unfamiliar subject, but the younger ones were quite attentive and seemed to be following closely.

After a short break the chairman of the session, Prof. Fang Sin-fang, opened the question period: "Chairman Mao has said, 'Let a hundred flowers bloom, let a hundred schools of thought dispute.' Presentation of different opinions is the only way to discover truth. I answered some questions about bacteriophage genetics which indicated a broad familiarity on the part of most, and more detailed knowledge on the part of the few specialists. I was also asked about progress in cancer research and in molecular biology in general, recent achievements such as the chemical synthesis of a gene and discovery of transcription of RNA into DNA, and– somewhat embarrassing for me–progress in the application of microbiology to agriculture and industry. The discussion was forthright and lively.

Medical Care

In June 1965, Chairman Mao issued a rather surprising statement for a head of government: ". . .the Ministry of People's Health. . . .is serving 15 percent of this country's population . . . the upper class. The broad masses in the countryside are receiving no medical care at all. The Ministry . . . should be renamed the Ministry of Urban Health, of Upper Class Health, or the Health of City Gentlemen. Medical training must be reformed. (1) In response, many doctors have moved to the countryside, where more than 80 percent of the people live. At the Number 3 Affiliated Hospital of Peking Medical College, Kuo Fa shang, head of the Revolutionary Committee, told us that one third of the staff has now moved permanently to the countryside to care for the peasants and train 'barefoot doctors'. The latter are largely uneducated peasants given a three month course in first aid setting broken bones, superficial surgery, and traditional remedies such as acupuncture and herbal medicines. The remaining two thirds of the staff, besides picking up the slack at the Hospital, are also organized in mobile teams that occasionally go to the neighboring districts and countryside to give medical care and lessons in preventive medicine. Mao's instructions, "In medicine, put

continued on p. 15

WHY I RESIGNED FROM THE NATIONAL ACADEMY OF SCIENCES

At its 1971 annual meeting in Washington, I resigned from the National Academy of Sciences, to which I had been elected three years before. While the precipitating issue was the Academy's secret war research, the contradictions involved in membership in such an organization run much deeper and transcend any particular immediate political situation. In many ways, the National Academy of Sciences embodies the chief dislocation of scientific and professional life so that an analysis of the Academy is an analysis, in miniature, of the social relations manif st in the scientific community at large.

An inquirer into the nature and history of the Academy will be told immediately that the Academy was founded by Abraham Lincoln to advise the federal government on the request of any agency, on scientific and technical issues. For the press, the Congress and other segments of the non-professional public, the element of unbiased scientific advisor to the government receives almost exclusive play by the public relations organs of the N.A.S. Indeed from its functional description one would get the impression that the N.A.S. is simply a government agency like the National Bureau of Standards or the President's Science Advisory Commission, perhaps a branch of the Office of Scientific Technology. But there is a critical difference. The N.A.S. is not a government bureau of hired state functionaries; it is an *Academy*, that is, it is a club whose membership is restricted to those elected by the club itself. Moreover, it is a very exclusive club; on a per capita basis the most exclusive scientific club in the world (850 members from a scientific population of 300,000 as compared, say, to the Royal Society with a membership of 600 out of a population of only 50,000). It is this exclusive and elitist aspect which is the face shown to the scientific community. Membership in the N.A.S. is held out as the prestige goal to be aspired to by every scientist. Nor is prestige the only reward, for with such eminence come salary increases, unlimited professional mobility, entrepreneurial rewards and great political power in academic and professional life. Unlike the vastly more exclusive Nobel Prize or National Medal of Science, Academy membership is just *inclusive* enough to form part of the aspirations of developing professionals. Thus, it is a powerful tool in professionalization and its members serve as models to be emulated. We see, then, that the N.A.S. serves a double function related to its dual character as an institution. By emphasizing prestige and exclusivity to the scientific community, it is a professionalizing instrument; but at the same time it is a mechanism for coopting the profession into government service by linking the prestige of membership with the responsibility to respond to government initiatives on scientific and technical questions. I am reminded, when I contemplate the N.A.S., of the elementary schools in which the student with the highest marks is given as a reward a certificate and the position of—flag-bearer!

During World War I it became obvious that the membership of the Academy was incapable of bearing the load of responsibility for the huge amount and variety of technical and scientific advice needed by the government in the twentieth century. First, the Academy was too small and its members busy with their other professional affairs, and second, its members were too old. (Even after recent attempts to enlarge and rejuvenate the membership, the average age is 62 and one-quarter of the members are 70 or over.) Several alternatives were possible. The membership could have been drastically enlarged and packed with younger people, or a separate government agency, like the N.I.H., could have been created with a full-time bureaucratized staff. But either of these would have destroyed the essential synthesis of independent prestige and unques-

tioning state service. Instead, Woodrow Wilson asked the Academy to set up the National Research Council, a body of full-time functionaries and part-time expert advisors and committee members drawn from academic and industrial ranks, but *all serving under the direct responsibility of the National Academy of Sciences.* The N.C.R. is referred to in all documents as the operating arm of the Academy, and in fact, the two are usually linked as the National Academy of Sciences-National Research Council. This device explicitly completes the union of prestige and practice, for no member of the Academy need himself or herself actually engage in government business. As explained to me in a letter from the president of the Academy, Phillip Handler, the N.C.R. simply uses the prestige of the Academy to recruit members of its committees and working groups.

How does the system actually operate at the present time? First, the membership of the Academy at large does little else but elect new members and write obituaries of dead ones (they are much more energetic in the former than the latter activity; Einstein's obituary essay is still unwritten). There is a vast and baroque apparatus for election to membership involving a number of ballots, petitions, committee meetings and politics. The result, as expected, is a heavy representation of a few elite universities (15% from Harvard & M.I.T.) and a miniscule proportion of women (7) and blacks (1). Second, there is an inner academy consisting of the officers, members of the Council and some of their friends, who carry on the real business. Partly from the structure of the by-laws and partly from the lassitude of the membership at large, the Councils and officers are a self-perpetuating group of the younger (50's and early 60's) , more aggressive and politically motivated members. Of the current 16 members of the council, 12 are administrators of one kind or another, ranging from Vice-Presidents of A.T.&T. and I.B.M. to several academic department chairmen and institute directors. This inner academy usually handles dissidents by squashing them if they can or coopting them if they have to. They tried to do both with me, but since they had never before had to deal with radical dissidence, their standard methods of dealing with smart liberals like Clement Markert (now a Council member) or dumb reactionaries like William Shockley (now a laughing-stock), failed. The Council can also interfere in the election of Academy members by inserting several nominees of their own in the last stages of the election. This enables them to reward faithful servants of the Academy or the profession, or to punish dissidents not yet in the Academy as they did at the last meeting when Lamont Cole was denied membership because his public statements on air pollution ran counter to Handler's own line.

There are interesting lines of relation between the inner Academy and other academic and national political scenes. The previous President of the N.A.S. but one, Detlev Bronk, stepped down to become the first President of Rockefeller University (he was chairman of the R.U. Presidential search committee!). The next President of the N.A.S., Frederick Seitz when *he* stepped down became Bronk's successor as President of Rockefeller (*he* was chairman of his search committee!). The current President of the N.A.S., Phillip Handler, was head of the National Science Board that runs the National Science Foundation and was the other leading candidate for the Presidency of Rockefeller University. The current Vice-President of the Academy, George Kistiakowsky, was chairman of the President's Science Advisory Commission under Eisenhower and, together with Council member Paul Doty, is a member of the self-appointed Cambridge disarmament group that has an inside track with the White House, since Doty is a buddy of Henry Kissinger.

The inner Academy sometimes takes on the role of enforcer of territorial rights when it looks as if poaching is going on. When I arrived at the Academy's marble palace in Washington to attend my first annual meeting in 1969, I found Handler and a number of my professional acquaintances climbing into a long black limousine. This was the inner academy, as it turned out, on their way to the White House, to castigate Nixon for his interference in the appointment of Franklin Long as Director of the N.S.F. because Long had opposed the A.B.M. Nixon, new to the neighborhood, had not yet learned to smell where the other dogs had peed. He got the message, made a public apology, and has since steered clear of pure science. Anyway, there isn't much percentage in it.

It is through its overseeing of the National Research Council that the inner academy does most of its direct service to the state. The N.C.R. will provide answers to any technical or scientific question posed by a government agency provided it has the competence. Questions of the use to which this knowledge is to be put, or the policies of the government requesting the information, are considered irrelevant.

Thus, the activities of the N.A.S.-N.R.C. are the classic example of the artificial separation of technology from politics that is the unshakeable principle of academic science. Moreover, the falseness of this doctrine is nowhere more patent than in the activities of the N.A.S.-N.R.C. The N.R.C. has, among its standing committees, one on Undersea Warfare and one on Mine Warfare. If the latter were asked for a feasibility study of mining Haiphong Harbor (for all I know or can know, it has already done so), it would carry out such a study up to its limit of competence. But, of course, mining Haiphong Harbor is not a political question since both Democratic and Republican administrations have made war in Indochina. In the social sciences, the same sort of thing goes on. The Division of Behavioral Science of the N.R.C. has just completed a report on the relationship between the Department of Defense and the social science community. A good deal of this report is devoted to how the social science community can be organized to better serve the D.O.D.

The range of services offered by the N.R.C. to the government obviously implies that some work will be classified. It is not only war-making reports that have security classifications, however. The N.R.C. is often asked to advise on the effectiveness of some compound or industrial process. To do so requires complete knowledge of the composition and/or industrial process involved. Corporations refuse to divulge this knowledge unless their "proprietary rights" are guaranteed; that is, unless the knowledge is kept secret. The result is that most members of the Academy are barred by law or administrative process from knowing what various working groups of the N.A.S.-N.R.C. are doing. In many cases even the title of the research is classified. At the last meeting of the Academy we were treated to the reading by Kistiakowsky of the specially sanitized titles of the projects ("Summer Study on Aircraft Communication"). Since the membership at large cannot know what is going on, who does? The Council? There is no requirement for security clearance in election to the Council, and some members are not likely to be cleared (one fought in Spain, for example). The President and Vice-President, then? Neither position requires clearance, but incidentally both incumbents are cleared at the highest level since both were members of P.S.A.C. Obviously the Academy cannot carry on its business unless some informal arrangements guarantee that the top of the inner academy is of unquestioned and unquestioning patriotism and loyalty. As for the membership at large, whatever their own politics, at the very least they must be willing to put their scientific prestige at the unquestioned disposal of the patriotic few at the top. When I have brought this question out, I have been enjoined by more than one member to "trust Kisty."

The particular issue of secret research is so deeply embedded in the nature of the Academy that its resolution would require a resolution of the fundamental contradiction implicit in the organization. The coupling of the highest prestige with unquestioned service to the state is a scheme of legitimation of state service on the one hand, and on the other a mechanism of coopting into the establishment system a professional group, which because of its own elitist, internationalist and intellectually rebellious tendencies, contains germs of dissidence and obstructionism. For the Academy to refuse classified work, whether industrial or governmental, would destroy the legitimation scheme and alienate the government. It would affirm the political content of technological and scientific research, because it would raise criteria other than scientific competence for the acceptability of research. *More deeply, it would affirm that men and women will refuse to assent blindly to acts of which they have no knowledge or over which they have no power.* On this last issue there can be no compromise on either side. It is an issue that is beyond reform. It is the issue around which a social revolution must be fought.

R.C.L.

ENGINEERS IN THE WORKING CLASS

These days, we engineers are in a bad way. Some 80,000 (about 6% of all engineers) are underemployed or out of work, while the others, putting up with a dull job, are taking shorter work weeks, or daily dreading being laid off. The professional societies, out of one side of their mouths, ask the government for relief, while out of the other spouting glorious words to maintain professionalism. The government is seen as both the creator and solver of problems in the engineer job market: it was the government who cut off funds and it is the government who can hire again. The current situation, however, is indicative of an even more fundamental change in the nature of engineering. Engineering work has deteriorated in creativity and independence. Despite extraordinarily high salaries and degree requirements, engineers serve essentially the same function as other blue or white collar workers in the American capitalist society. Engineering is no longer a profession. We engineers have joined the working class.

The Condition of Engineering Work; Alienation

Like other workers, engineers are finding themselves submerged within a large bureaucracy: in 1967, 54% of all engineers employed in industry worked in companies with more than 1,000 employees. The 81,000 employed by the Federal Government were in the biggest bureaucracy of all. Such organizations force control to the top, and routinize work at the bottom, leaving the individual little control over his own work. For efficiency, tasks are fragmented and each engineer finds himself making uncreative designs to conform to specifications set out by somebody else. Once in Industry, engineers find that most of their talents and skills are left to stagnate. Of 800 electronics and aerospace engineers in the San Francisco Bay area who were laid off between 1963 and 1965, 59% felt their technical training was not utilized to the fullest extent in their prelayoff job.1 This fragmentation of tasks deprives the engineer of the satisfaction he had previously gained through his work; the opportunity to work on a design with an ultimate physical outcome and to trace personal efforts to the end. Fragmentation reduces each engineer's contribution to an insignificant piece of the whole.

Large units of engineers in industrial bureaucracies actually work on no physical product at all. Engineers in the hot field of industrial engineering are employed only to rationalize the design and production process in complex organizations. A survey of professional engineers in 1964 found that 14% of professional engineers were engaged in methods and work simplification, which turned out to be the largest category in the survey. This complete separation from physical products, typical of other white collar workers, is an especially tough pill for engineers to swallow, given a long heritage of practicality.

Obsolescence is another danger facing engineers. Our skills are continually being bowled over by the expansion of technology; older engineers, if they don't make it into management, are given dull assignments and bear the brunt of layoffs during economic slowdowns. While only 37% of the country's R&D scientists and engineers are over 40, 48% of the unemployed scientists, engineers, and technicians presently registered with the Route 128 Division of Employment Security are over 40 2 and 46% of the 800 scientists and engineers layed of in the San Francisco Bay area during the period 1963-1965 were over 40.

The problem of obsolescence is not, however, the problem of rapidly expanding technology; engineers are as capable as anyone else in their ability to learn new tricks. Obsolescence results from the typical management practice of keeping engineers in narrow specialties, and buying new skills from recent–cheaper–college graduates, rather than providing retraining for older employees. A manager at RCA said, for example:

Electronics is changing so fast that some of the older engineers have fallen hopelessley behind. They could design a good unit using vacuum tubes but we have no use for it. Things are changing so fast that sometimes a good man hired out of school is more valuable than our experienced men.3

A study sponsored by the Engineer's Joint Council lists "inadequate or non-existent plans for training and job rotation" as a major cause of job dissatisfaction. At RCA the most complex jobs are given to the engineers under 31, while older workers are railroaded into uncreative specialties, and given little incentive to expand their abilities or the scope of their work.4

Perfect Labor Market

The job market for technical skills, which has all engineers at it's mercy, can be characterized by what econo-

ENGINEERS JOINT COUNCIL TO "STUDY" ENGINEER UNEMPLOYMENT

The June issue of *Consulting Engineer* reports that the National Science Foundation has awarded a $65,000 contract to the Engineers Joint Council for a study of engineer unemployment.

The Engineers Joint Council is a creation of U.S. old line engineering organizations: American Society of Civil Engineers, American Society of Mechanical Engineers, and so on. For years, its Engineering Manpower Commission has published tables and charts forecasting engineering employment. The head of EMC until recently was Donald E. Irwin, the manager of General Electric's engineer recruiting program. Its current chairman is college president Dr. William Hazell. The EMC Executive Secretary is J. D. Alden, a former naval officer. Employee engineers are left out altogether.

EMC compiles engineering employment data by circulating questionnaires to corporation personnel agents. EMC does not release figures for individual firms; hence there is no way of checking the figures' correctness. Indeed, since personnel men are under pressure to hire engineers as cheaply as possible, they always talk about an existing or prospective engineer shortage. Not surprisingly, EMC's data has consistently forecast such a shortage; thus EMC failed completely in forecasting the current unemployment disaster which finds 50,000 to 100,000 engineers out of work.

EMC's charts plot expected engineer job openings against numbers of new university graduates while omitting the large group of older experienced engineers seeking work. *(Chemical Engineering,* July 1970*)* In doing so, EMC condones employer discrimination against the older men even though this practice violates both state and federal law. (The U.S. *Age Discrimination in Employment Act of 1967* forbids employers of 25 or more persons to discriminate against individuals in the 40–65 age group. Additionally, California may impose a $500 fine and 6 months in jail for such discrimination. New York has a similar law with a one year penalty.)

EMC employment charts make other key omissions:

1. What proportion of university graduates were actually placed?–if an appreciable number did not find jobs, the data is useless.
2. Do the curves show completely new job openings? Or do they include the replacement of older, experienced men with new graduates at lower pay?

EMC recently published a group of charts purporting to show engineers salaries against the number of years since graduation. (*Chemical Engineering,* April 19,1971) Here also, EMC made significant omissions:

1. They failed to distinguish between employee engineers and those holding supervisory and managerial positions. Salaries therefore appear higher than actual.
2. They did not include the 50,000 or 100,000 engineers now unemployed, thereby embodying one more upward bias.

The reason for EMC's publicizing of falsely high engineer shortages and salaries is obvious: to help create a large pool of engineer labor by enticing young high-school graduates into the field. Under these circumstances, the National Science Foundation's $65,000 contract for an enemployment "study" is just another boondoggle.

We do need reliable engineer job data. One way of accumulating such information is for engineering undergraduates to circulate questionnaires to prospective employers asking such questions as:

1. How many engineers did you hire last year? Over 40? Over 50?
2. What was the average pay in each group?
3. Did you layoff any engineers last year? How many in each group?
4. How many in each group quit? Why?
5. How many years service for a two week vacation? Three weeks? Four? Sabbatical year off?
6. What tuition payment for additional schooling? What work time off for this purpose?
7. How long for pension contributions to become employee property? What provisions are there for transferable pensions?

Answers from individual companies should be published; publication would reveal false replies within a year or two. Companies with nothing to hide should be willing to answer. Those who refuse should be denied the privelege of campus recruiting. S.S.

mists would call a perfect labor market. The commodities traded on the market are the technical skills held by engineers, who must sell themselves to the highest bidder if they are to survive. The skills required for any particular slot can be summarized in a phrase or two on a personnel form. Just as workers on a production line or secretaries in a typing pool, engineers with similar skills or training are remarkably interchangeable. Since companies invest little in training each engineer, they have little incentive to retain an employee during economic slowdowns. Engineers, like other workers, are layed off and rehired according to market fluctuations. Job insecurity has been a significant stimulus to the formation of technical unions in the war industries.

The engineering labor market also demands a high degree of geographic mobility. This requirement is greatest in the war sector, in which engineers are systematically moved from one plant or Air Force base to another, following the rotation of contract completion dates. Forced relocations are common in large industrial firms, which ship teams of engineers to oversee plant design and completion, especially for foreign investments. Relocations are also used as an advanced personnel technique to minimize frictions when an engineer is promoted. These practices, treating the engineer as a commodity first and as a human being second, prevent him and his family from developing meaningful ties in a community; and lend a hand in "perfecting" the labor market for engineering skills.

In a strict Marxian sense, engineers have always been alienated; all the productive equipment has been owned and administered by capitalists. But prior to 1930, the engineers relationship to capitalist control was a special one: he was a professional, he designed the new equipment, had a great deal of influence over its use, and at work had frequent contact with the capitalist. Each engineer was given individual credit for his accomplishments, and enjoyed a craftsman's pride in the completion of projects. With technology advancing at a slower pace than now, he could afford to finance his own retraining and typically enjoyed more interesting responsibilities as he grew older; experience was a valuable asset. The relationship between the engineer and the capitalist during the era of engineering professionalism was a necessary concomitant of rapid growth. But the spending on war technology and related industry since the beginning of World War II has changed all that. The professional engineer is no longer needed in the economic order and experience has become a shackle of obsolescence. The privileges of professionalism have been eaten away and all that remains is a hard-dying myth.

Career Earnings: An Historical View

The pattern of career earnings since 1890 dramatically shows how the professional status of engineers has been eliminated. In 1914, an engineer with 20 years of experience made 5.6 times as much as an engineer beginning his career. By 1953, the ratio of salaries for similar groups had dropped to 1.9, and in1968 the ratio was down to 1.7. The corresponding number for high school graduates for 1960 was 2.0, roughly equivalent to the ratio for engineers in that year. In the realities of the labor market, the engineer is no longer treated as a professional. Although each engineer still percieves his salary to be rising over time, the structure of earnings now looks very much like that of the working class as a whole.

There is no intention here of ignoring the fact that engineers make a great deal more money than high school graduates. The point is that, in spite of the salary differences, the structure of earnings has become very similar, reflecting that both kinds of workers now face the same sort of unprofessional job market: one in which skills are easily definable, workers are interchangeable, and little extra is paid to a worker with a lot of experience.

Modern and Traditional Engineering Work

These salary changes and elements of alienation at work have been caused by the rapid growth of new engineering industries; industries related to war production and characterized by high job separation rates, low emphasis on on-the-job training and quick obsolescence. Although most engineering fields have shown trends in these directions, the markets related to the aerospace, consulting, electrical, instruments, ordance, fabricated metal products, and communications industries are the worst. Those fields have also been growing the fastest: in 1940 they represented only 23% of all engineers. By 1967 53% of all engineers were employed by such industries. On the other hand, the share of engineers employed in the traditional fields of chemical, petroleum, construction, machinery, utilities and transportation declined from 45% in 1940 to 27% in 1967.

In the modern fields, the engineers are chiefly paid for their school training. Technical information grows very fast and experienced engineers become obsolete rather quickly. Because the investment in college depreciates fast, their early salaries are high. Firms tend to place them in highly technical R&D interdisciplinary teams, to push out the frontiers of technology. A specialty is soon developed and the engineer is encouraged, through quick salary increases, to stay in his specialty. Work is creative and challenging until obsolescence sets in at age 30 or 35 when the engineer becomes aware that younger engineers are being assigned to the newest projects. The company no longer finds it profitable to offer impressive salary increases, so the engineer finds his salary leveling off at age 40 or 45 and his work becoming dully repetitive. After a few job changes and perhaps a few technical courses to try to catch up, the engineer finds his work situation hopeless, and hangs on for the final 15 years of his career, dreading the possibility he will be laid off at the whim of a government spending cut or priority shift.

The engineer in the traditional industry, on the other hand, enjoys a different sort of career development. His school training prepares him less for the specifics of work, so that the employer spends a great deal teaching him technical lore and standard operating procedures. The engineer is taught early to identify with management and the overall profitability of the company in the commercial

goods market. He acquires skills that are useful only to his particular employer, so that he becomes interchangeable only among the other engineers within his company. Resignations are low, since other firms will not pay for skills they cannot use, and company layoffs are also low because the costs of training new engineers are high. There is less tendency for the engineer to become obsolete, since he learns on the job most of what he knows, and the technical substance of work changes only slowly. Because of his integration into the company, the engineer has more opportunity to become a manager, and enjoys salary raises throughout his career as he becomes increasingly valuable to his boss.

The statistics bear out these differences. In the largely government-supported modern engineering industries named earlier, the yearly separation rate of engineers (layoffs + resignations + retirements) is 10%; that is almost half again as large as the separation rate in the traditional industries, which had 7% rate in 1968.

The distinction between the two kinds of labor markets is not likely to remain clear cut, however. The construction industry is becoming increasingly reliant on new technologies and rationalized methods: the use of composite materials, and of prefabricated structures are just two examples. The engineering market for machinery designers is also becoming rationalized, as new technologies are employed in manufacturing. For example, lasers are being used in the textile industry to cut cloth. The elimination of professionalizm is now penetrating all markets for engineering skills.

Conditions Undermining Engineer Group Consciousness

The system has many "fire extinguishers" which undermine a radical engineer movement: the most powerful is the ability of the economy to deliver the goods in greater volumes. The economy continues to expand, boosted by maintenance of consumer demand through manipulative advertising. Although the age-earnings profile for engineers has been flattening, individual men have always received consistent wage increases to age 40. To the extent that engineer dissatisfaction with work is replaced by satisfaction with consumption, engineers will continue to identify the present economic structure with satisfaction of their needs. Engineers, like all other workers, can learn to put up with the job in order to take home a salary.

Engineers also identify with the existing order in a deeper way: their entire career structure and sense of personal worth apparently depend on maintenance of the existing organization of technology. To talk to an aerospace engineer about conversion of his firm from war technology to meeting human needs is absurd; no engineer in his right mind would organize to put himself out of work.

Engineers also continue to maintain some measure of control over their work; as outlined earlier it is in the nature of engineering work to be at the forefront of technological change, and to make plans to be carried out by others. The professional-consultant myth dies hard, especially in the face of corporate personnel policy to maintain it.

Separation of the entire white-collar labor force into classified segments, each requiring special training, affects the engineer as well: he is given a well-defined status at work, separated from the draftsmen, accountants and production workers, and is socialized to maintain his status. This sets up high barriers to realization of group consciousness.

Older engineers are most likely to join unions; of the 500 engineers in RCA's Communications Systems Division, 80% of those over 32 belong to the collective bargaining unit while only 16% in the age group 22–26 and 56% in the group 27–31 belong. The alienating conditions of work somehow overcome the individualistic notions, prevalent in the professionsl myth, encouraged in school and early on the job. However, even when engineers get it together, they still maintain distinctions by calling theirs a "professional" union, and not allying with other workers in the company.5

Through their one dimensional education, engineers are taught to look for technical solutions to all problems; political activity seems too uncertain and vague to promise solutions. Further, an engineer working for the government must maintain a security clearance to keep his job; that's a very strong incentive to remain apolitical. During the present unemployment situation, engineers are repeatedly told to seek personal solutions: The government and professional organizations sponsor workshops to teach engineers how to sell themselves as commodities and counseling services to advise them to adapt to their alienating situation. This approach blunts the individual's ability to realize the source of the problem and his group's potential to achieve necessary changes.

Despite the current decline of interest in engineering careers because of the economic crisis, the system has a strong ally in young engineers. These men are at the forefront of technology, and are inheavy demand upon graduation. Although their class backgrounds are no different from other college graduates, their attitudes towards school are quite different: they learn a definable skill for which society will reward them upon graduation. Engineers have been notably inactive in student movements. There are issues around which to organize young engineers, but such organizing must fight the tough reality that the immediate economic and work prospects for young engineers are generally very good.

Revolutionary Potential

Although there remains a whole catalogue of conditions hindering engineers from organizing themselves into radical groups, it is objectively true that engineering work in the capitalistic system is developing powerful contradictions.

One contradiction is in the growing amount of interdisciplinary work. The expansion of technical knowledge to applications in industry has forced the schools to spe-

cialize their students. As a result, engineering design becomes a group effort, in which engineers at the lowest levels must cooperate to make design decisions. In group decision-making lies the potential for realization of group power and the assertion of control over work through the overthrow of administrative management.

Another contradiction lies in the wasteful products of engineering work, and the desires to design socially useful products. All of the defense research and development is wasteful, and a great deal of the R&D for commercial markets is wasteful as well, being devoted to designing irrational model changes and gadgets for the sales effort. Yet engineering skills are greatly needed in such areas as housing, mass transportation, waste utilization and resource allocation. However, under the present system, these needs have the lowest priority.

Finally, we engineers are joining other people in recognizing that our problems are not purely personal, and are coming together to make demands for political solutions. Demands by engineers on the political order to reverse its technological directions and support science for the people will rise from the contradictions.

P.B.

Footnotes

1 Loomba, R.P., *A Study of the Reemployment and Unemployment Experiences of Scientists and Engineers Laid Off in the San Francisco Bay Area During 1963-1965,* San Jose College Center for Interdisciplinary Studies.
2 Results from a personal project.
3 Thomson, Paul H., *Performance Appraisal, Some Unanticipated Consequences,* Harvard Business School thesis, 1969, p. 21.
4 Ibid., p. 46.
5 Walton, Richard E., *The Impact of the Professional Engineering Union,* Harvard Business School, 1961.

FIGHTING THE POLICE COMPUTER SYSTEM

The National Crime Information Center (NCIC)

During the last several years, the FBI has been developing a computer-accessed data bank as part of an automated nationwide police information network. The central element of this network, the National Crime Information Center is financed by the federal government under the so-called Organized Crime and Safe Streets Act of 1968. The system is also supported by the Law Enforcement Assistance Administration (LEAA), a federal agency which has received funding from the Ford Foundation as a part of a program to encourage the professionalization of the police.

Although the FBI maintains the central computer, state and local police are encouraged to participate in the use and development of this system. Teletypes installed at local police stations are connected by local phone lines to state police computer centers, which in turn are connected by leased lines to the central computer in Washington D.C. Large cities have their own citywide computerized networks connected to the state centers.

The FBI uses slick little booklets to urge local participation in the system. The telephone company helps too. Last year, for example, the sales staff of the New England Telephone Company visited 117 towns in Massachusetts to educate local boards and committees about the need for NCIC in modern police operation. Ma Bell gladly leases both the teletypes and telephone lines at a handsome profit.

Federal financial assistance also encourages the widespread use of this system. Towns in Massachusetts pay on only their individual teletype rental, about $2000 annually, to join NCIC. At first, to lure the towns in painlessly, a 40% federal subsidy was provided to reduce this rental cos cost further. Now with more than 160 towns connected to NCIC, the subsidy is ending. Federal funds also subsidize the expenses borne by the state, including the cost of the telephone lines and the computer center operation.

Because of indirect financing and professional selling, NCIC has begun operating almost entirely without the knowledge or approval of the public that it fundamentally affects.

Currently, NCIC is a repository of information on arrests, warrants, and stolen property. The Massachusetts section, for example, provides "immediate information on stolen cars, missing and wanted persons, lost and stolen property, lost and stolen securities, stolen guns, outstanding warrants, narcotic drug intelligence, and suspended and revoked drivers' licenses and automobile registrations." This fall, NCIC plans to give its users access to the first 19 million individual citizens' arrest records--records on nearly 10% of the country's population. Euphemistically called criminal histories, (making it sound as if any person who was ever arrested has a history of criminality) these records

are intended to help police make decisions about arresting, searching, detaining, questioning, and investigating suspects and offenders.

The availability of this information permits quite varied services, including the recovery of stolen automobiles and runaway children. An FBI pamphlet also encourages clever use of the system such as the arrest of suspicious persons for disorderly conduct in order to facilitate an NCIC check.

Although the system is already in operation, it is still possible for people to fight it. An example of such a fight has taken place in the annual town meeting for the past two years in Wayland, Massachusetts.

Fighting the Police Computer in Town Meeting

Wayland is one of the bedroom suburbs of Boston located just off famous Route 128, home of electronics and computer industries. It has a population of 3500 families with a median family income of $17,500.

Because of its small size, Wayland is governed by a town meeting at which all attending residents can vote. Among other functions, the town meeting has the power-of-purse over the local administration; in practice, the town's budget is drawn up by the Board of Selectmen and an appointed Finance Committee and submitted to the town meeting for approval. Approval is not quite automatic, however, and every year some items are amended or deleted from the proposed budget.

In 1970, the proposed budget for Wayland's police department included an item entitled "Tele-Process (NCIC)." With little preparation, a motion was made to delete the item from the budget. Although this move surprised the Board of Selectmen, they were able to made a few statements about the necessity and usefulness of the NCIC facility to the town. The budget item was retained by a 3 to 1 margin.

The same budget line appeared in the proposed appropriation for the police department for 1971. This time, however, the attempt to get rid of NCIC's presence in Wayland was somewhat more organized. An informal group of concerned citizens wrote and distributed a short leaflet to those attending the town meeting. When the NCIC budget item came up for discussion, a motion was again made to delete it from the budget. A spokesman pointed out that the exact purpose and use of the NCIC had never been explained to the voters. He suggested that because of its capacity for chilling the rights of free speech and free association, local use of NCIC should be discontinued until the system was more thoroughly explained.

The Board of Slectmen were also more prepared for the challenge this time. One member said that he thought it would be a shame to deprive the police department of one of their most modern pieces of equipment. Another added that the NCIC computer had proven invaluable to the department. The police chief said that of six runaways last year, four were returned as a direct result of NCIC. "NCIC is used for the protection of the people as a deterrent of crime. It is not a Defense Department monitor of citizens," he stated.

The budget item was retained by an approximately 2 to 1 vote.

At the second session of the meeting, however, the concerned citizens had another chance. A motion was introduced which would require that "the Police Department be directed to included in next year's Annual Report a statistical tabulation of its usage of the NCIC computer system." The report would include the following information: "1. number of inquiries by type of inquiry and the reason for the inquiry; 2. results of inquiries including arrests and known conviction; 3. a similar summary of information *entered* by Wayland police; and 4. troubles encountered (down time, false arrests, invasion of rights, etc.)."

This time a lively debate ensued. One of the selectmen said the motion would require too much expensive clerical work and that there were no funds to implement it. A voter retorted that the information was probably already available. Several members of the town meeting who had not previously worked against NCIC began to speak out against the system. A School Committeeman said that it was not too much to ask the police department to report and that he felt that there was a great potential for the system to be misused. Another voter said, "If I'm paying for it, I'd like to know what I'm getting for my money." Another town resident said that he had spent some of the best years of his life fighting the Gestapo and that the idea that such a system would be misused is far from ridiculous. The motion was carried.

Lessons

Few of us have any illusions about the ability of such a reporting requirement to stop or even hamper the NCIC. The importance of this limited victory is not in its immediate effect on the FBI but lies in the lessons we can draw from it.

First, it is quite impossible to reverse or eliminate decisions backed by federal and corporate power without the active and sustained intervention of a sizable, well-organized and well-informed community group. Such a group did not exist in Wayland where the efforts to oppose NCIC were small-scale and spontaneous.

Second, the concession that was won is quite easily circumvented. Who polices the police? How is such a reporting requirement going to be enforced if the police are quite opposed to cooperating?

Third, even though the FBI advertises the NCIC as a deterrent to crime and as a criminal information system, it is nothing more than an elaborate means to keep track of and control people.

A nationwide network of such expensive computer equipment is at once a source of enormous corporate profits and a powerful tool in the hands of one class to be used to insure the smooth operation of the capitalist system by instilling fear and submission in the people. It is only recently that the middle-class has begun to awaken to this reality, poor and black people have known it for a lon

long time. After all, one major function of the police, the welfare snoopers, inferior medical services, etc. is to humiliate and coerce people into submission For suburbanites the pill is sugarcoated and presented in the name of science, efficiency and modern equipment.

Because the ruling class defines the rules of the game and is capable of backing it up by force, it is no surprise that the deaths reaulting from slumloards' neglect, the physical and spiritual crippling through mindless work and exploitation by business, the destruction of cities and countryside by industrial developers for profit, the wanton killing and robbing of countries already impoverished by centuries of imperialism, are not called crimes. These are legitimate practices sanctioned by their system of justice. Instead, NCIC is intended to keep track of purse snatchers, pot smokers, political activists, and other types of suspicious persons.

In fact, it is the victims of crime rather than the criminals who are the objects of NCIC's real interests.

As we realize that this information system is designed to keep track of the victims of crimes rather than the real criminals, we should also see that it is the criminals and not the victims who have access to the information kept on file. For example, the Lenexa, Kansas Police Department was using its terminals (which access the computer center of the Kansas City Police Department, and through it, NCIC) to inquire, upon request of Lenexa apartment owners, into arrest and conviction records of prospective tenants of their apartments. In defending this *free* service to the businessmen of Lenexa, a spokesman for for the Lenexa Police Department pointed out that several *undesirables* had thus been kept out of that little city. Similarly, information from the New York State Identification and Intelligence System (NYSIIS) has been sold to American Airlines, Pinkerton's, Burns Detective Agency, and Retail Credit Company, the nation's largest insurance investigating agency which itself has 45 million dossiers. Under a 1969 law, member firms of the New York Stock exchange have access, via NYSIIS, to the complete *rap sheets* of all of their employees.

Those who might argue that these examples are instances of the *misuse* of the system fail to see that in fact this was the way the system was designed to be used; NCIC (and the state versions such as NYSIIS) is designed to facilitate the compilation and retrieval of dossiers. Like the retail credit data banks, it is designed for the convenience of people who use and keep dossiers. Those who feel that the system was intended for use by the guardians of justice fail to perceive that in our society, the banks, landlords, and employers *are* the guardians of justice. It is their own justice that they are guarding whether they do it themselves or have the police and national guard do it for them. Computer systems, in this society, are tools of the ruling class.

With these realizations, it should be clear that attempts to keep NCIC and other data banks, but including provisions for the safeguard of privacy and individual rights, are beside the point.

S.R.

continued from p. 5

stress on the rural areas "is apparently being taken to heart.

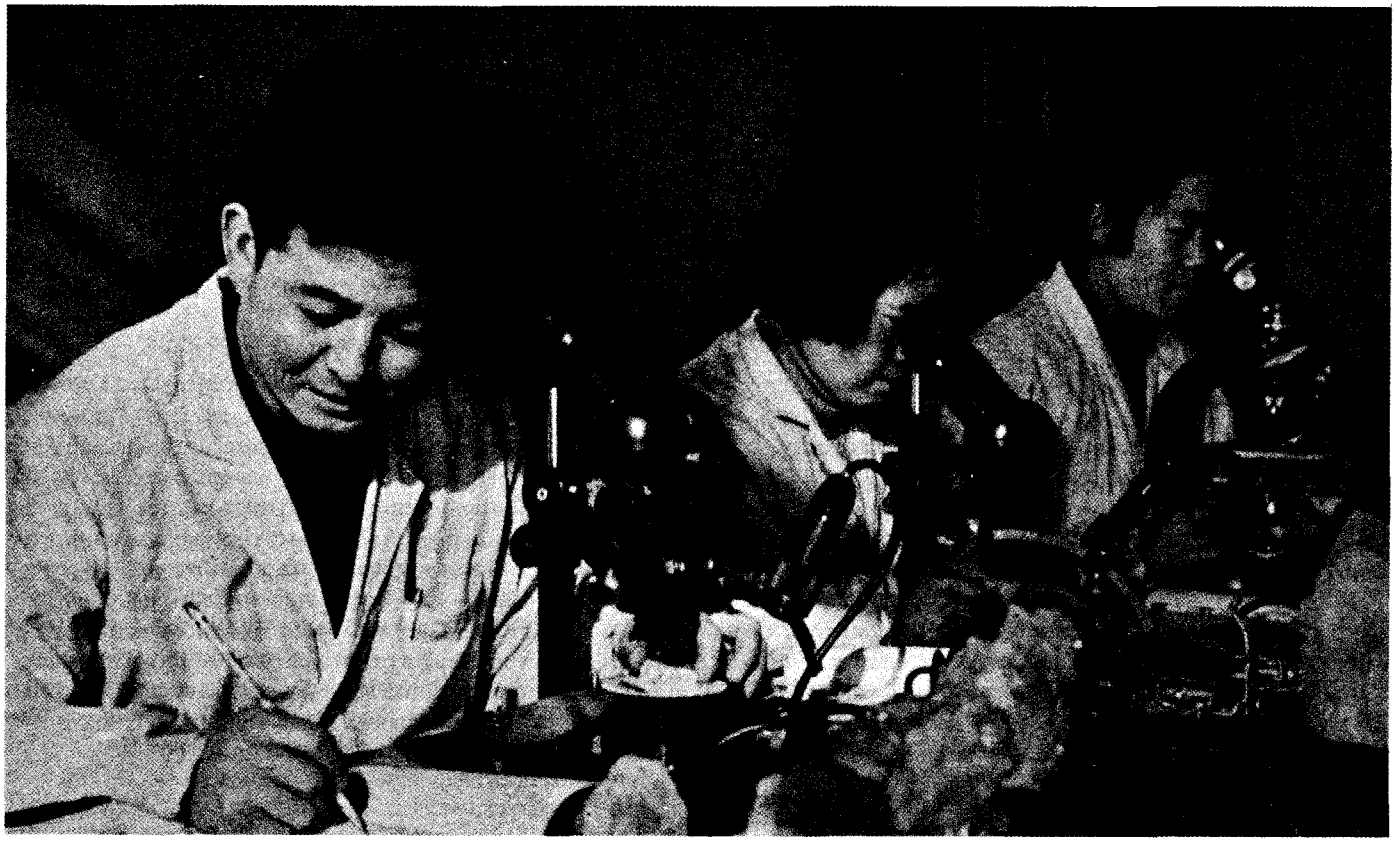
The Hospital, now controlled by the city rather than the Ministry, is one of more than 80 large hospitals in Peking, of which one dental and three medical hospitals are affiliated with the Medical College. Founded in 1958 as a polyclinic, it has departments of medicine, surgery, obstetrics, pediatrics, neurology, otorhinolaryngology, and ophthalmology. There are 700 staff, of whom 160 are doctors and 260 are nurses, for the 606 beds. Including barefoot doctors, medical personnel in this district of the city total 1.1 percent of the population.

Medical care for workers and peasants is either free or covered by cooperative medical plans costing very little (a few tenths of a percent of an average salary), although dependents must pay half the medical costs. It is generally organized through the factory or agricultural commune. At the Number 3 Peking Cotton Textile Mill, we saw a small hospital with a staff of 60 (including 20 doctors) for the 6000 workers. It includes outpatient clinics and wards, operating and delivery rooms, diagnostic and X-ray laboratories, and a pharmacy well stocked with both Western and traditional medicines.

Traditional medicines appear to be taken very seriously in China, following Mao's instruction: "Chinese medicine and pharmacology are a great treasure house. Efforts should be made to exploit them and elevate them to a high level." The Chinese are teaching peasants to recognize, grow, and handle medicinal herbs, and, since the Cultural Revolution began, the taxonomists at the Botanical Institutes and in the University Departments of Biology have been preparing manuals to help identify them. Scientists are trying to extract the active principles from many of these, as at Chungsan University where we saw students testing oil extract preparations of *Collicarpa* spp. used to stop bleeding. And Western-trained doctors are encouraged to study traditional medicine and combine the two systems.

The Chinese are also finding new uses for acupuncture the traditional technique of piercing the body with long, fine needles, used for hundreds of years to cure aches and pains, insomnia and other minor ailments. By experimenting with new points of application, and varying the length and number of needles, they have developed the use of acupuncture as a local anesthetic for major operations. We saw four operations at the Affiliated Hospital in Peking–removal of part of the stomach, hernia, removal of a thyroid tumor, and removal of an ovarian cyst–with acupuncture as the only anesthetic, and other Western observers have reported seeing open heart surgery.

As we watched, four to six needles were thrust into each patient's body at specified points at different places in the legs for the three abdominal operations, with an additional pair near the incision for the hernia, and in the neck and wrists for the thyroid tumor. A report of numbness by the patient in each case indicated successful placement. Although needles are traditionally



rotated by hand after being set, here they were vibrated electrically with a mild current, which might also have played some role in the anesthesia. Anesthesia was established after about 20 minutes, and we were told it may last as long as nine hours. Over 3000 operations have been done with acupuncture at this hospital, including removal of eyeball, lung and spleen, and amputation of limbs. The four surgical teams seemed fast and competent. The patients all were conscious during the entire operation–the ovarian cyst patient's pulse was constant at 88, and blood pressure at 110/80, throughout–and seemed quite calm, chatting with the doctors. The exception was the hernia patient, who was extremely nervous throughout the entire operation and clutched the red book of quotations from Chairman Mao to his breast for comfort.

Another new use for acupuncture is in curing deaf ness. At a school for deaf mute children in Peking, we saw a class of ten to twelve year olds read as best they could from the blackboard Mao's precept, "We must not fear hardship or death." Those whose turn it was for treatment (every ten days) then had needles inserted in the temples and the backs of the wrists, rotated briefly and removed. Modest results are claimed: 90 percent of the children have had some hearing improvement since treatment started in 1968, but only 6 of the 238 children have improved to the point of being able to transfer to an ordinary school.

The acupuncture method is entirely empirical. Although the Chinese have been trying to find a physiological basis for it they have not yet succeeded in doing so.

Traditional medicines are also combined with modern ones in psychiatry. Depending on the symptoms, acupuncture and herbal medicines may be combined with vitamins and insulin therapy, or electric shock treatment (discontinued at the Affiliated Hospital). But the main treatment is discussion therapy not based on Freud or other idealistic Western theories, but rather on dialectical materialism and the philosophy of Chairman Mao.

Social Structure of Science

One of the most profound changes instituted during the Cultural Revolution is the attempt to disestablish intellectuals and technical experts as a privileged, elite social class. This is being done partly through political education that stresses the virtues of workers and peasants. In the early days of the Cultural Revolution, extensive reorientation classes for intellectuals were apparently quite common. Many still spend several months at the May 7 Cadre Schools, named after the date of the letter from Mao to Lin Piao in which they were proposed. There they learn to serve the people by accustoming themselves to manual labor, learning peasant skills such as farming and building huts, and studying Mao's ideology. "Serving the people"is expected in ordinary jobs, too, where those in positions of authority still take turns doing the necessary menial work (2), and everyone is expected to spend time studying and discussing Mao's

precepts—as at Chungsan University where the professors meet to do so for an hour a day. At Peking University faculty duties are said to include research, teaching, and manual labor in agriculture or industry, and faculty are expected to spend several months to a year alternately in each occupation.

Factory workers and peasants are apparently being brought into the decision making process. Instead of traditional management personnel (cadres) only, all institutions are now run by elected Revolutionary Committees constituted according to the "three in one" principle: cadres, ordinary workers or peasants, and army or militia. The army does not seem to be included as a military presence, but rather because of its political loyalty to Mao—the army was in fact Mao's principal agent in making the Cultural Revolution. Thus the net effect on management is to increase participation of and answerability to ordinary people, and at the same time to control political direction. At Peking University, with over 2000 faculty and a student body expected to approach 10,000, the Revolutionary Committee has 39 members: 9 teachers, 7 students, 6 cadres, 7 army members, 6 workers, 3 more workers from University-run factories, and 1 representative of faculty and staff families. At the Affiliated Hospital, with a staff of 700, the Revolutionary Committee includes 3 doctors, 2 workers, 1 technician, 2 nurses, 4 cadres, and 3 army members. Although we had little chance to observe the interplay of central and local planning, I had the impression of some flexibility and independence at the local level within broad guidelines set by the government.

The practice of having scientists do part of their research work at factories and communes, and workers and peasants spend time in research laboratories, also helps break down elitism. Intellectuals are officially encouraged to pay close attention to suggestions from ordinary, untrained people, and several scientists offered us unsolicited instances from their own experiences. At the Microbiological Institute in Peking, it was a visiting worker who suggested correctly that the efficiency of the industrial process converting starch to glucose (with the enzyme alpha glucamylase from Aspergillus) could be improved by making the enzyme insoluble. Other scientists working there on contamination of industrial bacterial cultures with several viruses were having trouble obtaining multiply resistant strains, but at the suggestion of a factory worker seemed to have success using instead mixed cultures of singly resistant strains. In Shanghai Dr. Loo Shi-wei, trained at Caltech and now at the Botanical Institute, knew (as do U.S. scientists) that the hormone giberellin normally increases plant growth rate but not final yield; however, he was able to increase yield by 20% by applying it at the flowering stage rather than the orthodox seedling stage, at the suggestion of a peasant at the Malu Commune where he has lately been working. And when scientists began going to factories to find out about production problems, we were told, the experienced workers took pains to help them learn. These examples were quoted, not to pretend that peasants and workers are automatically always correct, or that uneducated people are necessarily smarter than educated ones. Rather, they were to emphasize the current notion that suggestions should be evaluated only on their merits, and that even uneducated people can make valuable common sense suggestions—in contrast with the situation before the Cultural Revolution when, it was said, experts and intellectuals would not deign to accept advice from uneducated people.

A similar leveling process is said to be occurring within the research groups. At the Microbiological Institute in Peking the title of professor has officially been abolished (although it seems still to be used deferentially for older scientists), and all the scientists are considered research workers at the same level. There are still heads of research groups, but whereas they used to make all decisions, now "bright young persons can insist on the truth, which is sometimes in the hands of the minority". Thus anyone, including workers, can suggest a research project to the group for discussion, although the final decision on adoption rests with the Revolutionary Committee of the Institute or even a higher authority.

We were quite aware of the absence of one kind of elitism during our tours of institutes and unviersities and the formal interviews that alway preceded them. Although those in authority were very clearly treated with respect and deference, people who were obviously rank and file seemed to show no hesitation or self-consciousness in interrupting in the conversation or contradicting their superiors when they had something to say, nor did these contributions seem to be taken amiss. We had a similar impression at the numerous formal banquets arranged for us, where the waiters often contributed to the conversation in a very natural way.

Science Education

The reduction in emphasis on intellectuals is also changing the character of higher education. Last fall, the Universities accepted their first classes since the Cultural Revolution began in 1966, but the students are no longer chosen directly from secondary school on the basis of competitive examinations. Instead they are primarily workers, soldiers and peasants who must have spent at least a few years (and often longer) working in production, before they may be recommended to the University by their factory or commune (or apply themselves with factory or commune approval). Most are expected to have finished secondary school, but private study apparently may do instead. The competitive examinations seem to have been replaced by a more informal assessment of educational, political and social qualifications. Quotas for the different departments are established by the government, but the Univesity allocates the individual students, respecting preferences where possible.

Although a University placement committee assigns jobs where necessary, most of the students say they will return to their old jobs after two to three years at the University. (When asked directly what they expected to do

after graduating, almost all the University students we talked to answered at first, whatever the country needs.) Thus most science education is geared directly to industrial or agricultural production. A few of the science students will go on to further study and careers in research. But although the number for any subject is fixed by the government for each University, it is the students and faculty who are said to select the individuals by discussion of both professional and political qualifications, with final approval by the University Revolutionary Committee.

The University curriculum, too, is being altered to suit production. At Chungsan University the Biology Department used to include Zoology and Botany sections, but since the Cultural Revolution it has been divided into Industrial Biology, Agricultural Biology and Traditional Herbs. In order to combine research, teaching and production, the University now has a small pilot plant producing the antibiotic tetracycline on the campus -- built by students, faculty and staff - - and is carrying out several collaborative projects with outside factories and agricultural communes. And the educational base has been broadened with the institution of two to six month courses in agricultural and industrial technology held in the countryside by faculty and students. Thus far nearly fifty teams from Chungsan have trained 443 people in 20 counties.

The new experimental curriculum at Peking Medical College has been shortened from six to three years and streamlined, according to the principle of fewer and more efficient. The first ten months include courses in anatomy, physiology, biochemistry, pathology, histology, embryology, microbiology, pharmacology, parasitology, epidemiology and preventive medicine. Next follow six to eight months of clinical training in affiliated hospitals, and the students are then sent to the factory or the countryside with their teachers for eight months more of practical training. Finally, they return to the hospital for advanced clinical and theoretical training. Doctors are expected to be proficient in diagnosis and treatment of common diseases, routine major surgery, obstetrics, and diagnostic bacteriology and parasitology. Some of them may later go on to specialize, if the people in their departments feel they need it.

The College and its four hospitals can accomodate 2800 students, and as elsewhere the present class of 750 is the first since the Cultural Revolution began. Although secondary education is the customary requirement, many of these students have apparently substituted training as barefoot doctors, and practical experience.

General Comments

A visit as short as ours raises more questions than it can answer. Besides lacking the time to see many things, we had to generalize from a very small number of examples, and accept many facts at second hand. Furthermore, we were observing a frankly experimental shift in policy that is still in its early stages, and it seems far too soon to tell how permanent or successful will be the changes instituted as part of the Cultural Revolution. Nevertheless, certain general trends were quite evident, and we often learned much about the Chinese from the way they chose to express themselves.

The quality of most of the scientific research we saw was modest. This is perhaps not surprising considering that, when China emerged from feudalism as recently as 1949, there were only 125,000 college-trained people in the entire country (there are now said to be over two million (3) , and in that sense progress has been quite significant. On the other hand, there were significant exceptions such as the synthesis of insulin, the production of a birth control pill, and the use of giberellin to increase plant yield, and the Chinese have made great strides in the physical sciences (4).

The social upheavals of the early years of the Cultural Revolution largely halted scientific research (3), like many other aspects of Chinese life. The extent to which it has been restored is difficult to judge; the laboratories we visited appeared fully staffed and running at a normal level. China has obviously suffered a short term loss in scientific productivity, but in the long term this will have to be evaluated in the light of any gains that may ultimately result from the reorganization of research under the Cultural Revolution. For example, although basic science is now de-emphasized, most of the basic research that was described to us by scientists who have now shifted to applied work was not terribly impressive and often duplicated Western work; putting those resources into applied research and depending on foreign basic research instead might prove to be more profitable to the Chinese.

It is clear that Chinese science will strongly emphasize applied research for some time to come. The Chinese maintain they are not against theoretical research, but that industrial and agricultural production should be the source of knowledge used to construct theories. Even very long-term, exploratory research is acceptable, they say, although "we must still handle correctly its relationship to production" (5). Presumably this means some basic research is still supported, even though all the scientists we met who had formerly done basic research are now doing applied work. The shift to applied science is complemented in scientific education by the emphasis on workers and peasants, and the fairly direct connection with agricultural and industrial production. It is also reinforced by the development, in parallel with large scale science in research institutes, of science on a small scale in factories and communes–part of Mao's general policy of "walk on two legs."

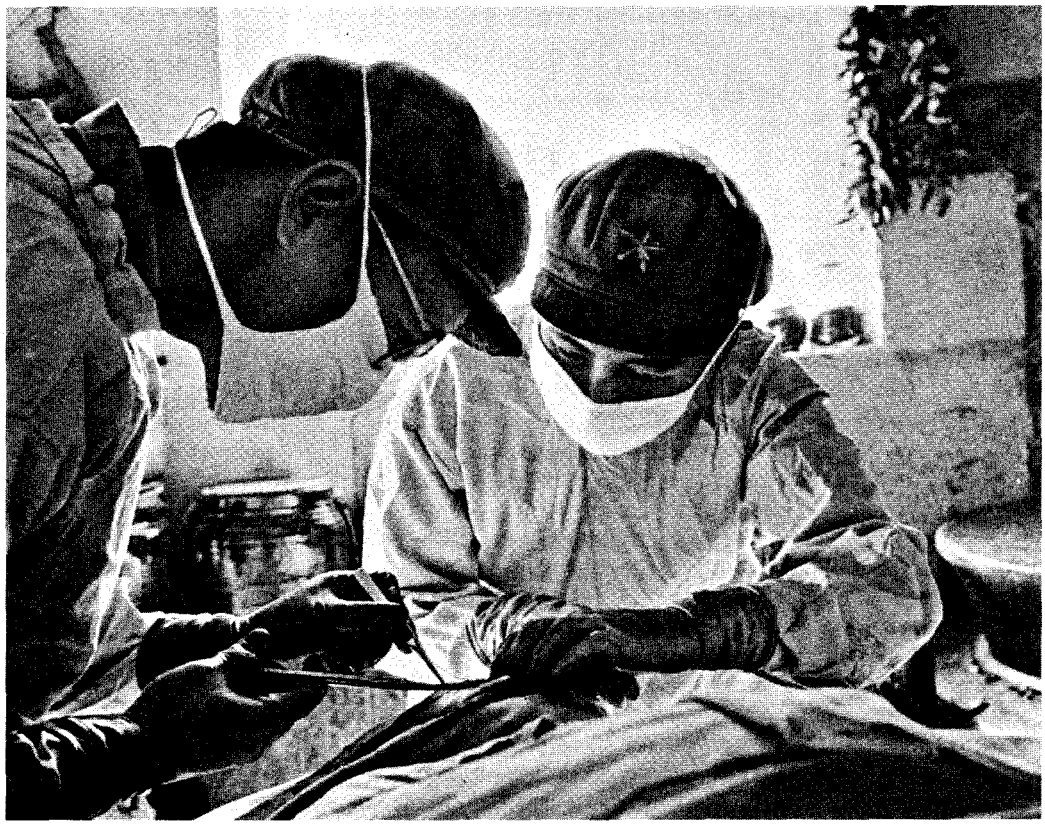
At the same time, the emphasis on workers and peasants–as in health care,for instance–and on practical, common sense knowledge, and the efforts to combat elitism and serve the people are already affecting the priorities and attitudes of scientists. The attitudes of ordinary people towards intellectuals will probably be a long time in changing–one of our guides commented that the fact of my speaking French indicated that scientists are more intelligent than ordinary people. Also, it is likely that there was a good deal of opposition among

intellectuals to their loss of class privileges and deference, and of course we did not expect to be introduced to opponents of the policy. However, most of the scientists we met seemed remarkably sympathetic with this sort of egalitarianism. Doctor Shen Shu-chin, trained in the 1940's at the Pennsylvania Medical College for Women, used to practice at a hospital in Peking, but has spent the last 18 months in a distant province training "barefoot doctors" When the Cultural Revolution started, she assumed at first it didn't apply to her, and it was only political re-education and study that changed her mind. "I really thought I was leading a useful life," she said, "but I see now that I was living only for my personal satisfaction, and I'm much happier now that I can serve the people directly." This might sound forced to Americans, but she seemed quite genuine and sincere, and she was already looking forward to returning to the countryside after a month or two with her family. If this trend continues, Chinese scientists and intellectuals may come to see themselves, and be seen, as simply useful members of society rather than an elite class of mandarins.

The policy of self-reliance and independence from foreign influence is obviously very important to the Chinese self-image. It may be quite practical as well, considering the past hostility of the two superpowers, the United States since 1949 and the Soviet Union since 1960. Despite their professed preference for things domestic, however, the Chinese will presumably offset their own emphasis on applied science by relying to some extent on foreign basic science, which seems sensible in view of the extent to which this has been developed in the West. Nevertheless, the traditional Chinese lack of interest in things foreign does not seem to have changed much. The scientists seemed aware of the general outlines of recent Western scientific progress, if not the details. But although they seemed politely curious about us as Americans and about American science, and those who had studies in America sometimes asked after their former institutions and friends, we definitely did not have the impression that they felt cut off from the West or were thirsting for knowledge of it, but rather that they were simply preoccupied with their own concerns. As Dr. Shen said, explaining why she had gradually stopped corresponding with former acquaintances in the U. S., "We don't seem to have very much in common." E.S.

Footnotes

1 Ch'en, Jerome. *Mao Papers.* Oxford University Press, 1971.
2 Horn, Joshua. *Away With All Pests.* New York, Monthly Review Press, 1971.
3 Sigurdson, Jon. *Natural Science and Technology in China.* Report No. 154., Stockholm, Swedish Academy of Sciences, 1968.
4 Macioti Manfredo. "Hands of the Chinese." *New Scientist and Science Journal,* June 10, 1971, 636-639.
5 "Integration of Research and Practice." *BBC World Summary Broadcast, Far East,* FE/3586/B/5. From Peking Home Service, January 6, 1971, translation of broadcast by Chinese Academy of Sciences (Academia Sinica).



FOOD ADDITIVES OR 1+1+1...MAKES MANY

Food is the single largest retail industry in the U.S., doing over $125 billion business in sales anually. It is a messy industry, using between 50 and 80% of all packaging materials. It is also an international industry, marketing the products of U.S. knowhow throughout the Third World.

Non-nutritional food additives have a great deal more to do with profits and convenience to industry than with human nutrition. If most food additives are not required for human nutrition, but nevertheless appear in our food, what are they for? The following list indicates the major groups of additives and their major functions.

I. *Coloring matters.*
II. *Preservatives.* Substances used to prevent spoilage caused by bacteria, fungus and mold, and to improve keeping quality.
III. *Antioxidants.* Substances used to inhibit the oxidation (leading to rancid odors, etc.) of fats during storage.
IV. *Acids and bases.* To impart a tartness to food or to make the food acid (for example, to prevent crystallization of jams) or to generate gas for baking or carbonated beverages.
V. *Flavoring agents and taste enhancers.* Aromatic substances used as components of food flavors or as sweeteners.
VI. *Gelling agents, stabilizers and emulsifiers.* These are used to produce or to maintain texture.
VII. *Improving agents.* This catch-all group includes compounds influencing flavor, consistency, polishing and glazing of confectionery, products, etc.
VIII. *13 identified vitamins and essential minerals.*

We all know that bread is made from flour, salt, sugar, eggs, butter or margerine or oil, spices, milk, yeast, and water, plus lots of work. At home you might start with whole wheat flour, which doesn't mix easily, rots, mildews, forms lumps, and gives a product with an unpredictable flavor and color. Industry "matures" its flour (with chlorine, chlorine dioxide, nitrosyl chloride, azodicarbamamide, and nitrogen oxides) and produces a uniform, easy-mixing, long-lasting, dead white powder called white flour. The process takes out most of the thiamine, riboflavin, vitamin D, niacin, iron and calcium in whole flour; if these are added back, the result is called enriched flour. The eggs you use at home are nutritious and make the bread stick together; industry uses dried egg solids treated with silicates to make them free-flowing (fresh eggs would muck up the machinery) and relies on gums such as carageenan and the mono- and diglycerides to serve as emulsifiers. Gluten, a product of chemical hydrolysis (breakdown) of starch is also an optional ingredient and is added to make the bread lighter and easier to work with in the factory. Vegetable oils or lard work well as shortening, but the industry also uses lecithin and the mono- and diglycerides since they mix better and do not go rancid as fast. Home-made bread gets stale or soggy with sitting; it breaks into crumbs and cannot be wrapped around a hot dog. Industry's bread can be wrapped around a hot dog because it has softeners such as polyoxyethylene monostereate to keep it soft, antioxidants such as butylatedhydroxyanisole (BHA) and butylatedhydroxytoluene (BHT) to stop it from going rancid, propionate to stop bacterial and mold growth, and calcium salts to give it a good body and feel, and to stop crumbling. That's what additives are for.

Some foods have very few intentional additives (such as eggs, prime meats, raw vegetables). Others, like Space Sticks and the diet breakfast "meal in a glass" products are really 100% additive. In the food game the future belongs to the entirely artificial, not to the costly, bulky natural product.

Doesn't anyone get hurt; aren't some additives poisons? The original flour maturer, Agene (nitrogen trichloride) was removed from use after it was found to cause running fits in dogs. Many of the organic peroxides produce mutations (that is, they can alter the DNA of cells). Phenetyl alcohol can interfere with DNA synthesis. 1 Occasionally there is a bad mistake. In 1960 a new kind of artificial emulsifier used in margarine called ME - 18 caused 60,000 cases of skin disease in Holland. 2 However, the cases of outright deaths, or outbreaks of malformed embryos or massive allergic reactions are quite rare, considering the fact that some 10,000 new

supermarket items appear each year. The logic of the food industry is summed up by the aphorism "there are no harmless substances; there are only harmless ways of using substances." The real need for concern lies in the area of long term effects, or sub-clinical abnormalities. Several of the more recent public issues have involved this area; two examples are the cyclamates and monosodium glutamate.

Some Examples of Why the Industry Uses Additives

The Cyclamates. M. Sveda discovered in 1937 that sodium cyclohexane sulfamate (or sodium cyclamate, later sold as sucaryl sodium) produced the sensation of sweetness. Dupont obtained a patent for its manufacture in 1942. Both sodium and calcium cyclamates are sweet; both are about 40 times as powerful as an equivalent amount of sugar (sucrose). Because of the growth of diet and convenience foods, combined with our predilection for sweets, it was estimated that during the 1960's over 75% of the U.S. population used cyclamates as sweeteners. Cyclamates have no caloric value, and unlike saccharine, they do not produce a bitter taste in the amounts normally used for sweetening. In 1919, when the FDA issued the Generally Recognized as Safe (GRAS) list for the first time, cyclamates were among the original 183 compounds on that list. The list was set on the basis of responses from 355 out of 900 scientists who replied to an FDA questionnaire, although the Nader group has strongly criticised the validity of the GRAS list, especially since only 194 of the responding scientists had no comment or concurred that the compounds listed were in fact GRAS. A GRAS compound can be used in any food for which a formal identity is not already established, subject only to stated tolerances in the case of some chemicals. That is the basis of FDA practice is an extension of the system that has worked so well for human behavior; a chemical is innocent until proven guilty. In many cases cyclamates became part of the identity of foods such as jams and jellies, so that there was no way of knowing whether the sweeteners were being consumed (unless the consumer happened to have all four volumes of the CFR Title 21 in her or his kitchen).

Evidence accumulated that cyclamates were not GRAS, but the FDA did not take any action. In 1950 they reviewed a drug application from Abbott for Sucaryl Sodium. Although the data submitted were acknowledged to be inadequate, FDA allowed the application on the basis of their own tests. In fact it was later noted that FDA's tests showed a high frequency of lung tumors and other rare malignant growths in experimental animals. In 1966 two Japanese scientists found that cyclamates were transformed in the body to give cyclohexylamine (CHA). CHA is a teratogen capable of producing abnormalities in embryos similar to those produced by thalidomide. In 1969, two scientists on the FDA staff (Drs. Verrett and Legator) 3 reported similar findings and also the result that CHA caused chromosome breakage. This is potentially more dangerous than a teratogenic action, since a teratogen alters the body of the newborn but not the genetic material. FDA did not react to these findings, which were then published in the general literature and picked up by the press. Perhaps as a result, on October 19, 1969, Secretary of Health, Education and Welfare Robert Finch announced that cyclamates were no longer GRAS. In doing so (the official cancellation date was Fall 1970) he effectively condemned over a billion dollars worth of merchandise, whereas more rational early action might have stopped the production before it started.

Why did it take FDA so long to act? Are cyclamates really bad for humans? Nader's investigators present a good case to show that FDA has rarely acted to curtail use of a substance that may be of questionable health value, so long as industry finds it useful. The manufacturers concerned are petitioning the government for aid, having tried to give their stocks to charity, and in at least one instance, shipped them off to SE Asia.

The industry argues that even if cyclamates do cause cancer, the quantity required would amount to several ounces a day and that no human would consume that much. In essence they are saying that since cyclamates do not make you drop dead, don't the advantages outweigh the disadvantages? Why doesn't this argument make sense?

If cyclamates were a necessary part of the human diet, the argument the industry uses might be quite forceful. Even if they were by long-standing social custom *almost* essential, the industry would have some sort of case. But the same industry has exerted pressure on the FDA to establish "identities" that mean that possibly harmful but GRAS ingredients need not be listed explicitly and to adopt practices that allow any chemical to be used so long as there is agreement that it is safe. This cynicism amounts to the same kind practiced by the automobile fuel industry when they say that pollution is a "people problem". The real problem for people is an industrial society that puts no profit premium on management of waste and does not discourage the development of additives that have no value except as a way to make more profit.

Monosodium Glutamate

Monosodium L-Glutamate (MSG) is the sodium salt of an amino acid that occurs in most living things, especially plants. L glutamate and related chemicals such as gamma amino butyric acid (GABA) are involved in the function of the nervous system in some animals and perhaps in humans; they may serve as chemical messengers linking one nerve cell to another. It was first marketed under the name of Aji-no-moto (essence of taste): this brand still accounts for about 40% of world production. About 60 million pounds of MSG are sold in the U.S. each year–almost 1/3 pound per person. Because MSG occurs in nature, its use as an additive can only be a question of how much is enough.

MSG is an enhancer or intensifier rather than a flavor.

Relatively small amounts make sweet things sweeter and salty things saltier. Exactly how this happens isn't clear but probably involves a direct effect of the chemical on the taste receptor cells or the nerves that carry signals to the brain. Disodium 5' inosinate (IMP) and guanylate (GMP) are also enhancers and are said to be about 100-200 times more potent than MSG in many applications. These chemicals are two of the building blocks that make up the DNA and RNA molecules involved in genetic material.

In addition to enhancing flavor, MSG causes brain damage in very young animals and produces a malady known as Chinese Restaurant Syndrome in humans. When young mice were either fed or injected under the skin with MSG, they developed a peculiar abnormality of the brain. These results led the experimenter, Dr. John Olney, to suggest that perhaps MSG should be restricted for use in foods consumed by infants. MSG had been included in many baby foods, not because the babies liked it, but primarily to make the food taste better to mothers. Dr. Olney's reasonable suggestion was initially ridiculed by the industry, primarily and most vociferously by Gerber, but due to the bad publicity, the additive was discontinued in most baby foods. Once again, the damage to humans is presumptive, not, thank goodness, a proven fact.

Chinese Restaurant Syndrome,on the other hand is a human malady and describes the symptoms associated with eating Chinese food which contains 2-4 grams of MSG: facial pressure, burning sensations and chest pains. Not all people develop the syndrome, but it is definitely produced in succeptible people after eating amounts of MSG on the order of the amount suggested by American manufacturers of the chemical. Although Chinese Restaurant Syndrome is perhaps not a significant hazard to public health, it is clearly unpleasant to many people and it seems somewhat questionable whether MSG is in fact GRAS. However the industry might point out that pepper in excess produces unpleasant symptoms and that arsenic, a deadly poison, is permitted in foods at very low levels. FDA does require that MSG be identified by name and not just as "artificial flavoring", but does not at present restrict its use otherwise.

Both cyclamates and MSG, especially in excess and in young organisms, can produce either permanent or temporary abnormalities. Neither chemical in any reasonable amount causes humans to drop dead. Yet neither chemical increases the nutritional value of food, and both could be used for the purpose of concealing inferiority or to make a food product appear to be something more than it really is. Both chemicals were an essential part of the food industry profit structure; one has been restricted,the other has not been.

A Little More About the FDA

Since FDA is in charge of regulating additives, we should be as clear as possible about what they are doing. The GRAS list, which began with less than 200 compounds, has grown to 11 pages of small type. 5 It is now under review and the intent is not to change the list itself but to begin to use and enforce it in such a way that unofficial acceptance and use of substances *not* on the list will be discouraged. Some of the compounds on the list have tolerances or limitations. For example, between 50 and 200 parts per million (ppm) of the antioxidants BHA and BHT are the maximum permissible. There are also chemicals which are not GRAS but which can be used in foods provided that limitations are observed; for example, arsenic can be present at up to 2 ppm in some meats, DDT in 1.25 ppm in dairy products, etc. Many chemicals can be used "in accordance with good manufacturing practice". . . that is, without limitation.

FDA has established identities for many foods; bread was the example chosen earlier. In cases where identities have not been established, the problem is usually not lack of zeal on the part of FDA, but an unresolvable discrepancy between their idea of an identity and the ideas of the food industry (for example, cherry pie, egg bread, etc. have no identities. In cases where no identity exists anything on the GRAS list can be used as an additive.

FDA also regulates color additives. Most natural colorants are GRAS, but FDA also recognizes almost 100 certified artificial colors! 6

As the sheer bulk of the list of additives used in this country indicates, we do far less regulating than many other countries. For example, Canada allows only 15 artificial colors and the USSR only three. This in part reflects a basically different attitude toward the function and the scope of additives. To quote concerning the USSR regulations,

"Substances which have not received the approval of the public health authorities are illegal for use in food production. Permitted food additives must conform strictly to governmental food standards, technical specification, or special technological directives.

". . . Soviet authorities have always recommended that additives be kept to a minimum in the protection of foods." 7

Contrast this with,

"it is impractical to list all substances that are generally recognized as safe for their intended use. However, by way of illustration, the Commissioner regards such common food ingredients as salt, pepper, sugar, vinegar, baking powder, monosodium glutamate as safe for their intended use." 8

Although the principle of innocent until proven guilty may be an excellent idea for governing human behavior, its application to human nutrition seems to be on the basis of experience somewhat questionable.

Designed Consumer Food
Final Chapter of the Proud Story ?

A recent survey conducted by one of the image maker companies showed that 10,000 new super market items (not all of them foods) were introduced in 1968; 8,000 or 80% failed. About 7,000 failed in test markets or regional trial distributions, but 1,000 were national failures. 9 A test market failure costs about $100,000. A national failure can cost up to $20 million. Based on these figures, failures in the 70's will number in the hundreds of thousands at a cost in advertising alone of $5 billion in test markets and $7 billion for national products. The cost of these failures will be passed on to us, thus we have an interest in why failures occur.

Pizza and hickory-flavored catsup by Heinz failed in 1964 at a cost of over $1 million. Another me-too catsup called Barbecue that contained onion flavor also failed; the survey notes–in Heinz sight– that the major users of catsup are kids who hate onions. This sort of product is made possible using FDA approved combinations of artificial flavors, such as Chicken Breast 520041 or Hamburger 520083 (Polaks Frutal Works, Inc., Middletown, N.Y.). In 1966 General Foods introduced Post's cereal with freeze-dried fruits. Pre-testing showed that there might be problems with too soggy cereal and too dry fruit, but the product was put on the national market and lost $5 million. The General Mills snack foods Bugles, Whistles and Daisys are called marginal failures; apparently the capacity of the daisy-eating public was overestimated.

A modern food product should be and usually is the result of an intensive combination of technology, testing procedures, and media testing. First the product must have a distinctive profile; a characteristic combination of smell, taste, color and texture. New profiles are based on the use of additives and are worked out through the use of both cookbook technology and human testing panels.

If the industry had to operate within the definition of conventional foods, it is obvious that expansion of production beyond a certain point would be limited by the size of our population and our ability to stuff it all down in three meals. Without expansion the industry would have no place to tuck away those excess profits. Therefore, they created (or at least carefully nourished) a demand for fourth and fifth meals, for convenience foods, and diet foods to alleviate the effects of the preceding. Fried corn chips are the classical example; these are now available in virtually any shape, texture taste, and color you might or might not desire. Fortified drinks based on soy protein, flavored to out-taste the most heavenly milkshake and with a balanced salt composition to ensure rapid water intake (such as Gator-Go, son of Gator-Ade) are new additions to this growing family. Aerosol cans that squirt out fluffy little puffs of cheese or ham or bacon or smoke or raspberry flavored nutritional non-

sense to go on the cornchips are compounded from a growing list of fully functional artificial flavors and colors that are all GRAS and probably will remain so.

The industry also goes one up on itself by creating artificial look-like taste-like substitutes for those old favorites like ham and bacon and sausage. These are based on cheap protein, usually soy, perhaps soon safflower. The basic stuff sells for about 10¢ per pound; after processing and extrusion through a machine not unlike those used for making nylon, the product, textured vegetable protein, sells for about 35¢ per pound, dehydrated. This can be made into such items as Stripples or Sizzles and sold to undercut bacon and sausage prices and still turn a tidy profit (since a pound of bacon cooks down to about 4 oz. when fried, bacon costs about $4-$5 per pound on the plate–something to think about). One version of the imitation meat is already on the national market as Baco's, little red bits that, it is said, can be added to scrambled eggs or just about anything. Despite names that hint that the product is something that it isn't (Baco is an example), the "bland digestible protein from soy" is a good source of amino acids and a plausible hero in a world in which two thirds of the people are suffering from hunger. Only in the context of over-fed, over-fat North America are efforts to sell cheap protein *prima facie* absurd, because they are efforts to stuff the full even fuller.

Conclusion – or, So What ?

No one can provide a shopping list that will allow us to keep our diets absolutely pure. Adele Davis has tried hard, but as she says, there is more organic food sold than is grown; rip-offs are an intrinsic part of capitalism and not of only one industry. Some common sense in dealing with the food industry is needed; we shouldn't pay for junk we don't need, we should read the labels and do our own cooking from basic materials when possible.

No individualistic solution will work. Even if one can afford organically grown food, turning on to foods is a waste of energy unless we also turn on to the politics that shows how the food industry exploits us.

Now that we can have biodegradable everything in the kitchen, the result of the cooptation of ecology, it is clearer what cooptation by the food industry might mean. We should welcome food reforms and help liberal consumers to get reforms, but we should not lose sight of what we want.

There is no way that the U.S. food industry can reform itself to serve the people. The industry is built on aggressive, technologically based expansion. If market size stabilizes, expansion takes other forms. Gradually, more chemicals, more energy, more machinery, and more executives are larded into the space separating us from raw food. This is *not* a good way to increase employment, except for managers and food technologists.

The existing uses of food additives are not only bad, repressive and exploitative but they are logical uses, given the makeup of the industry. This society abuses the human physiology and it will take revolution, not reform, to change this. Reform may successfully change a few product lines, but it cannot break the general stress placed on our bodies by a combination of products, marketing, pricing and advertising.

American food is a drug, a culture killer. In black and native colonies here junk food in the stores and low protein school meals break down traditional patterns. Calorie content may be high, but nutritional value suffers. The U.S. political presence abroad coincides with the marketing of Coca-Cola and overmanufactured junk food. We use food as a weapon, both at home and overseas. Sometimes our actions are crude and obvious: we develop new varieties for blasted, ruined Vietnam, varieties that require American-made chemical fertilizers, pesticides and herbicides to grow. Sometimes we are more subtle: when we sell soy-supplemented health drinks like Puma in Latin America. Higher quality proteins have strings attached. The efficient pusher lowers the price to bait the hook, confident that the ultimate market size will offset any short-term losses. American technology replaces traditional ways of planting, fertilizing, harvesting, selling, caring for the earth, in return for . . . an end to hunger. It also forces people off the land and into unemployment in crowded cities, breaks up the family structure, and destroys the traditional culture.

Food additives don't exactly cause bad nutrition, but the development of modern food technology, marked by a cynical disregard for nutrition and massive proliferation of technological gimmicks, really illustrates the way science and technology now serve the elite. We must start to make science serve the people. A.S.

Footnotes

1 *San Francisco Chronicle,* November 2, 1969.
2 Borgstrom, *Principles of Food Technology,* v.2, p.166.
3 Legator et.al., *Science,*165, p.1139, 1969; Stone et.al., *Science,* 164, p.568, 1969; Stoltz et.al., *Science,*167 p.1501, 1970.
4 Schaumberg et.al., *Science,* 163, p.826, 1969.
5 Code of Federal Regulations, Title 21, 121 101.
6 Title 21, chapter 1, sub-part c.
7 Stenberg, A.I., "Food Additives in the USSR." *Food Additive Control Series,* Food and Agricultural Organization of the United Nations, Rome, 1969.
8 Title 21, chapter 1, sub-part B, 121 101.

May 18-20 the Spring Joint Computer Conference (SJCC) held its annual trade show in Atlantic City. SESPA joined with Computer People for Peace in activities critical of the misuse of computers and of racist and sexist practices in the industry. One of Boston SESPA's contributions was this poster. Individual copies are available at SESPA, 9 Walden St., Jamaica Plain, Mass. 02130 at $2 plus postage. Larger quantities can be obtained at considerable discount.

SCIENCE FOR THE PEOPLE

COMPUTER WORKERS-JOIN WITH OTHER WORKERS
MAKE COMPUTERS SERVE THE PEOPLE! ATLANTIC CITY '71

CPP
DOLPHIN CENTER
137A W 14TH ST. N.Y. 10011

SESPA
SCIENCE FOR THE PEOPLE CENTER
9 WALDEN ST. J.P. MASS 02130

REPORTS FROM LOCAL GROUPS

[We solicited reports from local SESPA groups and groups like SESPA, however, the mails have been slow and our request may not have reached some people because of summer vacation. Therefore, we would like to invite our contacts to send us any news of activities for the next issue–deadline Sept. 10, 1971.

Despite the foregoing remarks the response has been good. The reports reprinted here reflect several different political perspectives and we would like to invite you to send us your comments and criticisms.]

Los Angeles, California

Several months ago I suggested that my name and P.O. Box might be used as an L.A. contact point for SESPA, but that I probably wouldn't be able to get into much organizing activity immediately. This is because I am already spending much time in community organizing and working for the Peace and Freedom Party. However, I have made some contacts with several local scientists, have promoted a good working relationship with Computer People for Peace, and I think by mid-fall we should have something a little more properly called a "chapter". A. H.

Berkeley, California

SESPA recently gained some ground here in the battle for free speech and free assembly at the Berkeley Lawrence Radiation Laboratory. Director Edwin M. McMillan reversed his long held position that only scientific meetings are allowable and proper. He has appointed a committee headed by physicist J. D. Jackson, an outspoken free speech advocate, to establish "time, place, and manner rules" similar to the ones we have had on campus since 1964. This victory was accomplished by continued pressure from a coalition that included not only science faculty and students but also workers from other areas of the lab such as shops and offices.

Now we can begin in earnest to hold discussions at LRL Berkeley on the subject of science and social responsibility. It is a place particularly suited to the discussion of atomic weapons policy since many people who worked on the original bomb are now at the lab.

One of our members, Prof. Charles Schwartz, has been the target of institutional repression for his political activities, in particular for his role in the free speech movement last summer at the Radiation Lab. LRL has fired him from the summer appointment he has held for years, a firing that has gone officially unexplained but whose motives are quite clear. And yet, ironically, director McMillan has just decided that what Charlie was fighting for was a good idea after all.

Over the summer we are considering methods of expanding SESPA throughout the campus departments–including the social sciences, which have made great contributions to the politics of empire. Right now our numbers are small because we have neglected the task of organization and relied too heavily on mass meetings, resulting in shallow and transient commitments from potential members. We have adapted for a more organic growth, deliberate growth, the strategy for which will evolve from our self-analysis this summer.

The movement is now at the point where women must be brought in once and for all and the male chauvinism of the movement overcome. Otherwise further growth is not possible. This is especially true in science and engineering where male domination is extreme and virtually unchallenged. SESPA in Berkeley is considering actions related to breaking down the barriers to women in the sciences, including our own barriers in the Science for the People movement. The women among us are guiding the group in this endeavor.

We are also getting a Science for Vietnam project together, and we held a teach-in and workshops last May 17th, along with groups in Chicago, Madison, and Boston. Messages of solidarity, with invitations for scientific exchanges, have been sent to the D.R.V. and to the liberated areas of Cambodia, Laos, and Vietnam. Recently, SESPA arranged for visiting biologist Arthur W. Galston to give a talk and show slides of his travels in China and Vietnam. J.S.

New Brunswick, New Jersey

Several people, last winter and spring, have quite individually learned of SESPA and have joined. These individuals only became aware of each other very close to the end of the academic year. At present the only thing we have is a desire to do much more in the coming year. We have thought of trying to affiliate ourselves with some other chapter that had been meeting, but as of yet have taken no action. G.P.

Lawrence, Kansas

Our *Science for the People* group this summer has settled down to about 10 people. These include a biology professor, a biochemistry professor, a programmer at the computation center, two students in math and computer science, two grad students in biology, two in chemistry, one in medicinal chemistry, one in pharmacology, and me. We still have the problem of people finding 3 or 4 hours a week away from their regular research work and studies. Attendance at meetings varies from 5–10.

We put out a newsletter in conjunction with Mayday activity on campus. Three biology people went to the *Science for Vietnam* conference in Chicago. There is some individual activity in preparing packets for Vietnam, but very little. The response to the newsletter was not too

great. Many people were suspicious of some of the statements because they weren't documented. It was also too long and most people probably didn't read the whole thing.

So we decided to form a study group for the summer to develop a concrete analysis and program of action which will hold together when we get back into mass organizing actions. We are doing posters and putting them up all over campus to keep in touch with people. Enclosed is the first one.

The development of the study group has gone like this; We first each gave brief personal histories so as to get to know each other better and to see where we're coming from. One of the people had already been working with a street drug analysis program. Out of this came some lively discussion of drugs, a few of us feeling we should take a stand against drugs for political reasons and most feeling it's a matter of individual choice. All agreed we should develop the drug analysis and education program. We do qualitative and quantitative analyses and are doing a series of drug education articles in *Vortex*, the local underground newspaper.

A couple of us have talked to a couple of ambulance medics and are beginning to work towards setting up a free health clinic and program.

Right now, the study group is getting into developing the overall analysis of what we mean by "Science for the People." As I said in my previous letter, we really need literature and study suggestions from other groups, like copies of SESPA *Newsletter* and *Science for the People* magazine. We are also investigating the research activities at Kansas University to provide local data for our analysis. Again there is a split between those who want to just deal with small immediate problems and those who want to read and study to develop an overall understanding of capitalism, science and technology. But we're all struggling together pretty well. We need suggestions and communication from other groups. S.H.

New York, N.Y.

The New York chapter sends greetings to the Editorial Collective and to SESPA chapters throughout the country. New York activities remain centered upon Riverside Research Institute, the largest weapons laboratory in the city. The project to close down Riverside, begun in 1969, continues with morning and evening picket lines in front of the Institute and with frequent picketing of the homes of weapons engineers who work for Riverside. In May a sit-in was conducted at this laboratory by four of our members. The action succeeded in preventing the lab's staff from using the building's elevators and stairways to reach their offices and resulted in at least two employees' resignations. Since we began the Riverside project, approximately 20 out of a total staff of 100 professionals working at this death lab have quit and made their resignation known to us. Several of these people have joined the weekly picket lines.

The city government and the Consolidated Edison Company (New York's power supplier) have also been picketed on the Riverside issue. Both the City and Con Ed have given money or have under consideration research grants to Riverside. In the process of ferreting out information over a period of six months we have learned that Riverside has officers of the corporation and former employees peppered throughout Mayor Lindsay's administration. At the Urban Technology Conference held this spring in New York, Lindsay had us for company at the podium as he gave the keynote address to an audience filled with the sagging hulks of the aerospace industry. The mayor refused to discuss with us the two officers of Riverside who sit on his Science Advisory Board. We later learned, at the same conference, that one of the Mayor's appointees to the Fire Department was formerly employed at Riverside and awarded the laboratory a contract to ride technical shotgun on a sick elephant project the Fire Department had with the defense electronics firm, Norelco. It now appears that Riverside's hopes for a pollution study grant from Con Ed have been effectively squashed and that the name of Riverside is not much better than mud in the non-Lindsay quarters of the City government.

Among short term projects conducted last Spring in New York was a week long action at the Institute of Electrical and Electronics Engineers convention. A literature table was placed on the main exhibiting floor and podium protests were conducted at a technical session on air pollution run by weapons engineers. The annual banquet was attended by three SESPA members who stood before the head table with signs when David Packard rose to give the featured address. This demonstration had an immediate effect upon the audience and we were told would have repercussions throughout the Institute's hierarchy. Our actions at the IEEE are described in more detail in the March 29 issue of Electronics News and in a quest editorial we were invited to write for the June issue of *Electro-Mechanical Design.*

To acquaint engineering and science students with SESPA and the activities of the New York chapter, members have spoken at several anti-war and professional career opportunity conferences at various engineering schools throughout the city. Stressing action projects along a clear anti-weapons line, we have found participation in these events has brought us new members, particularly from the engineering schools.

At Columbia University action was recently taken against a member of the physics department who is also working for the Jason Division of the Institute for Defense Analysis. A Sigma Xi initiation ceremony at which this professor spoke was leafletted by a student of his own department and by an initiate of the honor society.

Members here who are publishing have begun to respond to reprint requests from military laboratories with signed postcards politely refusing such requests. The policy has been applied without national exception: requests from military establishments of foreign countries are also informed of refusal.

In addition to manning the Riverside picket lines, New York SESPA is planning some new projects at weapons labs in the metropolitan area and invites SESPA mem-

bers visiting New York to meet the crew on the job any Wednesday morning (8:45 to 9:30 AM) or Friday evening (4:45 to 5:30 PM) in front of Riverside Research Institute, 64th Street and West End Ave, Manhattan. D.W.

Cleveland, Ohio

Not much has happened in Cleveland. I was just a contact for most of the year and the first SESPA meeting was not held until the spring. At the first meeting we couldn't decide on anything except a second meeting. By the time of the second meeting I had my terminal notice and brought along a colleague who had, similarly, been fired . The half dozen people at the meeting became enthused about a protest meeting around firings generally triggered by these two. We had already discussed the common interests of campus students, teachers and workers at our first meeting. In addition there was a clear political dimension in my case, where the teaching content had become more radical and my disagreements, gentlemanly but firm, with the dominant conception of social *science* more explicit. The meeting on campus firings was small, reflecting a weakness in our organization of leafletting activities. Parts of the campus where students of the three fired teachers who were to speak lived were insufficiently covered, a typical bit of self-undercutting: a typical radical weakness, to fear success. Nevertheless two dozen people came, mostly known to the handful organizing the meeting. Also there was success in the University's chief anti-subversive agent, Vice President Musselman, came and took notes. Unfortunately, we did not learn his identity until after he left, or we could have exposed him beautifully during the meeting.

For the meeting we did a lot of research and found out a good deal about the firing picture for teachers on campus. But many teachers are afraid to say they've been fired and, if they fear a political motive, or a personal one, afraid to say that. I hope we can bring some of these together this fall.

What SESPA here lacks is a couple of good fighting organizers. That's probably true everywhere. I'm sure Cleveland has the capacity to support more action than we've had yet. I wish someone other than myself would become chief local non-organizer; I don't know how strong an organizer I'll be. There is plenty to hit here; besides doing military and police research and polluting the environment and the minds of students, the university is a big exploiter of workers, especially women and black people. D.N.

Boston, Massachusetts

Boston SESPA continues with a diversity of activities each involving relatively small groups of people. Two kinds of groupings have developed in Boston: one is issue or task-oriented, the other is workplace or school oriented. In the first category is the Science Teaching Group, Science for Vietnam, Editorial Collectives and various short-lived study groups. In the latter are the BBN Underground and the Harvard Medical Area group. Because workplace and school organizing has been weak organizing projects are planned for the fall at Northeastern University, Raytheon Corporation, Boston University and Tufts University. If we have the resources, we will also pull together selfsustaining groups at other technology-based companies.

Science for the People Center. In May the Helen Keller Collective gave to Science for the People the first-floor four-room apartment of their house in the Jamaica Plain/Roxbury section of Boston. The center is now almost fully equipped. It has a main office and reading room, a meeting room (also used for silk screen work and mailings) a small office and a workshop/kitchen. A very large barn is also available if the resources to fix it up and a use are forthcoming. Accomodation for out-of-town visitors is available and a few have already made use of it.

Office Collective. A general meeting of Boston SESPA agreed to establish an office collective for the summer/fall. The six people in the office collective have been gradually getting things in order—setting up files and records, fixing up shelves and benches and finding people who will commit 4 hours per week to the office. There is still a hell of a lot to do. If your letter hasn't been answered yet please be patient. Suggestions and criticisms of operating procedure and volunteers for office duty should communicate directly with the office collective at Walden St. (427-0642). They meet Thursday evenings. Hopefully by January when a general meeting selects a new collective there will be a lot of experienced people available.

Activities at Professional Meetings. Boston SESPA has not hosted activities at local meetings in the past few months but did participate in actions or simply sold magazines in cooperation with others at several meetings elsewhere. We joined with Computer People for Peace (CPP) in Atlantic City in May at the Spring Joint Computer Conference (the poster we provided is reproduced on p *25* .) At the Society for Microbiology meetings in Minneapolis David Baltimore announced upon receipt of the Ely Lilly Award that half of it ($500) was being given to SESPA/ Science for the People. We also had a table of literature at the Medical Committee for Human Rights (MCHR) meeting in Cambridge.

Technical Assistance Project. Pretty quiet during the summer, activity has been scattered—fixing our own office up, advice on carpentry and electrical wiring to a food coop, installing a gas heater for a child care center, fixing the IBM typesetting machine at the Media Center, etc. An interesting problem we can use some help on is that of finding a mechanism for slowing down traffic. The automobile-caused death of a young child across the street from the Science for the People Center stirred the people of the neighboring housing project to action. They barricaded two streets running through the project and forced the city to erect permanent barricades to prevent through traffic. Since there must be at least one street with through traffic we have been asked to propose some method suitable to a north-temperate climate (e.g. something that does not interfere with snow removal) for mechanically slowing traffic. Any ideas?

Informal Planning Meeting. Taking advantage of travels of Chicago and New York people we had a weekend of informal discussion attended by several local people. Among the topics was the question of the nature of our participation in the Philadelphia meetings of the AAAS. As a result of those discussions and subsequent general meetings in Chicago and in Boston, we agreed to recommend to all SESPA chapters that participation in the Philadelphia AAAS meetings should be primarily as critics in the regular sessions and not by organizing our own sessions under their auspices. Other topics were the Science for Vietnam program and problems of organization. These topics will be discussed in subsequent issues of *Science for the People.* Office Collective Boston

TASC

The following article is reprinted from the June 1971 newsletter sent to us by TASC (Technology and Society Committee), a group of scientists, engineers, and other technical people in Santa Clara County, Calif. For more information about TASC, its newsletter, its weekly luncheon schedule, and other activities, write to P.O. Box 952, Palo Alto, Ca. 94302.

One of the more notable features of the kind of political system in which most of us have grown up is that in fact politics is taboo. It is somewhat curious to become aware of this, but the so called democracies have abolished politics. It is taboo to have politics in the schools, it is taboo to have politics in the home (in particular in a heterosexual group) and most definitely it is taboo to have politics at the place of work. Having noted this it then comes as no surprise to realise that in fact the politicians are also non-political. That is to say, no politician in a western democracy would be caught dead expounding a serious attempt at a political analysis of a social problem. All good and evil in the social world is in their view a question of personalities, not ideologies. (One must also realize that this anti-politics is itself political and serves certain ends.)

The depth of this depoliticization is astonishing. One finds that expeeimental physicists who have been carefully trained to apply logic, test theories by experience, and build axioms when dealing with the material world, have apparently been equally carefully taught *not* to do any of this when dealing with the social world. One can hear distinguished and internationally famous scientists gravely explaining that the political behavior of the United States is governed by the set of rules they used to teach in seventh grade ten years ago.

It is thus an interesting and rewarding experience to violate these taboos in a government-funded laboratory. When the Cambodian thing broke in May of 1970 it was evident at Stanford Linear Accelerator Center that people were ready to do something. After a few days it was possible to organize a group of about fifty people into a set of activities around raising consciousness about Indochina. Altogether, an informational picket line was maintained on the main gate for a full month, some 20,000 leaflets were distributed to employees, there were some dozen or so rallies, there were theater groups, lunches on the lawn, small group seminars and beer parties. There was no doubt that a lot of consciousness was raised. After that time one's politics were a public thing and you knew who was who. One irate employee called the sheriff because the flag was displayed upside down and another wrote his congressman, causing a field investigator from the AEC to put in a month interrogating the cadre.

But all that died down with the rest of the movement after the sadness of the Kent State and Jackson State murders. The question then came up, how and what to do to make use of the awareness raised at that time. Two approaches have been used. Firstly a couple of people have organised a series of lunchtime discussion groups. These started out with no clear plan of how we would proceed. We started by just raising some ideas and reviewing the literature. People talked about Marcuse, about the Chinese Cultural Revolution, or about an overview of the modern corporate economy. We talked about the revisionist view of the relationship between the third world and the advanced industrial countries and we talked about Ivan Illich. Lately we have begun bringing outside speakers, but again emphasizing the analytical approach rather than the phenomenological.

The group is growing in size, the people are beginning to sound like a group rather than a competitive collection of individuals, and it seems likely that we are facilitating the development of political consciousness. There is evidence that the discussions do not end when people leave the room, but are carried on with others later.

The second activity which began about the same time was the development of a magazine of political commentary. This has followed a similar line to that of the lunchtime meetings . . . that is, an analytical and radical position. Most of the writing is presently being done by two or three people, with four or five others helping with the layout and printing. One innovation is worth attention. The mailing list was chosen by the editors. We didn't ask who wanted it, we decided who would get it. The importance of this point was not obvious to us at first. But we realize now that if we had asked who wanted it we probably would have gotten few responses, largely by reason of taboo. But with this blind list we have never had anybody tell us they didn't want it after they got it in the mail. Similarly, we don't charge people. We ask for voluntary contributions, and so far have been able to cover our printing bill this way. We have had many people volunteer favorable criticism, and many people have been able to relate to the issues raised in the text in ways that were surprising to us. Politics at this laboratory is no longer taboo, and one even begins to hear political comments being made in the context of technical and administrative meetings. We don't see clearly where this is going, but it feels good right now. Why don't you try it? J.H.

LETTERS

Dear SESPA:

You're great—the organization I've been looking for to finally get me off my petty-bourgeois-individualist ass. (am active in Chicago chapter).

I'm enclosing info and check for my own membership, and also money for subscriptions for two of my friends.

Roberta T. Ash
Chicago, Illinois

Sir,

I recently read in *Science* (we get it in Paris by surface mail) as well as in *Nature* various reports about the disruptions of the AAAS meeting in Chicago by radical scientists or students, and I am disturbed, although not unduly surprised, to see distinguished people implying that these rioters were behaving like the German Nazis. Those who say it remind me of my own students who, in May 1968, claimed the French policemen were SSs because they clubbed and gassed us. Although I had little sympathy for our native CRSs, I told my students at the time they had never seen real Nazis in full action; they answered they had been born after 1945.

I suspect that a lot of American people, although substantially older, are in the same situation as my students were; this may be especially obvious in the case of the American "scientific community", since Los Alamos, the Chicago stadium and the Lawrence Rad Lab were probably not very good vantage points if you wanted to lbserve Nazis at close range.

It may well be that, seen from the 1970 AAAS meeting in Chicago or from the editorial office of the *Washington Post* the Nazis were those awful barbarians who in 1930 shouted down world-famous and utterly harmless physicists who had devoted their lives to Pure Science. But for us in Europe the Nazi problem was not primarily centered in the abusing of Einstein. There was also the killing of six million people in concentration camps and gas chambers, the murdering of perhaps twenty million Russians in the most savage invasion ever seen, the slaughtering on orders of every human being in sight in such places as Oradour or Lidice, the first aerial mass bombings at Guernica, Rotterdam or London, and those thousands of partisans who got caught by the Nazis and were tortured by them until death inclusively. The basic principle of Nazi civilization was perfectly clear: in order to solve human problems, kill the human beings.

From this point of view, it seems to me that it takes either a lot of cynicism, or a quite incredible naivete, to draw any comparison between the Nazis and those bearded young Americans who claim that there are a lot of weapons makers among your scientific elite, and that a large part of it is very closely connected with the "military-industrial complex."

Of course there are a number of Nazi features in American life (as well as in lots of other places, including mine). Bearing in mind the Nazi motto—to solve human problems, kill!—please consider Hamburg, Tokyo, Hiroshima, the Super, and ICBM Committee, CBW, the MIRV, and My Lai. There is nothing behind those names of places or gadgets but actual or planned mass killings. Those who designed these horrors may not be full-fledged Nazis, but it seems to me they come far closer to the original Nazi model than any of the young guys who at Chicago confronted some of your luminaries with mere words.

Words don't kill. Only weapons do, and in your country they are *not* made by leftist protesters.

Roger Godement
Paris, France

[*This letter was originally submitted to Science magazine.*]

Dear Friends,

I have looked at your back copies with great interest. I agree with your objectives and I enclose a $5 check for a 6 month trial membership.

The engineering field badly needs a genuine engineering study; current crap is pitched at the lowest propaganda level possible. I enclose a piece on EMC's phoney engineering shortage. If you use it—or this letter—please do not publish my name in order to avoid reprisals.

I like your magazine. However, I would like to suggest more attention be devoted to the tremendous issues right under people's noses: the urban renewal and freeway swindles, fake police figures, inspection scandal, and so on. After many years' observations, I don't have much respect for those whose radicalism varies directly as the square of their distance from home—those who know the most minute details of communal farming under Chairman Mao but are completely disinterested in the home inspection scheme under Mayor Yorty that throws elderly pensioners into the street in favor of real-estate thieves.

I have some information on the current engineer "retraining" scheme aimed mostly at throwing gravy to Govenor Ronnie's buddies. Do you want such a piece? Or something on the freeway/rapid-transit swindle?

name withheld by request
Los Angeles, Cal.

Dear Fellow Scientists:

Enclosed is a couple of bucks to keep me on your mailing list for a few more issues. Although I disagree with many specific acts and positions which have been taken by SESPA and its members in the past, I believe SESPA is a valid and valuable approach for scientists who see the need of offering alternative views and plans of action from within the scientific community. So—best wishes; you're doing well, performing a valuable service to scientists, laymen and politicians.

Best wishes for your continuing contributions to public knowledge and discussion.

Leroy F. Berven
Missoula, Montana

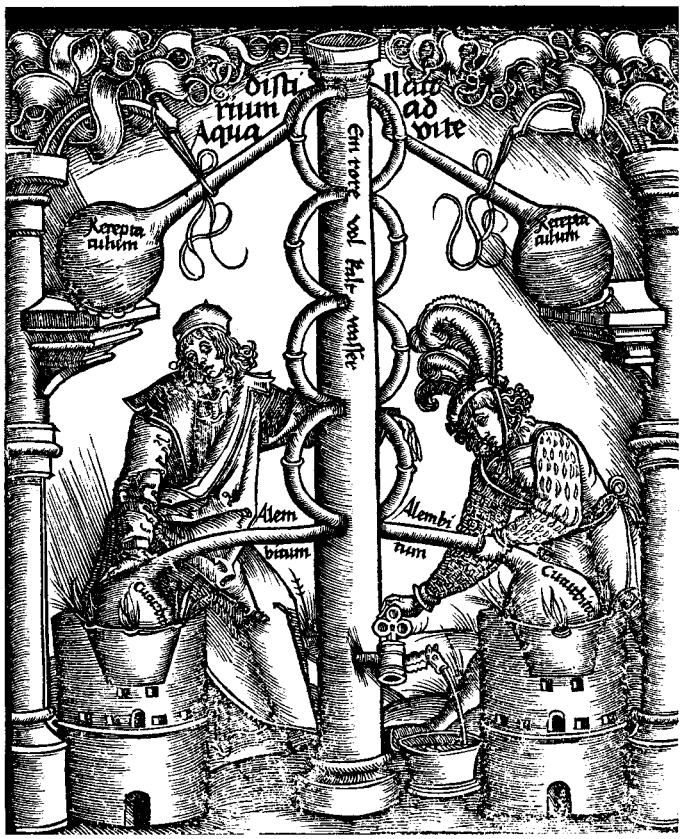
LOCAL ADDRESSES FOR SESPA/SCIENCE FOR THE PEOPLE

BERKELEY	Box 4161, Berkeley, California 94704
BOSTON	9 Walden St., Jamaica Plain, Mass. 02130
BOULDER	c/o Dick McCrae, 1900 Baseline Rd. Boulder, Colorado 80302
CHICAGO	Box 89, Ryerson Laboratory, 1100 E. 58th St., Chicago, Illinois 60637
CLEVELAND	c/o David Nichols, Interdisciplinary Studies in Social Science, CWRU, Cleveland, Ohio 44106
DETROIT	c/o William J. Steffy, 1279 W. Forest Detroit, Michigan 48201
LAWRENCE	c/o Steve Hollis, 1406 Tennessee St., Lawrence, Kansas 66044
LOS ANGELES	c/o Al Huebner, Box 368, Canoga Park, California 91306
MADISON	c/o Joe Bowman, Teaching Assistant Assoc., YMCA, North Brook St., Madison, Wisconsin 53715
NEW BRUNSWICK	c/o George Pallrand, Grad. School of Education, Rutgers University, New Brunswick, New Jersey 08903
NEW YORK	c/o David Kotelchuck, 49 w. 96th St. Apt.53, New York, New York 10025
	c/o Rod Wallace, Pupin Lab, Columbia Univ., New York, New York 10027
NORTHFIELD	c/o Mike Casper, Dept. of Physics, Carleton Coll., Northfield, Minn. 55057
OSSINING	c/o Ed Walker, Spring Valley Road, Ossining, New York 10562
PHILADELPHIA	c/o Peter Sterling, Dept. of Anatomy, Univ. of Penn., Philadelphia, Pa.19104
ST.LOUIS	c/o Jeffrey Schevitz, Dept. of Sociology Washington Univ., St.Louis, Mo.63130
STONY BROOK	c/o Ted Goldfarb, Dept. of Chemistry, SUNY, Stony Brook, New York 11790
STORRS	c/o Lorraine Roth, 5 Meadowood Rd., Storrs, Connecticut 06268
VENICE	c/o Ken Ziedman, 2342 Penmar, Venice, California 90291
WASHINGTON	c/o Mike Marchetti, 4004 N. Fifth St., Arlington, Virginia 22203
WORCESTER	c/o Jim Blaut, Grad. School of Geography, Clark University, Worcester, Massachusetts 01610
WEST GERMANY	c/o Claus Offe, Max-Planck-Institut, D 813 Starnberg, Riemerschmidstr. 7
CINCINNATI	c/o Michael Carsiotis, 34 Burton Woods Lane, Cincinnati, Ohio 45229

The AAAS meetings this year will be held in Philadelphia, Pa. We wish to encourage people early to get together to plan disciplined actions, position papers, workshops.

For information, facilities and coordination write or call Bob Factor, 305 S.40th St., Philadelphia, Pa. (215) EV 2-6963 or (215) 594-8396.

For advice and suggestions contact also the Boston and Chicago SESPA chapters.



BULK RATE
U.S. POSTAGE
PAID
BOSTON, MASS.
PERMIT NO. 52696

SUBSCRIPTIONS TO *SCIENCE FOR THE PEOPLE* AND MEMBERSHIP IN SESPA

SESPA is defined by its activities. People who participate in the (mostly local) activities consider themselves members. Of course, there are people who through a variety of circumstances are not in a position to be active but would like to maintain contact. They also consider themselves members.

The magazine keeps us all in touch. It encourages people who may be isolated, presents examples of activities that are useful to local groups, brings issues and information to the attention of the readers, presents analytical articles and offers a forum for discussion. Hence it is a vital activity of SESPA. It is also the only regular national activity.

We need to know who the members are in order to continue to send *SCIENCE FOR THE PEOPLE* to them. Please supply the following information:

I am a member (check here if subscriber only. [ ])

1. Name:

   Address:

   Telephone:

   Occupation:
   (if student or unemployed please indicate)

   If you are working, do you work in industry [ ], government [ ], university [ ], other _____

2. Local SESPA chapter or other group in which I'm active:

3. I am enclosing money according to the following scheme: (a) regular membership–$10, (b) indigent membership–less than $10, (c) affluent or sacrifice membership–more than $10, (d) completely impoverished–nothing, (e) I have paid already.

4. I will sell ___magazines. This can be done on consignment to bookstores and newsstands, to your colleagues, at meetings. (If you want to give some away free because you are organizing and can't pay for them, let us know)

5. I am attaching a list of names and addresses of people who I believe would be interested in the magazine. Please send them complimentary copies.

Please add any comments on the magazine or SESPA or your own circumstances. We welcome criticism, advice, and would like to get to know you.

SEND CHECKS TO: SESPA, 9 WALDEN ST., JAMAICA PLAIN, MASS. 02130