

# SCIENCE FOR THE PEOPLE

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Black Workers and Occupational Hazards

Danger: Women's Work

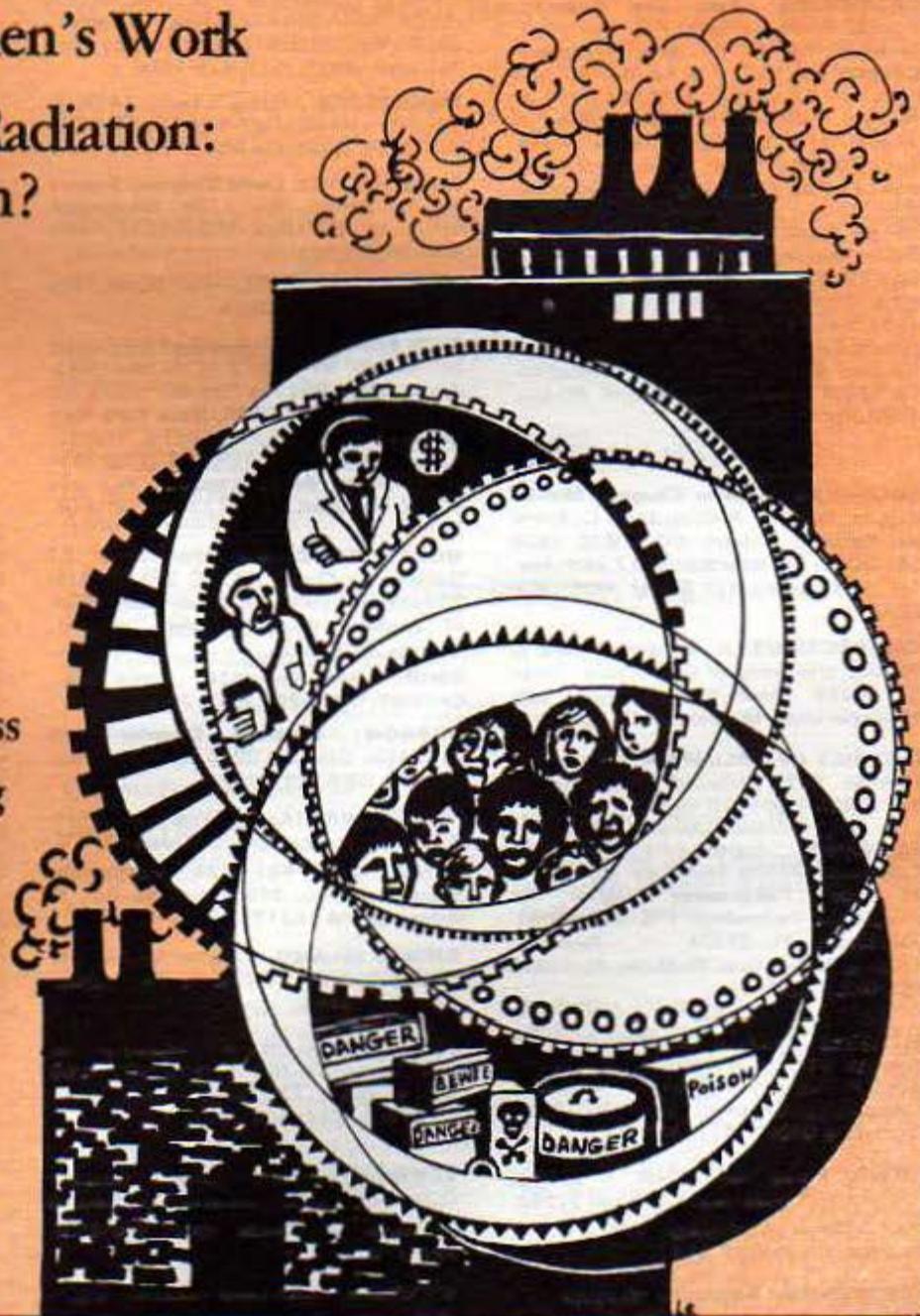
Nonionizing Radiation:  
Unsung Villain?

Psychogenic Illness

Genetic Screening

Dying for a Job

Interview with  
Health Activist



Focus on Occupational Safety and Health

## Chapters and Contacts

Science for the People is an organization of people involved or interested in science and technology-related issues, whose activities are directed at: 1) exposing the class control of science and technology, 2) organizing campaigns which criticize, challenge and propose alternatives to the present uses of science and technology, and 3) developing a political strategy by which people in the technical strata can ally with other progressive forces in society. SftP opposes the ideologies of sexism, racism, elitism and their practice, and holds an anti-imperialist world-view. Membership in SftP is defined as subscribing to the magazine and/or actively participating in local SftP activities.

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# about this issue

U.S. industry would have us believe that health and safety are ice cream issues — the latest demands of workers who are so well off, so comfortable, and so well protected, that in the manner of spoiled children they now cry for yet more delicious desserts. *Science for the People* has gathered here a variety of articles to demonstrate that, far from being a matter of luxury, the demand for improved health and safety conditions is a declaration of basic human rights: the right to an unabridged, uncontaminated, and unalienated life. As evidence pours in documenting the sorry conditions of more and more occupations, it becomes clear that we and our children are perhaps better housed and better doctored by our higher wages, but are at the same time disfigured and disabled by the fringe hazards of our well paid jobs. On behalf of a sagging economy, workers are entreated to make sacrifices — safety improvements are costly. But dying for a job is a sacrifice no worker should be asked to make.

Once it is understood that the choice industry lays out — between work and health — is a false dichotomy, we gain some insight into an important organizing issue. In industry's construction, workers are necessarily damned, consigned either to poor health or to unemployment. The *real* choice, which was already made for us, but without our consent, is between expenditures for projects in the Pentagon's interest versus expenditures for programs in the public interest. The concrete struggle for a safe workplace throws the real contradiction into the spotlight and therefore has strong potential as an organizing issue. By researching health problems and educating people about the real contradictions, scientists and other knowledgeable people can help generate improvements in the quality of our lives. Formal institutions, like the Occupational Safety and Health Administration (OSHA), which were designed to shoulder this responsibility, are weaker now than when they were first established, and the recourse they were meant to provide to workers is more theoretical than real. With rising inflation and the job insecurity attendant to a high unemployment rate, workers are forced by economic necessity to seek or keep hazardous jobs, often with the tacit agreement to make no waves.

Minority workers are particularly vulnerable to this trap and therefore typically experience harder and more dangerous conditions than others (see Morris Davis' article on occupational hazards and black workers, p. 29). Trying to keep pace with this spiral, progressive agencies like San Francisco's Worker's Clinic have come into existence to treat job-related health problems (see Molly Coye's description of the clinic, p. 25). But as much as we need medical facilities tailored to occupational health problems, adequate treatment is no substitute for prevention.

In a technological economy, is the prevention of hazards a realistic expectation? Using a cost-benefit calculus, industry almost invariably answers this question in the negative (see Mandy Hawes' analysis of this issue, p. 14). Yet we see from Molly Coye's report on conditions in Cuba (p.22) that when worker benefits replace corporate benefits in the equation, prevention is a perfectly realistic expectation. When worker benefits are a sworn priority, even a poor country can defray the expense. Because capitalism subordinates worker safety and the public health to profits, the rush to adopt new technological equipment and processes usually ignores all consideration of hazards that might be unleashed by the new advances. So it was with the development of microwave technology, and so it might be with the planned Satellite Power System (see Ross Flewelling's article on nonionizing radiation, p. 32).

Like a criminal who is presumed innocent until convicted, runaway technology is presumed harmless until conclusive research proves it dangerous. But since this research almost invariably follows rather than precedes the adoption of a new advance, the culprit runs free until its victims are numerous enough to constitute a case for confinement or condemnation. During the period of technology's presumed innocence, damaging evidence is often denied and people who suffer from its assaults are diagnosed as hysterical (see Laurie Case's analysis of mass psychogenic disease, p.18). Once it can no longer be denied that the assaults are indeed real and debilitating, there is still no guarantee that the culprit will then be restrained. Cost-benefit arguments may succeed in keeping it on the loose, and there has now come

on the scene an even more sinister plan, which is to allow the culprit to remain in circulation by controlling the *people* who might be particularly vulnerable to assault! (See Jon Beckwith's article on genetic susceptibility and occupational disease, p. 20.)

To some extent, special protection for specific classes of people (e.g., pregnant women) is justified. Frequently, though, as Katz, et al. point out in their article on women's work, focusing on women's

reproductive capacity draws attention away from their general health and safety conditions on the job. Since women are concentrated in certain industries and usually are relegated to low status jobs, the routine hazards to which they are exposed seldom get much publicity.

Safe environments, even under socialism, are hard to come by. Our hope is that this issue of *Science for the People* will stimulate thought and action for improving the health and safety of people everywhere. □



## letters

Dear SftP:

I would like to comment on your response to Jim Conley's letter in the November/December issue of *SftP*. That such a response was printed in an issue devoted to exploring ideas pertaining to a more politically enlightened pedagogy is unfortunately ironic, and therefore distressing.

The evident pleasure in your answer to Conley's clichés that you found "too good to pass up" and the "Congratulations!" you sarcastically tossed back at one of your readers unfortunately sound like oppressor tactics. Instead of responding to the challenge of someone confused, I think you sought to "teach him a lesson." Conley, however clumsily, sought to engage you in a dialogue. Despite his apparent preference for two common anaesthetics of our culture industry (beer and movies) he did not react with the more customary numbed silence of the oppressed. Amid the clearly sectarian limits of his comments could

be read the anger of a reader for whom I think you would at least publically demonstrate more concern. (Privately we may all bitch about such short-sightedness.) The irony may be found in the larger context of the publication itself: Conley's letter was like the complaint of a school child who is frustrated by a subject or "bored" perhaps as protection against estranging authority. Instead of engaging him as a subject in a struggle your journal encourages, you treated him as an object of ridicule. Like a bad teacher, you cracked your editorial ruler and so relegated him to the corner with the necessarily silent dunces. Your answer was neither fair nor responsible: its lack of understanding vitiates your judgement and the tone of its delivery vitiates editorial integrity.

I would not belabor your unfortunate response except that I think there is a more substantive issue here than that suggested by a single flippant editorial reply. In your otherwise excellent issue, Marvin Kalkstein's review comments on the correspondence between authoritarian conditions of the classroom and the workplace. I submit to you that just as the educational system reinforces factory rule, so too the relation between writer and editor is too often conditioned by the same relationship of dominance and submissiveness: an expression of dehumanization too rarely dis-

cussed and yet clearly present in our literary market place. The dialogue between a writer and the public is a thoroughly mediated one. In writing to you one must, just as Conley, *submit* in the truest sense. At your behest a writer may be printed or silenced, engaged or denigrated. The intermediary character of editorship is fraught with power that begins with the authority to choose or reject, cut or answer, address or ridicule, and finds resolution in either the responsible encouragement of dialogue or the tyranny of censorship. Just as a dialectical relation may develop between people engaged in learning, in a classroom or elsewhere, so the dialectic between reader and writer can be effected or sabotaged in the cutting room of a journal or newspaper. In a Letters Column, where editor and reader may most nearly meet as individuals, the potential for abuse is unsettling, particularly in the context of a publication intent on discussing "the frustration and obstacles involved in the process" of education, as you write in your issue description. Editorial authority at its worst functions in its mode of production as an adjunct to the Quality Control Department in the factory that is painfully like too many of our schoolrooms. Letters, like piece-

*continued on page 31*

# DANGER:

## WOMEN'S WORK

by East Bay SftP



*Why is it necessary to separate the occupational health hazards of women from those of men?*

- *Because women are biologically different?*
- *Because women can pass on health hazards to fetuses?*

*Why are more women entering the job market?*

- *Because fewer women are becoming mothers?*
- *Because modern women have more free time?*

We shall look at each of these questions in turn, and attempt to separate myth from reality. We shall then examine three occupations in depth: women health workers, clerical workers, and blue collar workers.

### Occupational Health Hazards: Separate But Equal

Most scientists who conduct statistical studies on women's occupational health feel it is necessary to separate women's health hazards because women who are pregnant can potentially transfer those health hazards to the fetus. This by all means is a consideration. However, it is time that women stop being viewed primarily in terms of their childbearing capabilities. It is time that women's occupational health, not simply pregnant women's health, be studied and dealt with.

Obtaining information on women's occupational health hazards is difficult. Examples of sexism in the study of women's health hazards are numerous: the first major scientific conference on women's occupational

*This article was put together by a group of East Bay SftP members (Liz Katz, Steve Lyons, Sandra Marburg, and Jim Tobias). They wrote parts of it themselves and also incorporated articles by Jeanne Stellman of the Women's Occupational Health Resource Center in New York (who generously allowed her work to be liberally edited) and material on clerical work hazards provided by Union WAGE (Women's Alliance to Gain Equality).*

health, "Women and the Workplace," held in 1976, dealt solely with health hazards in terms of reproductive capabilities. In 1963, a survey conducted by the U.S. National Center for Health Statistics on the effects of employment on pregnancy gathered only data on the occupation of the *father*: the mother's job and job history were not even recorded! And the list goes on.

Women's occupational health hazards must be studied separately from men's because the majority of women have been coerced into very narrow areas of employment, as shown by the fact that the top 57 female occupations cover about 75 percent of all the women who work outside the home. However, the top 57 male occupations only cover 52 percent of all the men who work. Most readers could probably guess what the top ten job categories are for women: secretary, waitress, registered nurse, elementary school teacher, cashier, stitcher and sewer, retail salesperson, typist, private household worker, and bookkeeper.

Many excellent books and articles have been written on *why* and *how* women have been segregated into such narrow job categories, and we will not deal

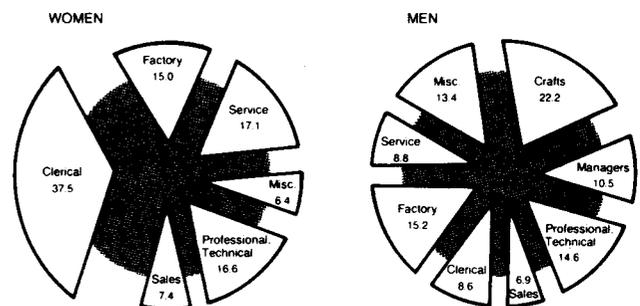


Figure 1 A COMPARISON OF THE OCCUPATIONAL DISTRIBUTION OF MEN AND WOMEN, 1970

SOURCE: U. S. Bureau of the Census.

*Women's Work, Women's Health*

with that issue here. It should be noted, however, that most females find themselves in jobs in which they fulfill the role placed upon them by a male-dominated society — that of nurturer, supporter, and homemaker.

### WHY ARE MORE WOMEN WORKING?

Figure 2 shows the percentage of women in the work force for the past 80 years. Why such a dramatic increase in the percentage of women working? The answer to this question is usually given in terms of a woman's reproductive capabilities, aptly summarized in the following statement, from the U.S. Department of Labor Women's Bureau's "1975 Handbook on Women Workers":

A series of technological and business innovations early in the century provided less costly substitutes for the manual work performed by women in the home. Perhaps even more significant was the dramatic change in child-related aspects of a woman's life. For example, in 1910 married women in the age group of 45 to 59 years had borne an average of five children; by 1950 the number of children borne had declined to about half that figure.

The pieces seem to fit together, and the theory represents conventional wisdom on the subject of why women are working: an increase in free time due to technological and business innovations and decrease in family size. Again we see women viewed as childbearers and homemakers. However, as we shall see, this view is based on an *incomplete study of the statistics*.

#### Fewer Children, More Mothers

To determine the increase or decrease of women free from the responsibilities of motherhood, it makes sense to look at the percentage of women who become mothers — as opposed to family size, as the Women's Bureau has done. From this perspective, we find that although family size is *decreasing*, the percentage of women who are mothers is *increasing!* The percentage of women having no children has actually dropped from one in five before 1950, to about one in ten women today. Moreover, the greatest increase in women workers has been among women with young children. Thus to attribute the increase in women workers to smaller family size is false, because smaller family size does not, as we have seen, necessarily imply an increase in the number of women available to join the work force.

#### Increased Free Time?

Perhaps the explanation for why more women are working is that the amount of housework is decreasing, as the Women's Bureau suggests. It would seem obvious

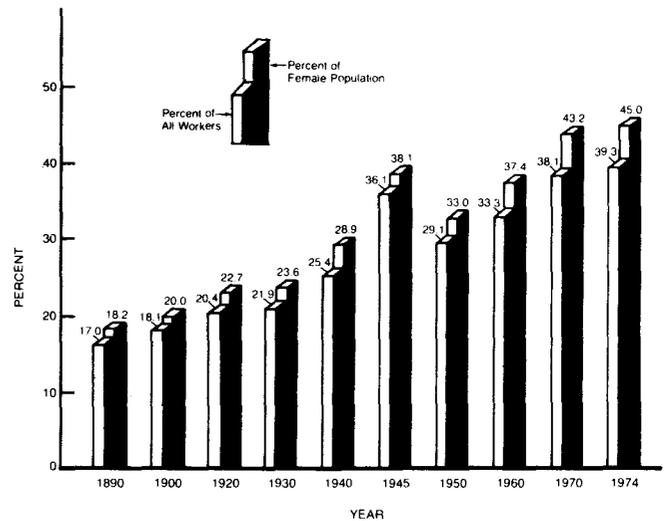


Figure 2. PERCENTAGE OF WOMEN IN THE LABOR FORCE, 1890-1974

The percentage of women employed is an underestimate, at least until 1930, because farm women were generally not counted as employed, while their husbands were (see Table 1).

SOURCE: U.S. Department of Labor Women's Bureau, 1975 Handbook on Women Workers (Washington, D.C., 1975).

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that the amount of housework would decrease with the use of modern appliances and conveniences. However, the time spent at housework by most women today has actually increased by 6 hours a week since 1950 (70 hours a week compared to 64 hours a week).(1) A decrease in household chores cannot therefore be the explanation for the increase in the number of women working for pay.

#### Why Are Women Entering the Labor Force?

Women and men work for similar reasons: economic need, economic independence, desire to own material goods, erosion of family earnings by rapid inflation, increased consumer debt at very high interest rates, identification of individual and social worth derived from a paycheck, and so on.

In 1978, over 42 million women were in the labor force as full-time and part-time workers. Forty per cent of these women workers were either single, widowed, separated, or divorced. This would suggest that most of these women worked to support themselves and possibly dependents. Women whose husbands earned less than \$10,000 accounted for 7.2 million working women in 1978. In all, the U.S. Department of Labor estimates that nearly two-thirds of the women in the labor force in 1978 worked to support themselves and their families, or to supplement low family incomes.(2) Finally, most women are not entering into the so called "glamorous" high paying jobs, but are entering as clerical workers, factory workers, and service workers at the lower ends of the pay scale.

## STRESS: The Occupational Hazard Of the Dual Role for Women

In the majority of households, working women must bear the burden of both homemaker and breadwinner, the reason being that men do not share equitably in the housework. The old saying "a woman's work is never done" has never been more true than it is today. On the average, working women are occupied at least 80 hours per week by their jobs and their homes, while working men average about 50 hours a week. For low income families, the inability to buy support services may place more stress on the woman to meet all the needs of the family, but even among high paid women workers the stress of the dual career is present. A recent study of female physicians in Detroit revealed that three out of four of these women did all the family cooking and shopping, and were responsible for child care as well. Moreover, about half of these women were married to physicians.

The result: women are faced with a work/home induced increase in psychological and physical stress. Stress causes complex changes in blood chemistry, digestive function and cardiovascular function, which over a long period of time may cause heart disease, kidney disease, stomach ulcers and ulcerative colitis. However, even though women are faced with ever increasing stress, almost all research money for cardiovascular research goes to the study of males.

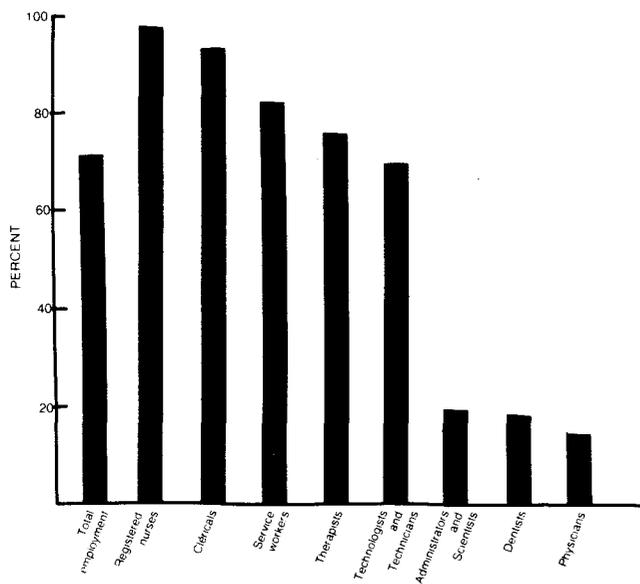


Figure 3. THE OCCUPATIONAL DISTRIBUTION OF WOMEN IN HEALTH CARE, 1970

SOURCE: U. S. Bureau of the Census.

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## WOMEN AND THE WORKPLACE

We have chosen to detail workplace hazards for three job categories in which women predominate: health care, clerical, and factory workers. These are not the areas in which job hazard may be greatest but rather the areas in which a large number of women are affected. We don't know whether the health hazards in these jobs affect women differently than they affect men, because research has not addressed this question. We will not be discussing women's health hazards in terms of hazard to fetuses. Rather, we will emphasize hazards to the women themselves — a subject largely ignored in occupational health.



Lynn Roberson

## HEALTH INDUSTRY

Health care is a huge, labor-intensive industry, employing over three million women. Over 70 percent of health workers are women; of these, 20 percent are registered nurses and more than half are service workers — nurse's aides, food handlers, and janitors (see Figure 4). While health workers face an extraordinary variety of hazards ranging from ozone exposure, to x-rays, to laser beam lesions, a few examples of hazards — hepatitis, back injury, and heat stress — will serve to illustrate typical problems.

## Infectious Diseases

It's not surprising that nurses (97 percent of whom are women) suffer an abnormally high incidence of serious infectious diseases, including hepatitis, tuberculosis, staphylococcus, herpes simplex, and Rubella (German measles). But direct patient contact is only one means of exposure; also at risk are workers who transport, analyze, and dispose of biological specimens, including laboratory and janitorial workers.

A recent survey of hepatitis risk conducted by Local 1199 of the National Union of Hospital and Health Care Employees showed that laboratory workers in 34 New York City hospitals experienced *more than twice* the incidence of hepatitis found in the general population. (This study may be applicable to the nation's 200,000 clinical laboratory workers, of whom 74 percent are women.) The survey implicated mouth pipetting as one major reason for high hepatitis risk. This practice is dangerous. Pipettes are strawlike tubes used to transfer liquids, often used for blood, urine, and other biological samples. Those workers who accidentally had taken a mouthful of liquid — even once — had nearly three times the hepatitis risk of workers who claimed they had not. Automatic pipettes are not routinely provided in most hospital labs. Inadequate methods of specimen disposal and poorly packaged and labeled specimens also cause contamination problems. The risk of hepatitis is high as well among kidney dialysis workers, dentists, and persons working with drug abusers. Due to a lack of research concerning the spread of hepatitis and other diseases, the true extent of hospital induced infections among staff and patients is not known.

## Hospital Service Workers

Hospital service workers have the dirtiest and least rewarding work. They must lift patients and carry loads of food service or cleaning equipment, making back injuries a major recognized hospital problem. Although it is unsafe for an unassisted worker to lift a patient, hospitals continue to employ so few workers that teamwork is made impossible. Other preventive measures such as mechanical carrying devices and better bed design have not been instituted.

Very little attention has been paid to the health and safety of the many hospital service workers employed in laundries. Counting both in-hospital and outside laundries, the number of employees is 350,000 — 70% are women.

Laundry work is dangerous and hard. The temperature and humidity are often unbearable, taking a toll on the cardiovascular system. It is well known that heat causes an increase in blood flow to various organs and can lead to acute reactions such as heat stroke and liver damage. However, we can only guess the long term

health costs from thermal stress. The need for research is especially striking because heart and circulatory disease have become leading causes of death.

Laundry equipment is frequently poorly designed and maintained, exposing workers to burns, electric shock, and severe injury from unguarded machinery. Another hazard is exposure to dangerous substances in the laundry. In hospitals, hepatitis and other diseases have been transmitted in this way. (Outside hospital laundries, cases of silicosis- and asbestos-related diseases have been recorded among persons washing dusty work clothes.)

In conclusion, the general industrial and physical dangers facing hospital workers are compounded by the exposure to pathogens (communicable diseases) and to biologically active agents (disinfectants, anesthetics, x-rays). Rapidly developing technologies in medicine assure new sources of hazards for health care workers.



Jim Tobias

## CLERICAL WORKERS

Little attention has been paid to the health hazards of clerical work. As more than one out of every three working women is employed as a clerical worker (compared with less than one of every ten working men), this is an oversight which represents a serious problem for women. Traditionally, the health and safety of workers has been taken seriously only after tragedies have come to light — like deaths from accidents or cancer. Even then, regulation of these hazards is often inadequate.

The fact that clerical workers are not exposed to immediately life-threatening dangers does not mean that their work is free from hazards. And office workers, like all other workers, have the right to a safe and healthful workplace, guaranteed by law.

There is still much to be learned about hazards for clerical workers, but some dangers are already known. They include:

- Sitting all day, which can lead to back problems, hemorrhoids, varicose veins, and other circulatory problems.

- Exposure to toxic solvents which are used for duplicating machines and found in common office supplies, like rubber cement.

- Exposure to ozone from duplicating machines in poorly ventilated places.

- Exposure to asbestos in the air conditioning.

- Stress (both physical and emotional) which can result in serious health problems, ranging from daily headaches to ulcers and high blood pressure.

### Seating

Backaches appear to result from poorly designed chairs. They can be aggravated by the stress that often accompanies "sit-down" jobs. Unfortunately, executives usually get the best chairs, secretaries the worst ones although they spend more time in them. Poor chairs also impede circulation, thereby causing or aggravating varicose veins and hemorrhoids.

### Lighting

Some people cannot work under fluorescent light without suffering severely from impaired vision, swollen eyelids, and bloodshot eyes. The flicker and hum can also be disturbing, possibly causing headache and fatigue. Persons predisposed to epilepsy may even be triggered into a seizure by the light.

Fluorescent lights are known to leak a small amount of x-rays. Whether these levels are dangerous over a long period of exposure is not known.

### VDT's: A New Hazard

Modern technology has invaded the clerical world in the form of video display terminals (VDT's). Millions of these machines are used by workers in publications, communications, banks, law offices, and retail stores. The VDT's look like electric typewriters attached to a television screen. VDT's are powered by cathode ray tubes, an artificial illumination source, similar to that found in televisions or fluorescent lights.

In 1976, two male copy editors at the New York Times developed cataracts after they started working with VDT's. Seventy-five United Nations typists later walked off their jobs, refusing to work on VDT's, citing health dangers. The most immediate problem is eye-strain. Additional complaints include visual deterioration, headaches, fatigue, and backaches. Whether some of these complaints are related to the machines or other conditions of work is not known.

In sum, it is apparent that clerical work is not "safe," as is commonly presumed. In fact, hazards are prevalent, sometimes aggravated by new mechanical and chemical additions to the workplace. These issues are rarely the target of union activity or scientific research.



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### BLUE COLLAR WORKERS

Fifteen percent of women workers are in blue collar jobs. They are highly concentrated in either a few industries, such as clothing and textiles, or in certain parts of industries, such as circuit board assembly in the electronics industry. While hazards women face in these jobs are not known to affect women selectively, workplaces dominated by women are not the usual focus of industrial health research nor are the kinds of hazards borne by female industrial laborers ordinarily public knowledge. Additionally, changes in the chemical complexity of traditional women's industrial jobs have dramatically intensified the chemical dangers of what once might have been considered benign "women's work".

### Textiles

To give some index of the concentration of female workers in the textile industry, 94 percent of the stitchers and sewers in the clothing industry are women (875,000 women workers). Another 500,000 women (76 percent of this labor force) are employed as manufacturers of fabricated textile products and apparel.

Serious workplace hazards which women in the textile industries face relate in part to problems arising from the use of natural and synthetic fibers and to changes in the treating, assembling, and finishing of

fabrics. Women who work with cotton, for example, are exposed to cotton dust which in turn can produce byssinosis, a disabling lung disease commonly known as "brown lung." No specific estimates have been made of the number of women workers with brown lung, but the Public Health Service estimates that 500,000 workers currently have brown lung disease. These workers, most of whom live in the southeastern United States, are forced to leave their jobs after contracting the disease, and usually — because most cotton mills are nonunion and function without health benefit programs — these workers receive no compensation for their disability.

Replacement of cotton and other natural fibers by petroleum-based synthetics, and development of new methods for assembly and treatment of fabrics, have resulted in exposure of workers to new chemical dangers. Polyester basting threads are now removed by solvents, thereby exposing the stitchers and sewers to the toxic fumes of complex chemical reactions. There is also evidence that Tris, the chemical flame retardant impregnated into certain fabrics before it was banned as a suspected carcinogen, was absorbed through the skin of garment workers. Unfortunately (perhaps conveniently), research on this problem was dropped when Tris was banned. There is also evidence that the potent carcinogen BCME (bis-chloromethyl ether) may form spontaneously from the interaction of formaldehyde residue from permanent press fumes with acidified chloride ions often present in textile processes.

### **Cosmetology**

New complex chemicals have also dramatically invaded the workplace of cosmetologists, barbers, and hair dressers. Almost 450,000 (68 percent) of these jobs are held by women. These women risk respiratory disease because of the extensive use of aerosol, volatile dyes, detergents, solvents, and lacquers. There is some evidence they also may be at risk for cancer in the use of hair dyes.

### **Electronics**

About 115,000 women work in the assembly and manufacture of electrical machinery, equipment, and supplies. They constitute 55 percent of the electronics labor force but are disproportionately involved in the assembly of printed circuit boards, a task which requires soldering miniature components. While soldering, these women inhale cadmium fumes, a metal present in the solder flux. Cadmium has been associated with a number of health problems including: weakness, nausea, vomiting, rapid pulse, inflammation of lungs, cough, soreness of chest, "metal fume fever," chemical pneumonitis, emphysema, kidney damage, and cancer. Circuit board assemblers are also routinely exposed to sol-

vents such as trichloroethylene, a compound which has been found to cause cancer in test animals and is suspected of causing liver damage.

### **Conclusion**

What do working women have to look forward to? Changes in production technology in the industries where women are employed (such as health care, textiles, clerical and electronics) continue to create new health dangers. More and more, women face the added stress of the dual role: homemaker plus breadwinner. And they can't just quit work and go home; most employed women work out of economic need. These trends look like they will continue. □

## **Reproductive Health Rights of Workers**

### **Some Facts**

- Women or men can lose their ability to have healthy children due to workplace hazards. Sterility, miscarriages, and fetal abnormalities can be caused by some chemicals, certain viral diseases, and ionizing radiation.
- The Federal OSHA law protects the "health and functional capacity" of employees. Reproduction is a functional capacity. Yet rather than require the employer to provide a safe work environment, OSHA has proposed "special" standards for all fertile women, which would bar them from workplaces. The Oil, Chemical, and Atomic Worker's Union and the Coalition for the Reproductive Rights of Workers are among the labor and women's organizations fighting such regulations.
- A number of giant chemical and metal manufacturing companies now formally excluded women of childbearing age from chemically hazardous jobs, whether they are planning a pregnancy or not. Some women have undergone sterilization to keep their jobs.

### **Some Misconceptions**

- "Men aren't vulnerable to reproductive damage." DBCP, kepone, lead, and ionizing radiation are a few well-established agents of sterility or genetic damage in men. Reproductive hazards for men are harder to locate and prove; research is scanty.
- "Any women will bear children unless sterile." If informed about the exact nature of the hazard, a woman can schedule her pregnancy to avoid damage. Some women will not have (any more) children.
- "When a company classifies women as especially vulnerable, it means the workplace isn't really hazardous." Actually, most of the agents causing damage to fetuses are also dangerous to the nonpregnant worker. For instance, most agents causing genetic defects in offspring also cause cancer in adults — male or female. In many cases, everyone can be protected by the same kinds of precautionary measures in the workplace.

But worthwhile reforms are possible; during World War II, when it was essential to bring women into the work force, childcare centers, flexible shift jobs, and job sharing made it easier for homemakers to take jobs. Other gains have been permanent. A minimum wage, the eight hour day, and overtime pay were first granted to women and then extended to all workers. Although these advances were originally justified by sexist generalization about the "weaker sex," they have been positive steps in the fight for occupational health and safety. Recently industry has tried to exclude women from certain jobs on the pretext of reproductive health standards. Keeping women on these jobs and insisting that they be made safe may result in further advances in workplace conditions for both sexes.

Unions remain the best tool in fighting for occupational health. Organizations like Union Women's Alliance to Gain Equality (Union WAGE) and Women Office Workers (WOW) have been active in helping women unionize. This is a two part movement, both to gain equality in existing unions and to create unions in presently unorganized fields such as electronics and office work.

We must oppose attitudes that see women's work roles as unimportant and their jobs as inherently safe. Industry profits from these attitudes, justifying poor working conditions and low pay, literally at women's expense. □

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#### RESOURCES

**Women's Occupational Health Center:** Collects and interprets scientific literature related to occupational health concerns of women. Publishes a newsletter, a quarterly *Technical Bulletin*, and informational packets. Write to: American Health Foundation, 320 East 43rd St., New York, NY 10017.

**Union Women's Alliance to Gain Equality (Union WAGE):** Organizes around women's issues and publishes a newsletter. Write to: P.O. Box 40904, San Francisco, CA 94140.

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# Bureaucracy vs. Health

***Death on the Job: Occupational Health and Safety Struggles in the United States***

by Daniel Berman

Monthly Review Press, 1979

*"What happens in the workplace cannot be separated from what happens in the rest of society."*

OSHA, NIOSH, LSHI, SEOH, WIOES, PACOSH, CACOSH . . . The past decade has produced a sloshy-sounding alphabet soup of new organizations active in the medical, political, legislative, academic, and research aspects of occupational safety and health.

Daniel Berman's *Death on the Job* is not primarily a documentation of work hazards; rather, its aim is to summarize the current U.S. occupational safety and health (OSH) movement and put it in historical perspective. Berman, a long-time health activist and former director of the Medical Committee for Human Rights, has the experience and perspective to make hamburger out of that sacred cow, the industry-dominated OSH system.

The book begins with a quick behind-the-scenes tour of the current OSH movement. We find U.S. Steel in 1910 trying to find a way out of the rising cost of lawsuits brought by injured workers and their survivors. Today's workers' compensation system contains the same essen-

tial features then pioneered by U.S. Steel: partial, rather than complete, replacement of lost earnings; insurance carried by private companies; surrender of the right to sue the company for damages; and the denial of the very existence of occupational disease.

This leads Berman to a survey of the various agencies and organizations involved with the "compensation-safety apparatus," which he defines as:

That complex of mostly private, corporate-dominated organizations which are concerned with compensation, workplace inspection, standards-setting, research, and education in occupational health and safety. It is called the compensation-safety apparatus because it emphasizes compensation over prevention and safety over health.

There is interesting and valuable material here on such organizations as the propagandistic National Safety Council, the Bureau of Labor Statistics (which bases its accident figures on employer self-reporting), the insurance companies (which profited \$45 billion in compensation premiums in 1974 alone), industry trade associations (which have an unseemly influence on federal OSH standard-setting), company medicine, and more.

The activism of the late '60s and '70s brought the first serious challenges to this system. The remainder of Berman's book is devoted to extended coverage of today's mushrooming occupational health movement. This includes a short section each on over a dozen unions and a discussion of various activist groups such as the Society for Environmental and Occupational Health. (Even Science for the People gets a friendly nod.) The long-neglected field of occupational illness is also brought into the limelight with discussions of the current state of knowledge regarding long-term exposure to hazardous materials including asbestos, radiation, and cotton dust.

Berman tops it all off with a welcome (and seldom encountered) plea for international cooperation in standard setting and enforcement, and some thoughts on the future. Some of the problems he discusses are rising unemployment, export of hazardous work, declining union membership, and contradictions between union bureaucracy and the rank-and-file.

When you take too big a bite, some inevitably gets left unchewed. Particularly in the historical sections, Berman's conclusions are often more clear than the facts upon which they rest; and, in spite of extensive footnoting, enough material goes unreferenced to create some frustrations. But be forewarned (if you haven't guessed already): *Death on the Job* is not a lecture but a speech — that is, not a dispassionate discourse but a polemic, albeit a well-documented one.

*Death on the Job* is a relatively short (196 pages) reference for workers, health professionals, and lay advocates, summarizing what everyone — industry, government, unions — is doing about occupational health and why. Berman's original research and radical perspective combine to make this a valuable work for those of us who have trouble telling the players without a program in the rapidly developing OSH movement. □

# DYING FOR A JOB

by Mandy Hawes

Between 1964 and 1969 George Zerwas ran a reflux asphalt extractor at a soil-testing company in the Midwest. The procedure called for heating the "universal solvent," benzene, so that its vapors would pass through an asphalt sample to a condenser, and then drip back down through the sample, separating out impurities. After several hours of repeating this process, George would remove the sample for drying. Twice while George Zerwas was on this job the extractor blew up, leaving him in a benzene "torch." But even when everything went as scheduled, the benzene vapors were strong: their odor carried to the floor above his basement work site. (The olfactory threshold for benzene is 1,000 milligrams per cubic meter, or about 300 parts per million. The lower and upper explosive limits for benzene are 1.3 percent and 7.1 percent of total air volume — 1,300 to 7,100 parts per million).

In the spring of 1974 the National Institute for Occupational Safety and Health (NIOSH) issued a "criteria document" on benzene which summarized the substantial body of medical literature accumulated over decades, documenting the association between chronic benzene exposure and dramatically increased leukemia risk. A year later, in May 1975, at age 29, George Zerwas was having back trouble and saw his doctor for some routine diagnostic tests. The results showed a positive diagnosis: acute lymphocytic leukemia.

For a time, George's disease was kept in remission. By 1977, however, it began to interfere with his ability to work. In April 1979 he entered the hospital for another round of treatment, and although he always intended to return to his job, he was so ravaged by his disease that he was never to return.

Meanwhile, the petroleum industry, together with manufacturers and industrial users of benzene, were engaged in another battle, one in which they were having

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decidedly more success than George Zerwas was having in his lonely struggle against leukemia. The industrial battle was against the enactment of an emergency benzene standard of one part per million. This standard, promulgated by the federal Occupational Safety and Health Administration (OSHA) in 1978, derived from a mountain of evidence which indicated that this human carcinogen needed very strict control. Industry did not try to deny the strong causal link between benzene exposure and a greatly increased risk of leukemia. Rather, they argued that in setting a one part per million standard, OSHA had failed to give adequate consideration to what it would cost American industry to attain it.

The federal courts have thus far sided with the petroleum companies, and OSHA's emergency benzene standard, issued almost two years ago, may never go into effect. At the moment, advocates on both sides are



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awaiting a decision from the United States Supreme Court, which heard oral arguments on this cost-benefit issue last October 10, just four days before George Zerwas died of leukemia at the age of 33, leaving a wife and child. To anyone touched by the human tragedy of toxic chemical exposure, arguments about costs and benefits are painful to hear, and the OSHA standard, while gratifying, comes late.

The cost-benefit argument appears repeatedly when industry puts up resistance to improved occupational standards. Under the current standards, industry bears the cost of workers compensation insurance, augmented sometimes by a citation from OSHA. Considering the cost of technological improvements that would be required by tougher standards, it is cheaper for industry to continue exposing workers to carcinogens, mutagens, and other toxic horrors, than to clean up toxic environments. Since it is very hard for workers to prove that their cancers and other disabilities are industrially-induced, it is hard for them to win claims for compensation. While tougher standards, if met, would strengthen industry's position in compensation cases, by assuring safer environments they would hopefully reduce the number of such cases.

### Toxic Substances: The Issue for the '80s

Until chemical manufacturers are taken to task for supplying unsuspecting workers and other purchasers with chemical time bombs, we will all be relying, to our peril, on a philosophy roughly the equivalent of "Better

Profits, But Often Worse Living, Through Chemistry." Even before the question arises of how to control the mind-boggling number of chemicals used in U.S. industry, health advocates clash with industry over the basic question of whether people have the right to know the name and the perceived hazards of substances with which they are working. Citing everything from supposed trade secrets to the potential confusion that disclosures might produce in the lay public, opponents of workers' right to know reached a new low when they appealed to the lack of bulletin board space as a reason for not posting information. They argued that since no plant could possibly post all the material safety data sheets that bear on environmental health, it is therefore better not even to try to share the scientific community's state of knowledge, *or ignorance*, regarding possible health consequences of certain industrial exposures.

This sort of calculated refusal to disclose known and suspected risks of certain industrial compounds and processes, has become a pivotal issue in claims brought by disabled workers against such corporate giants as Dow Chemical, Johns-Manville, and Hooker Chemical. In these cases, the charge is 1) fraud, and 2) conspiracy to withhold information about human health risks, on the apparent rationale that cognizant people would not willingly elect to work around such things as the sterilizer DBCP or the carcinogen asbestos without protection against exposure. Since protection of this kind would be more costly to the employer than paying workers compensation (the typical remedy for workplace injury or disability), workers are now asserting

that corporate greed prompts very calculated decisions by employers and third party chemical houses not to disclose health risks to innocent workers, and that such bad actors should not be immune from civil liability for their conduct.

As we enter the 1980s, these themes — fraud, conspiracy, cost-benefit — are fast becoming buzzwords in the area of job health and safety. Perhaps it is the enormity of the tragedy that forces us to grasp for shorthand buzzwords rather than dwell on the details of the small personal tragedies occasioned by toxic exposures on the job. But if we are to be effective in combatting these evils we must look at the specifics. We must document cases, measure air samples, learn to take sound occupational health histories, search far and wide for data and evidence and also for the allies whose support and encouragement are so vital.

In that regard, it may be instructive to examine some job health developments in one of the nation's fastest growing industries, electronics and semiconductor manufacturing. In California's "Silicon Valley," 26 percent of the work force is engaged in electronics work, and the overwhelming majority of production workers are women of childbearing age. Competition is fierce both for profits and for human talent. At the same time, while the industry projects an image of clean, light, advanced technology, the reality of much production work is a nightmare of toxic solvents, poisonous gases, and corrosive acids, to which workers are exposed daily with little or no personal protection and often under poorly ventilated conditions.

Two years ago I sent for a NIOSH pamphlet called "Know Your Solvent," hoping it would provide me with basic information about at least one class of industrial hazards faced by friends and clients who work in "Silicon Valley." I was dismayed to find that the pamphlet was essentially a series of bromides about being careful around solvents, and contained little discussion of acute or chronic health risks associated with specific exposures. Rather, the NIOSH writer advised, "When in doubt, ask your supervisor." It struck me that either the pamphlet was a joke or the writer was terribly naive. Since when has it been efficacious for a concerned worker to ask her supervisor about the possible health risks of inhaling such common solvents as trichlorethylene, methylethyl ketone, 1,1,1-trichloroethane or xylene (frequently contaminated with benzene)? Indeed, several women who, following long-term exposure to toxic wastes coursing through a malfunctioning ventilation system, became hypersensitive to their environment, asked their supervisor early on about a possible relationship between their acute symptoms and their exposure to TCE vapors. In response to their inquiry they were told they were simply exhibiting female hysteria.

In electronics and semiconductor manufacture, solvents are essential to certain production processes. If we

are to have the benefits of electronic technology, it appears inevitable that electronics will work with solvents, notably chlorinated hydrocarbons. This fact should not mean, however, that assemblers need to be subjected to toxic vapors strong and numerous enough to induce nausea and vomiting, headaches, dizziness, depression, menstrual irregularities, vision problems and kidney disorders, to name some of the problems now being documented. In theory at least, there are OSHA standards for exposure to each and every solvent used in this industry. Likewise, there are OSHA standards for the ventilation system that the employer must have to insure not only that these OSHA standards are not exceeded, but also that as a bottom line there are no exposures which result in human harm.

But while the principles of setting and complying with OSHA standards seem straightforward, there are a number of reasons why workplace hazards persist, in electronics as in many other industrial sectors. The benzene story may only be the beginning, in other words. In a short space the limitations of standards-setting and enforcement can only be catalogued, but that in itself may be useful. First, existing standards for industrial chemical exposure are based on what a hypothetical "healthy adult male" (under 30, 180 lbs.) is presumed able to tolerate over an eight-hour shift without adverse effect. This premise overlooks the difference in weight between American men of European stock on the one hand, and most minority workers and women on the other; it also fails to take into account that women, with proportionally more fatty tissue, may thus be much more vulnerable to assaults by fat soluble chemicals. In addition, it overlooks the fact that many workers, men as well as women, are not healthy anyway, and that factors such as speedup, noise, racism, sexism and other physical stressors make many of us something less than the superworkers the standards might conceivably protect. Further, the premise of an eight-hour exposure means that workers who customarily work a ten- or twelve-hour shift may be severely overexposed, even if the threshold limit values specified in the standard are never exceeded. Again, with the exception of OSHA's lead standard, existing standards do not consider possible reproductive risks of exposure. Attempts to bring this vital factor to bear on the question of industrial exposures have produced some frightening suggestions from industry, like the recent proposal by the California Manufacturers Association that reproductive risks be obviated by hiring senior citizens to work in toxic environments. Finally, unlike the benzene standard, most OSHA standards were adopted wholesale from industry when the Administration came into being in 1970. Never studied or scrutinized, neither have they ever been revised.

As new data emerge linking entire classes of chemicals with grave cancer risks, workers and their advocates

will have to step up pressure for stronger standards, as industry's resistance is likely to be massive. Job health advocates can advance the campaign for tighter standards by: 1) documenting acute health effects experienced during or after handling or inhaling the substance(s) in question; 2) documenting the types of controls and equipment that furnish protection from direct and indirect exposures; 3) requesting that NIOSH perform Health Hazard Evaluations, including health monitoring as well as site visits; 4) petitioning OSHA to begin the standards-setting process; 5) gathering evidence on the human toll taken by toxic exposure, in anticipation of the inevitable claim that stricter regulation will force massive economic dislocation, job loss and even bankruptcy.

In addition to the foregoing suggestions, we must bear in mind that even the most stringent OSHA standards will not take the place of rigorous shop-floor demands for a safe and healthful workplace. OSHA standards, even when they are enforced, represent a compromise between recommendations based on scientific research and those based on the political feasibility of adopting and enforcing a given standard. This most unpleasant fact of life in a capitalist society means that occupational health advocates must see OSHA regulations and OSHA's enforcement program as necessary but hardly sufficient protective measures — a bottom line on working conditions, which can be improved by concerted activity on the shop floor. Such activity ranges from petitions to collective bargaining, from right-to-know campaigns to mandatory health monitoring and health and safety walk-outs.

None of these important campaigns will be won

overnight. There will be heavy employer resistance and many workers will understandably hesitate to take risks, especially in unorganized industries, like electronics, where the assembly lines are staffed by workers who can find no other work and who work to survive. There comes a time, however, when the risk of speaking up may seem minor compared to the risks of disability or death from toxic chemical exposure. In its work with "Silicon Valley" workers, the Electronics Committee on Occupational Safety and Health (ECOSH) has seen a number of frightened and financially insecure people decide to take that risk, and clearly more will follow as evidence of some of the potential long-term risks of electronics work begin to emerge. In counseling workers about taking such a step, ECOSH stresses several points:

- All workers have an absolute right to know what substances they are working with and the risks associated with them.
- No one should be forced to choose between his or her job on the one hand and life and health on the other, nor should any worker, male or female, have to sacrifice reproductive capacity as the price of a job.
- Regulatory agencies respond in proportion to the clout wielded by those calling upon them, and unorganized workers must reach out for support if their demands are going to be heard.
- No rational capitalist will disclose the human health hazards of a profitable chemical product unless it pays to do so.
- No rational capitalist will clean up the workplace unless and until it pays to do so.
- The lives we save had better include our own. □



HEAR NO...



SEE NO...



BREATHE NO...

G. Frederick/LNS

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# MASS PSYCHOGENIC ILLNESS

by Laurie Case

Among the workers in California's "Silicon Valley" a variety of symptoms have been noted which seem to affect both individual workers and groups of workers at once and which often tend to disappear over the weekend, only to resurface Monday morning. These include nose bleeds, skin rashes, dizziness, headaches, fainting, and nausea. When researchers have investigated workplaces but have been unable to find persuasive evidence of toxic substances or other officially recognized environmental health hazards, they have revived and renamed an age old diagnosis, Mass Hysteria, and labelled these outbreaks "Mass Psychogenic Illness."

## Who Is Most Likely to be Labelled Psychogenically Ill?

Curiously, 90 percent of the workers said to exhibit mass psychogenic illness are women. Many of them do assemblyline work in the burgeoning American electronics industry which employs more than a quarter of the workforce in California's Santa Clara County.\* Seventy-five percent of all electronics production workers are women, and some 40 percent of these women are Third World, mostly of Spanish or Asian descent.

In this industry, where companies compete to increase production, speed and dexterity are at a premium, the work is extremely stressful and painstaking, and little is known about the toxic effects of the chemicals used. At \$3.28 per hour, the average starting wage is so low that women who head households often need welfare subsidies to survive. (These payments constitute an indirect subsidization of private industry by government.) Until recently, working conditions for assemblers have not been a concern of the industry.

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*Laurie Case is a freelance writer involved in the health care community in the Bay Area.*

## Sexism and Psychogenic Illness

Taking their cues from Freud, psychologists have traditionally argued that women are prone to hysteria. Michael Colligan, a clinical psychologist for the National Institute for Occupational Safety and Health (NIOSH) has modernized this argument for industry, holding that the sex bias of mass psychogenic illness reflects traditional sex roles which allow women to express psychological stresses and emotions, but require men to "bear down and suffer." The point, however, is that the predominantly female electronics assembly workforce is subjected to potentially hazardous and stressful work conditions. The work is carried out in plants that are often poorly ventilated, and the workers are exposed to hundreds of harmful chemicals: organic solvents such as TCE and chloroform; lead, arsenic and other metals; caustic acids; exotic gases such as arsine and phosphine; polychlorinated biphenyls (PCB's), epoxy resins and numerous other substances.

The work these women do is not only low paying; it is incredibly monotonous with little opportunity for creativity and advancement. They are constantly pressured by speed-ups, excessive demands for overtime and infrequent breaks. They are kept in the dark about the potential toxic effects of the chemical agents and processes with which they work. Importantly, they are mostly unorganized and thus lack the more usual channels for effecting changes in workplace conditions. When these factors are considered in combination with exposure to potentially toxic chemicals, the unexplained outbreaks of illness become understandable.

## Is Mass Psychogenic Illness Diagnosed Scientifically?

At 8 a.m. on May 10, 1979, four female electronics workers at Verbatim, a manufacturer of computer parts, began feeling dizzy, then severely nauseous. A hazy layer of air was seen hovering above their work station. The entire building was ordered evacuated, for many workers were experiencing similar symptoms and

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\* See also Mandy Hawes, "Dying for a Job," this issue, for further discussion of electronics workers.

35 were taken to a local medical clinic, where they were examined and promptly released. Occupational Safety and Health Administration (OSHA) representatives and a doctor conducted a walk-through inspection of the plant, and by noon management declared that full production could be resumed because there was no danger from toxic compounds. At 1:30 p.m. the first environmental sampling confirmed management's as yet unfounded conclusion. In a follow-up report issued two weeks later, an investigating OSHA physician, Linda Garb, summarized the incident at Verbatim:

It is my opinion that the most likely explanation...is mass psychogenic illness. Neither the industrial hygiene nor lab tests provide evidence which could otherwise explain the incident.

Colligan, Smith and Hurrell reported at a 1979 NIOSH conference on occupational stress that a diagnosis of mass psychogenic illness is "arrived at by a process of elimination and is based on impressionistic evidence." In other words, when no officially sanctioned set of physical conditions appears to be violated, researchers resort to the label mass psychogenic illness. Given the time lag between eruptions of illness and inspections, though, physical conditions are hard to assess with any accuracy; and even where it can be established that no violations occurred, OSHA guidelines are often inadequate. That is, a workplace might conform to OSHA standards and still be hazardous to its employees' health. For example, the toxicity of combined chemical effects (known as synergism) is poorly understood.

### The Real Dangers of Mass Psychogenic Illness

The illnesses these women experience are indeed real and they merit careful scientific attention. The label mass psychogenic directs scientists to look to workers' psyches for causes and solutions, meanwhile ignoring potential physical workplace hazards and stressful conditions. It allows scientists to translate their investigative inadequacies into "respectable" jargon and lets industry off the hook. Poor investigative procedures and jargon must never be allowed to masquerade as science. They must not be allowed to sidetrack efforts to discover critical environmental causes of the physical symptoms these assemblers display; workers must not be blamed by labelling as "hysteria" their physical reactions to very real stress-producing conditions. In short, the concept of mass psychogenic illness must not be allowed to divert attention away from the need to develop better methods for detecting and rectifying the effects of toxic substances, of the kinds of stressful working conditions these women encounter daily and of their synergistic interactions.



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### Implications of Research on Mass Psychogenic Illness

Research identifying the mental correlates of occupational disease has already generated some disturbing products. NIOSH's recently developed personality-trait questionnaire to identify the "hysteria prone worker" is one such product. If adopted, this sort of questionnaire (assuming it works with any reliability) allows industry to become more discriminating in its personnel decisions, meanwhile neglecting the toxic environments of its workers. (See Jon Beckwith's article in this issue for a discussion of medical research efforts to identify genetic "propensities" for occupational diseases.) These developments are dangerous because they shift the burden of hazardous work onto the industrial worker, thus creating the potential for denying protection, treatment, and compensation for job-related illnesses. Furthermore, they create the potential weapons for eliminating "unsuitable" and "undesirable" job applicants and employees. Ultimately they give industry a long term license to endanger the lives of workers. □

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# INDUSTRIAL GENETIC SCREENING

by Jon Beckwith

"Next Job Application May Include Your Genotype, Too"

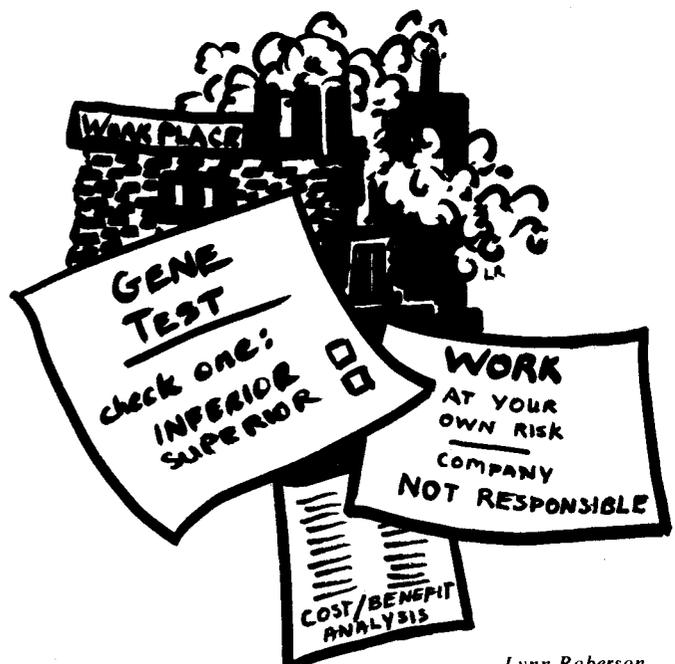
— *Houston Chronicle*, April 4, 1975

This newspaper headline reflects the trend in scientific and industrial circles to attribute occupational disease to the genetically susceptible worker. The connection has been made possible by recent developments in human genetics linking certain genetic disease states with the increased risk of specific diseases. While so far such examples are limited, the following ones appear to be among the clearest. Problems in the clearance of cholesterol, which can lead to heart disease, are in some cases due to well defined genetic defects referred to as familial hypercholesteremia. Genetic variations in certain proteins found on the surface of human cells (HL-A antigens) have been correlated with diseases such as ankylosing spondylitis, a progressive deterioration of the spinal cord. Individuals born with only very low levels of a protein called alpha<sub>1</sub>-antitrypsin due to the presence of two altered genes (homozygous defectives) have a high probability of developing emphysema.

Although this research can certainly benefit individuals by helping them avoid the specific environmental insults triggering disease states, it also poses a threat to the occupational health movement. For at a time when many labor unions and scientists have finally become effective in fighting to reduce the use of toxic agents in the workplace, "genetic susceptibility" is an asset to industrialists. It allows them to argue that the pollutant-caused disease we see among workers cannot really be ascribed to the pollutant itself, but rather to the genetically-susceptible individual. The solution, then, is not to clean up the workplace, reducing or eliminating the exposure, but rather to screen out those workers who are most likely to be afflicted. But even in those few cases where a real correlation has been established between a genetic trait and susceptibility to a particular

disease-causing agent, the supposedly "non-susceptible" workers are still exposed to considerable risk. And yet, these arguments are used to suggest there is no need to reduce occupational exposure to pollutants, and thus to maintain the high level of disease found in many industries.

The use of such arguments to avoid improving working conditions is not new. Earlier in this century, industrial spokesmen suggested that work-related accidents were caused by accident-prone workers instead of poor safety conditions. More recently, several industries in which high lead exposure is common have essentially forced women of child-bearing age to get sterilized. They have done this in lieu of reducing lead levels which endanger both male and female factory workers.(1,2) Dow Chemical and Dupont have instituted genetic screening programs for a number of differ-



Lynn Roberson

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ent genetic traits including sickle-cell trait and *partial* alpha<sub>1</sub> - antitrypsin deficiency, both heterozygous states.(3,4,5) In both cases the evidence for disease susceptibility for the heterozygote is very weak or non-existent.

### Responsibility of Geneticists and Genetic Screeners

Scientific and medical research are not apolitical. Social, economic and political forces affect what research is done, how it is done and how it is used. When researchers studying genetic susceptibility publish such statements as, "Screening tests may become commonplace in industry where such exposure occurs, so that the employer can protect potential employees who are genetically susceptible from being placed in positions detrimental to their health,"(6) they are unwittingly lending their support to one side in a societal struggle.

In an unequal set of economic relations as exist within American industry, scientists must work extremely hard to see that on matters of health all sides are considered equally. This means they will have to forge links with workers and progressive unions who are struggling over occupational health issues. They will have to take special pains to emphasize the broader issues of reducing to an absolute minimum exposure to pollutants. If scientists do not get involved in pushing to clean up the factories, they may find their work being used to cause more harm than benefit to people.

### Genetic Susceptibility and Environmental Pollutants

The dangers posed by research on genetic susceptibility extend beyond the struggle for occupational health and safety. They pose threats to the environmental and nutrition movements as well. The latter have made great gains in alerting the public to the dangers of increased pollutants in the atmosphere and of chemical additives in our foods. Moreover, the 1970 Clean Air Act and the activities of the EPA and FDA have had a positive impact on government policy. However, in a new report prepared by a National Academy of Sciences Committee, we see the arguments of genetic susceptibility presented in a way that can blunt the effects of these movements:

But in societies of abundance, differential selection acts through the agencies of individual habits and ways of living, as well as through pollutants, drugs, chemical additives, and special occupational exposures almost too numerous to count. If one were to make universal preventive rules to cover such a multitude of threats, the life of asceticism such instructions would dictate would offer little fulfillment, and in any case human nature would

cause them to be little honored. But to point out to a specific person the conditions under which his particular endowment may fail to protect him from impairment of his health offers some chance of rational behavior on his part.(7)

While clearly there is some truth to this analysis, this focus on the susceptible individual, instead of on societal changes, reflects a social perspective, not a scientific one. In effect, scientists have put themselves on the side of corporate powers in their struggles against a growing movement of people insisting on the right to take control of their own health.□

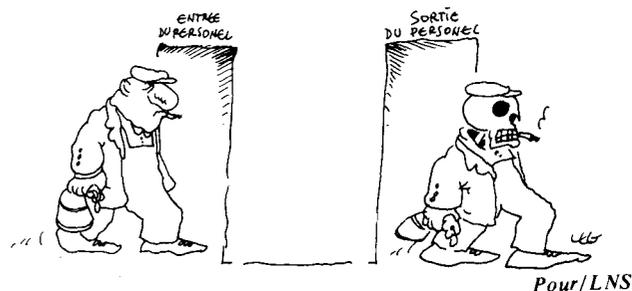
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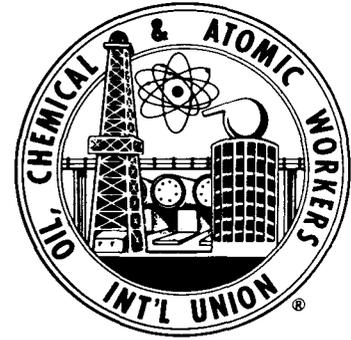
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Since the writing of this article, a recent series of *New York Times* articles entitled "The Genetic Barrier: Job Benefit or Job Bias" has appeared. They give an excellent summary of the issues and present important new details on genetic screening in industry. (The series began Sunday, February 3, 1980, and continued for 3 more days.)



# MOLLY COYE, HEALTH ACTIVIST FOR THE OCAW



*Molly Coye is a physician and chief of the Occupational Health Clinic at San Francisco General Hospital, and an advisor to the Oil, Chemical, and Atomic Workers Union. She has a background in both Russian and Chinese studies and has traveled extensively in Cuba and China. She was active in anti-war work and in support of recognition of the People's Republic of China.*

**SftP:** *You said that your trip to China led you into health care. How did that happen?*

**Coye:** I had been to China in February '72, and I spent two years giving lectures on China. When I talked to people about worker control of the factory, their eyes glazed over. But when I talked about a health care system which was run by the community and in which many of the people doing health care work identified themselves as community members and not as health care professionals, that got them very excited. I ended up going into medicine. That was a way to organize groups politically in America rather than simply appointing myself as missionary to the community.

Issues of health care are close to God, Mother, and apple pie. It is easy for someone who has been raised in the U.S. to say that of course there is labor, of course there is management, and of course management makes profit off of labor. It doesn't sound quite the same to say that of course there are doctors and of course there are sick patients and of course the doctors make a profit off the sick patients.

**SftP:** *Is there much training in occupational health and safety in medical school?*

**Coye:** The national average is less than ten classroom hours. I would say at Johns Hopkins we had far less. Usually the approach is to think there are a few specific diseases that are of occupational origin and that the majority have nothing to do with it, whereas the point of view that some of us take in the field is that there are very few symptoms that could not be caused or exacerbated by work. It is frustrating because I know that in other countries there is a great deal of education in occupational medicine.

I was suspicious of much of what was taught. For example, the chief of the urology department was a man who had operated on a large number of workers for bladder cancer. He knew that the reason they were getting sick was their exposure to aniline dye but had not informed either the workers or the union. My conclusion was that a great deal of what they would teach us was suspect. There is some very good literature in support of the fact that you can buy your doctor — you can find doctors who are biased and if you find the right one and keep hiring that doctor you get the results you want.

**SftP:** *So you think there's a conflict in the minds of some doctors, not only about healing people, but also staying in business?*

**Coye:** George Bernard Shaw pointed out that you pay a baker for the number of loaves he bakes and you pay a surgeon for the number of legs

that he cuts off. You don't pay him to keep a patient healthy. If you look at academic-based physicians, very few consciously think of trying to maintain illness; I do think you get closer to that danger zone when you talk about a company-paid physician, who's being paid not to prevent illness, not to bring it up or not to tell the patient about it.

Occupational medicine is an uncertain art and physicians don't like uncertainty. To venture into an area where they know there may be 70,000 chemicals of various toxicities that workers are exposed to and they don't know what any of them does — they're opening a Pandora's box and they don't feel very secure about it.

**SftP:** *You've been active in occupational safety and health with the Oil, Chemical, and Atomic Workers Union (OCAW). Can you tell us about that?*

**Coye:** I've been with OCAW about four years. As a medical student, I took part of my training with them. OCAW has been one of the most progressive unions in occupational safety and health. They were instrumental in the passage of the Occupational Safety and Health Act in 1970, and have been one of two or three unions that consistently brought OSHA to court to force them to promulgate standards. A good deal of this work was developed by Tony Mazzocchi, who was Vice-President and is now Director of Health and Safety.

One of the hardest things for people to accept is that you can't do anything about health and safety

without a union. People at the bottom — Blacks, Chicanos, Filipinos, Vietnamese — lose out in every way. They have more exposure, are paid less, and are less likely to be unionized. *People working with the unorganized on health and safety are most honest when they don't promise to be able to do anything until the workers are organized into a union.* It's hard enough even with a good union behind you to take on a management determined to fire people who are agitating around health and safety. The protection under OSHA says the employer can't discriminate against an employee for having been active on health and safety. There have been successful cases but you're talking about three or four years in court with no salary.

**SftP:** *How does OCAW handle occupational health and safety?*

**Coye:** OCAW was one of the first unions to set up a health and safety department. They have employed a full-time industrial hygienist since 1975. They also have a Health and Safety Coordinator who edits their monthly newsletter. They hired a physical chemist for a couple years in the early '70s. They got a grant from OSHA two years ago to hire five doctors to work in the health and safety department. They also have had student internship programs for many years for hygienists, nurses, etc.

They have been instrumental in attempts to get new legislation passed, and to use the courts to enforce legislation. They have, as of two years ago, a new program where, in each district in the country, a member of the rank and file gets paid time to leave the plant, train at headquarters in Denver, and then travel around the district visiting different locals and working on development of health and safety committees.

**SftP:** *How do things stack up when you're up against company experts?*

**Coye:** The range of exposures about which the health and safety department has to be knowledgeable

is tremendous, as you can see by imagining the exposures you have in such a union. In a negotiating situation, there are company-employed hygienists and physicians who know the ins and outs of their set of exposures. Going against them, the union docs or hygienists have had maybe three or four hours to put through some research before negotiations or court. So you have a thin spread of resources. The only hope is that the unions' small professional group can be used as backup to very strong health and safety committees within the locals.

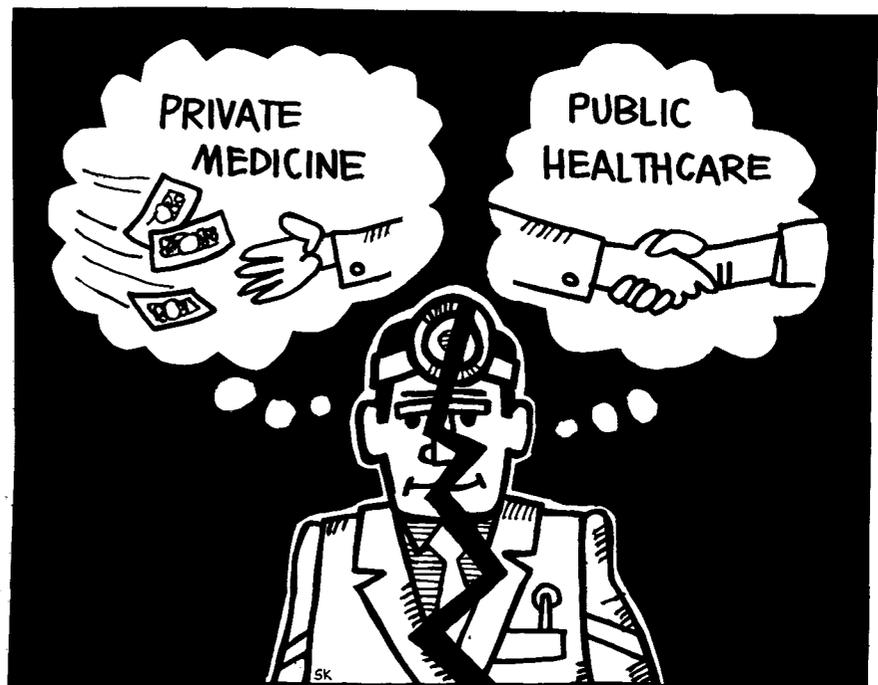
I try to respond to lots of different requests and do as much as I can with a small amount of time. Another response would be to learn everything there is about the hazards of, say, lead, so you can be the pro-union advocate. We need people who concentrate on one particular substance, though in some cases you don't need specialists.

There's a great story. Back in 1976, the first case I went into for OCAW, I went to negotiate a medical plan and protection for workers exposed to mercury. I was a fourth year medical student then. I did basic reading in the texts and came with xeroxes on mercury and the existing

legal standard: a blood level of 10 mcg/ml. The company paid for the national expert on mercury effects to come in on their side. The fellow said that he didn't worry about levels of 50 to 100 mcg/ml, which many of these workers had! In several factories he'd worked with, people had been up to 200, and he didn't think there was any real harm done! All I had to do was read chapter and verse from the medical texts to the negotiating committee for the union to feel tremendously strengthened that they had right on their side.

**SftP:** *Some of the entrenched unions see health and safety as a threat. Who's supporting it and who isn't?*

**Coye:** One of the most dangerous postures to get caught in right now is that of attacking unions. What you're looking at is one of the contradictions of industry under capitalism. With increasing productivity of work and the introduction of new materials with industrialization, there also results an increasing sophistication of the work force. In this country, older workers are more comfortable with safety questions, whereas younger workers, influenced by the environmentalists of the '60s, may be more open to the concepts of chronic disease, delayed



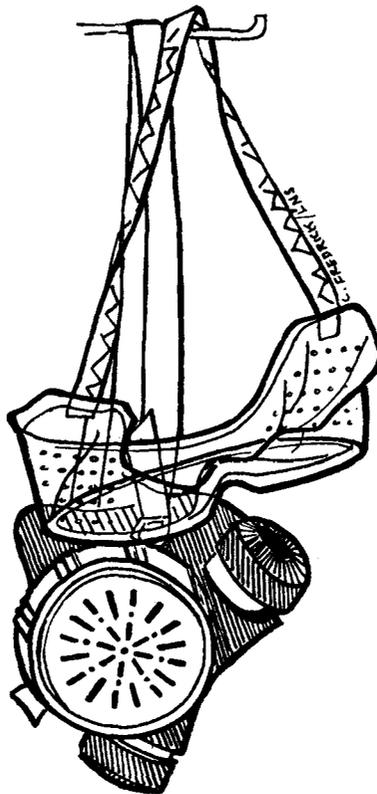
disease, cancer. On the other hand, older workers are seeing their peers dying off with these cancers and lung diseases and want to protect the next generation. Part of the next generation is saying, "What the hell, I'm going to die of cancer anyway, why protect myself?" So, it cuts differently in each local you work with.

**SftP:** Now we have OSHA, largely the result of union legislative pushing. What can be done next?

**Coye:** There are issues which are tremendously important. An example is 'right-to-know' legislation. It's good to organize around because it's obvious to workers that they ought to have that right. A labeling standard has been formulated by OSHA. There'll be many battles over the actual obtaining of the information, battles over trade secrets, proprietary rights, etc.

There have been several stages, beginning with the concept of safety as the number one health problem in an occupational setting and compensation as the way to deal with that. Then in the '60s and '70s we moved to the concept of chronic or delayed-onset disease, and the idea of prevention of exposures to certain chemical and physical agents. In the '70s, we've begun to emphasize stress. Workers are talking openly about the links between speed-up, shift-work, and other questions of the work process. *To the extent that we can redefine occupational disease as disease that results from all aspects of the work process, we can redefine the issue as control of the work process itself.* Then we'll be headed in a good political direction. Occupational disease can be conquered only by the preventive step of controlling the processes themselves. Illuminating this is really our role as health professionals.

**SftP:** Many people think that we have to accept occupational hazards in exchange for a high standard of living. This argument is applied not only to occupational health and safety, but to environmental issues. How do you respond?



**Coye:** With two answers. There are different levels. In terms of workplace, the way you have it now, workers get all the risks and management gets all the profits. One way to approach this with workers is, "Let's equalize the situation. Let's redistribute profits." That's talking standard of living. When management raises, "This is going to cost something," raise the issue of the profits of management and why some of that shouldn't be redistributed for health and safety. Obviously, what you're headed for is redistribution of profits on a larger scale. What you're using health and safety for is to get at that larger

question and also point out that those profits are being taken at the cost of the risk the workers incur. *What we are talking about is equality of access to what are the presumed benefits of our level of industrialization and consumption.*

The second level of the question is, "What's the real cost to society?" This is one of the hardest things to raise at the same time you are discussing the first issue. The major point is, in the 4000 years we have had written history and civilization, there has been no change in our bodies' protective mechanisms. We are not designed for most of the assaults on our bodies in the environment or in the workplace — not just synthetic materials, but things which are natural, like asbestos. We're exposed at a level which was never possible 4000 years ago. *The question is not whether to have a lower standard of living, but what materials we will use to construct our higher standard of living; we're never going to be able to deal with it until we have socialism, because the issue of equality of access is always going to take priority.* The second level is going to be seen as a luxury of the middle class, which it is at this point. I don't think you can successfully use the second issue as an organizing issue in a capitalist society. That has been one of the failures of the environmental movement. But it is a real issue and if we don't get socialism we'll never deal with it in time — we'll mutate ourselves off the earth, or whatever.

The basic contradiction is between productivity — and in capitalist models development is defined as increasing productivity — and worker health and safety. The contradiction is blatant under capitalism. What happens to it under socialism? Is this the "declining productivity" which appeared in the early '70s in China? Do you sacrifice worker health and safety, or do you find some other ways of stimulating productivity? There is a bottom floor level of productivity you have to maintain to feed society, and the issue in China was that there was

such a drop that there were actually hunger marches and a real dislocation of society.

**SftP:** *You've seen some socialist models of occupational health and safety. What have you learned?*

**Coye:** There are a couple of things I saw in Cuba. They have enormous strength in the health care system.

The organization of primary health care promotes awareness of occupational health problems in the community and factory. Beyond the fact that all workers have free health care, each community health center — 'polyclinics' is what they're called — is responsible for sanitation of all workplaces in its area. They do in-

spectations on an annual basis to enumerate hazards and, in the case of national priority hazards, do medical testing. They almost never see acute lead poisoning anymore. Every worker exposed to lead is identified by their polyclinic and receives a minimum once a year screening. If found to have an elevated

## San Francisco Worker's Clinic

Few clinical facilities in the United States offer a worker medical care that includes adequate consideration of the possibility that one's job may be hazardous to one's health. For more than a year now, such a facility has been in operation at San Francisco General Hospital. Located in one of the hospital's clinical spaces one evening a week, the Occupational Health Clinic offers much more than medical care. Information on hazardous exposures and legal assistance are also available.

About half the patients are referred by their unions, and this proportion is increasing. Interest from unions has been strong, and the Clinic has provided much information helpful to unions in battles over health and safety. In fact, one-third of the patients have no medical complaint at all, but want education about some aspect of their workplace.

The cost to patients follows a sliding scale or is picked up by the worker's insurance. Lab costs are paid for by the patients, but Clinic staff is seeking funding for this. No one is turned away for lack of money.

The volunteer staff consists of about 40 people, with half assigned each Tuesday night. Staffers speak Spanish and Chinese. The twelve physicians come from the hospital house staff and faculty, as well as from local community clinics. Among them are a toxicologist, a pharmacologist, and an occupational medicine specialist. There are seven industrial hygienists and 15 health educators, who serve as patient advocates. Four lawyers are on staff and sit in when legal questions arise. Most of the staff came to work at the Clinic with the idea of doing political work in a unique setting. The Clinic works with the newly-formed Bay Area Committee on Occupational Safety and Health (BACOSH), with BACOSH doing much of the extensive outreach.

Each patient sees a team of three: physician, hygienist, and patient advocate. An initial evaluation takes about an hour and a half, including a physical examination and tests if needed. There is a discussion about what the plan is, and what follow-up might be needed. A large number of patients come in for only one visit, because they've already been diagnosed as having some condition and they want to

know if it might be work-related. The Clinic does not routinely handle Worker's Compensation cases, due to staff time limitations; but if a case shows promise of expanding the definition of compensable disease, the legal staff will work on it. In addition, educational materials are dispensed and liaison work is done with the patient's union.

Between weekly sessions, appointments are taken and both preliminary and follow-up research is done. As one staffer explained, "When a patient comes in and reports 20 chemicals at their worksite, you do a lot of scrambling to look them up." In addition, Clinic committees meet: outreach, education, steering, and a group for each profession within the Clinic. Administrative work is done on a rotating basis.

Not all of its work is done within hospital walls. Staff members will monitor worksites and do epidemiological studies. In one case they worked with a union to design a questionnaire, collect information, and complete the research to identify a baffling clinical syndrome among workers in a new building.

Over the course of its year, the Clinic has gone through many discussions about the nature of the work, for given the social context of occupational medicine it is not a purely medical enterprise. There have been struggles concerning elitism, and an effort is always made to keep the professionals in touch with the direct patient needs.

Especially obvious is the limitation of only being open one night a week. Were it a full-time facility, it could accomplish far more than simply seeing a larger number of patients. As one staff member put it, "We're a fly in the ointment of the normal functioning of the system. We're far more symbolic than our actual ability to deal with the enormous number of occupational health problems. We're a model of the fact that there is such a thing as worker medicine. There is such a thing as lawyers, health educators, physicians, and industrial hygienists who want to work for workers." □

—Molly Coye



*"I think the safety record of our plant is excellent - especially when you consider how dangerous it is to work there."*

blood level the worker is withdrawn from work at full salary and an investigation is made with authority to shut down the place for modifications. Identifying the hazards in each workplace and having a national priority system [for assessing hazards] is an incredible achievement even for an industrialized country, and in an industrializing country is a major challenge.

There are production assemblies at every work unit once a month, which 70 to 80 percent of the workers attend. All inspections of health and safety must be reported to the assemblies, and at the next assembly the administration has to answer with their plans to meet the criticisms. Every productive unit must include a budgeted item on health and safety in the administrative plans which are submitted to the appropriate industrial ministry each year.

Most workers are involved in 'emulation campaigns,' a combination of moral and material incentives to stimulate participation and productivity. One of the five points which workers must "emulate" to win a prize is 'health and safety.' A

work group will not win their prize if one or two members are careless. Therefore there's a lot of peer pressure built into the system.

All workers have pre-employment exams and yearly exams. At present, these are only very cursory exams designed to detect TB, VD, and other communicable diseases. One of the major projects of the Ministry of Public Health is to design more specific preemployment and periodic exams.

**SftP:** *Did you get any information on stress situations?*

**Coye:** Every local in the plant has a health and safety representative who has a kind of "welfare" function of identifying people who are troubled. They can go higher up in the union or to the polyclinic. There is a clear recognition in every polyclinic I was in that people experience stress at work. I've never heard anything about stress reduction therapies or ways to make people adjust to stress. Their attitude seemed to be that either the work conditions should be changed or the person should be rotated out. But it's not talked about very much, and after a few weeks there I realized we were talking in

terms of chemical and physical hazards almost exclusively.

As a matter of fact, it was ironic. When I was asked to give a talk on 'Occupational Health and Safety in the United States' recently at the end of my second visit, I talked in terms of physical and chemical hazards, reflecting their interest in that. When finished, there was a question-and-answer period. Half-way through, a guy stood up, said he was a psychologist working in occupational health, and was very puzzled that all I talked about were chemical and physical hazards. "Don't you think there is any role for stress in disease?" I thought it very ironic to be hoisted on my own petard.

**SftP:** *What about the education of health professionals?*

**Coye:** All medical students have a unit on occupational health and all spend several weeks rotation time in workplaces. All their training in polyclinics includes noting the work of every person who comes in. There are residencies in occupational medicine offered in the two medical centers and many go abroad for training in occupational medicine, primarily to Bulgaria.

**SftP:** *Did you see anything negative that particularly stuck out?*

**Coye:** They have the same tendency you see here on the part of professionals working in health and safety, not to want to open up more problems than they feel they can deal with. They feel they can screen for certain exposures and for certain chemicals. Since they have limited resources they don't see the point of educating workers about the myriad exposures they face, when they can't do anything about it. But that's carping, because the awareness of workers in Cuba of occupational health and safety is so much higher than the workers here. For example, outside of Santiago de Cuba I spent time talking with agricultural field workers, and they knew more about the effects of organophosphate exposure than most workers I've talked with in California. They monitor exposure by means of cholinesterase

terase testing every three months, and they have for 18 years.

**SftP:** *How have Cuba and China dealt with the contradiction between productivity and occupational health and safety?*

**Coye:** The first question to raise is what happens when a country experiences a troubling decline in, or at least a plateauing of, the previously rising productivity of the economy.

This occurred in both countries. Both Cuba and China experimented in the mid-'60s with mass spontaneous participation in government, both in workplaces and in the community. In Cuba, that led to a late '60s decline, and they made a decision to recreate the trade unions

in '73 and increase emphasis on popular participation and control in more organized ways.

In China, the timeline becomes different. In the early-to-mid '70s there was a severe decline in the rate of productivity to the point where there was difficulty feeding the population. The response, after the fall of the Gang of Four, has been to believe that increase in productivity will be possible only by emphasizing efficiency and relying in part on some management techniques from capitalist nations. It's early to guess how predominant this experiment will be. I think we owe it to the Chinese as our brothers and sisters who have been struggling for socialism to communicate the difficulties

Taylorist ('scientific') management techniques have created for our workers in general.

The acceptance of foreign aid — not just machines but management techniques as well — is a problem. On top of that, how much of the work process is defined by the technology you import? All these questions are troubling. There must be a good deal of debate in China about this. Rather than saying, "Well, China's taken the wrong turn," it's important to discuss things with them to the extent that we can. We're talking about a country that is having trouble feeding 900 million people, and part of the temptation must be the hope of an easy solution. □

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## news notes

### New Math Banned As Marxist Plot

The military dictatorship of Argentina, already infamous for its policies of torture, murder, televised book burnings, and other techniques of repression (see *SftP*, Jan./Feb. 1979), has now taken its war against subversion one step further. A new decree, put in force by the educational authorities of the province of Cordoba, and proposed for extension to the entire nation, has banned the teaching of modern mathematics. The new math has simultaneously been attacked in the press for subverting confidence in the established order. For example, the magazine *Confirmed* points out that "In the teaching of modern mathematics the postulates of formal logic are denied. This opens up a dangerous channel for subversive action." Another magazine, *Extra*, denounces the fact that "modern mathematics introduces procedures distinct from those taught by Aristotle...this encourages doubts about his logic and promotes a lack of confidence in the authority of traditional ruling figures, thus favoring subversion." *Extra* also cleverly notices that "certain parts of modern mathematics utilize such words as 'vector' or 'matrix', which are typical

of a certain Marxist and ideologically subversive vocabulary. The same is true of the word 'set' — used in set theory — which clearly tends to massify and evoke the multitudes."

### New Attack on OSHA

The latest attempt to gut the Occupational Safety and Health Act is currently before Congress. Ironically titled the "OSHA Improvement Act," it plans to exempt businesses with "good safety records" based on Worker's Compensation Data (which is notoriously inaccurate) from routine safety inspections. Even businesses with poor safety records can qualify for reduced penalties by setting up powerless employer-employee safety committees and consulting with Safety Consultation Services. Ninety percent of all businesses are expected to qualify as having good safety records.

The bill (S.2153) was introduced by Sen. Richard Schweiker of Penn. (Ronald Reagan's 1976 running mate) in December and is expected to go before the Senate Labor and Human Resources Committee in March. That committee is chaired by Sen. Harrison Williams of N.J., a co-sponsor of the bill. The bill then may come before the Senate by June. Schweiker hopes to get the bill passed by December when he retires.

Labor and occupational safety and health groups have already begun to fight the bill. The New York Committee for Occupational Safety and Health (NYCOSH) has put ads in the *New York Times*, and the United Steel Workers of America has been lobbying in Washington. If you would like more information or to help out, contact NYCOSH (address in the Resources section) or the SftP contact in Pittsburgh (address inside the front cover).

—Scott Schneider

### Nuclear Doublespeak

Not surprisingly, the National Council of Teachers of English awarded their 1979 Doublespeak award to the nuclear power industry. The industry reached new heights in doublespeak during the Three Mile Island power station accident... excuse me, I mean the Three Mile Island "plant transient." This "normal aberration" was characterized by "rapid oxidation" (fire) and "energetic disassembly" (explosion). And, lest you be worried about plutonium contamination of the reactor vessel, you will be comforted to know that all that happened was that plutonium had "taken up residence" in the vessel. All of which again goes to show that as far as the nuclear industry is concerned, "prevarication is our most important product."

—info from *Science*

*NEWS NOTES continued on next page.*

## NAS Energy Report

The National Academy of Sciences' Committee on Nuclear and Alternative Energy Systems (CONAES) has finally released a long-awaited report on the U.S. energy situation in the "transition" period from 1985 to 2010. The report, commissioned by the Department of Energy, was originally due in mid-1977; this date was later postponed until the end of 1978 (yes folks, that's 1978). Final price tag of the study: \$4.1 million.

The report stresses conservation, but several less savory options are also pushed. Concluding that obstacles to renewable energy sources over this period "are more fundamental and less tractable than obstacles standing in the way of expanded use of coal and nuclear fission," the report sees coal and nuclear power as the *only* large-scale solutions for electric power generation in the next several decades. The breeder reactor must also be considered a possible necessity, it states, if energy demand cannot be sufficiently reduced.

Two social scientists connected with CONAES contend that they had little influence on the committee's work, and that its report accepts too many assumptions about public behavior as givens. John P. Holdren, in a published dissent, points out that a preference for dealing with the "environmental and sociopolitical" obstacles involved with coal and nuclear power, rather than the "technical and economic" obstacles associated with renewable sources, "should be recognized as a value judgment that does not deserve to be paraded as the 'only' possible outcome."

What is perhaps most interesting about the CONAES report is its timing. Neither the report itself nor the media coverage of it mentions why the report was released *now*, after all this time, in the midst of official U.S. worry over the stability of our oil supplies in the face of the Iranian revolution and the Soviet occupation of Afganistan. Interesting coincidence, no?

—*info from Science and Science News*

## Their Jobs, Our Lives

As this issue goes to press, members of the Oil, Chemical and Atomic Workers' Union (OCAW) are on strike, demanding better health benefits and wage increases to keep pace with inflation. While oil company profits are up 30 to 106 percent above last year's levels, real

wages of refinery workers are declining. And while the corporations continue to blame these workers for gas price increases, the fact is that their wages account for less than one cent of the cost of each gallon of gasoline and in response to President Carter's fuel price stabilization guidelines were voluntarily held constant last year.

Strikers are asking for more comprehensive health coverage and a greater contribution by employers to workers' medical plans. Recognizing the importance of health monitoring, OCAW has its own medical staff surveying the health of workers at several refineries in the San Francisco Bay Area, among them the Chevron refinery in Richmond. In perfect juxtaposition to this effort, plans are under way by management at the Richmond refinery to eliminate the night and weekend operation of the plant's emergency medical clinic. Since the workers rotate shifts and are susceptible to overexposure and accident regardless of the day or hour, a clinic functioning on the premises is a vital necessity. Routinely exposed to such toxic agents as hydrochloric acid, benzene, hydrogen sulphide, sulphur dioxide, liquid sulphur, hydrogen fluoride, chlorine, and butyl alcohol, workers who are burned or poisoned as the result of an accident need immediate and competent medical attention. "Considering what we go through, I think we ought to have the best in health benefits," a striker told *Science for the People*.

In workplaces where dangerous substances are used, what the workers go through is often far more complicated and dramatic than most of us know. Occasionally, following an accident with catastrophic results, we get a glimpse of the risks that workers take to contain the damage and avert or minimize destruction in the larger environment. Almost never, though do we hear of the *near* accidents — the ones that didn't happen, because the workers (often at great personal sacrifice) kept them from happening, and that didn't get publicized, because the corporations put a lid on the story. About a year ago at the Richmond refinery, for instance, several furnaces with sulphur dioxide and water threatened to explode when an air-operated emergency release valve failed to open. Alert workers brought the emergency under control in two hours' time, but during the crisis all that stood be-

tween lethal acid rains for the city of Richmond (and possibly the whole Bay area, depending on weather conditions) was worker ingenuity and dedication. One of the unsung heroes of this event trembled for a whole week afterward.

This crisis and the countless others about which we never hear, point to the close link between the hazardous workplace and the larger environment. In a great many cases where toxic or combustible substances are in use, accidents are the result of technological failures, and the duty of defending the public health and safety transfers perforce from the broken down emergency machinery to the working man and working woman. Once it is granted — and it should not be granted without long deliberation — that a plant or laboratory with a potential for environmental destruction has a right to exist, it behooves us to take good care of the workers in such places, for our lives may quite literally wind up in their hands.

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*edited by*

*Rita Arditti, Pat Brennan,  
Steve Cavrak*

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## Adding Injury to Insult

# BLACK WORKERS AND OCCUPATIONAL HAZARDS

by Morris Davis

Countless thousands of workers continually confront noise, chemicals, heat, and radiation on their jobs, often without knowledge of possible harmful consequences. One group particularly hard hit by dangerous job conditions is black workers. Blacks make up the largest single minority within the U.S. labor force, or 10 percent of the 77 million American workers. Approximately three million blacks are unskilled or semiskilled industrial workers; many are employed in known hazardous situations. Compared to whites and the general population, black workers have shorter life spans and

suffer disproportionately from disease and disability due to their jobs. They also face other adverse job conditions in the form of discriminatory employment patterns and practices.

Although only a small amount of research has been done in this area, blacks' general health status and disproportionately high disability rates are an obvious

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*Morris Davis is a staff member of the Labor Occupational Health Project, 2521 Channing Way, Berkeley, CA 94720. This article is reprinted from the LOHP Monitor.*

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consequence of discriminatory employment practices, job placement, and adverse job conditions. Blacks have a life expectancy of 62.2 years, compared to 71.9 for whites. Of the six states with the lowest life expectancy rates, *five have the highest percentage of minority (black) workers* — Georgia, Louisiana, South Carolina, Mississippi, and Washington, D.C. Proportionally, blacks have a much higher incidence of major heart diseases, cancer, influenza and pneumonia, diabetes, and tuberculosis. For blacks between the ages of 25 and 44, hypertension kills males 15 times more frequently than white males, and females 17 times more frequently than white females.

Job related disability and injury figures are also much higher for blacks than for whites. Fifteen percent of the approximately seven million black workers are unable to work any longer because of partial and permanent disabilities due to their jobs, compared to only 10 percent of white workers. A 1970 study indicated that blacks have 20 percent more restricted activity days than do whites. A 1972 Social Security survey found that although blacks were less likely than whites to report chronic disease, they were still one and one-half times more likely to be severely disabled. Finally, yearly statistics show that five out of 100 black workers are injured on the job each year, a much higher rate than for whites.

### 1930: Gauley Bridge

How can we account for this disproportionate incidence of disease and disability among blacks? To a large extent, black workers are forced by discriminatory employment practices into the least desirable, lowest paying, and most dangerous jobs. In addition, racist attitudes and practices have historically worsened the hazards of many jobs held by blacks. A dramatic example is the West Virginia Gauley Bridge disaster in 1930-31. Five thousand workers, most of whom were black, were recruited to tunnel through a mountain with a very high

silica content. Exposure to silica dust can cause a disabling lung condition called silicosis. Although this disease usually takes a long time to develop, *very high exposures* can result almost immediately in silicosis. This is what happened at Gauley Bridge. A total of 500 workers eventually died. Of these, 169 blacks literally dropped dead in their tracks and were hurriedly buried in a field close by.

But Gauley Bridge could have been avoided. Wet drilling as a means to prevent silica exposure was patented in Britain as early as 1713, and was certainly used in the U.S. before 1930. Yet this method was not used. Nor were the workers even informed of the known silica hazards, or provided with protective breathing devices.

This kind of dramatic “mass murder” doesn’t happen all the time. However, black workers constantly face the same kind of racist employment practices and disregard for their moral and legal rights. The textile industry, with a 25 percent black workforce, still refuses to admit that byssinosis (brown lung disease) is caused by cotton dust. Some industries purposefully employ black workers at more hazardous jobs. In the iron and steel foundries, black workers are assigned to the furnaces on the assumption that they “absorb heat better,” and the electronics industry rationalizes placing “dark-skinned” minority workers in jobs which use caustic materials with the myth that skin irritations won’t be so noticeable on dark skin.

### 1970: Coke Ovens

In many industries, including metal, textile, agricultural, health services, laundry and dry cleaning, wood products, sanitation, rubber, chemical, and pharmaceutical, blacks continue to labor in the most dangerous, dirtiest, and lowest paying jobs under adverse job conditions, discriminatory job placement and employment practices. Although blacks make up only 22 percent of the basic steel industry workforce, 91 percent of



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them are assigned to the most dangerous process, coke plants. This process transforms bituminous coal into metallurgical coke for use at the blast furnaces by intensive heating of the coal. This process releases dangerous gases and dust particles, specifically the carcinogen (cancer-causing agent) benzo (a) pyrene, which is known to cause lung cancer. A 1971 study found that black coke oven workers had three times more respiratory cancer, eight times more deaths from lung cancer, and a significantly increased death rate from "all other causes" when compared to the general population. These statistics may explain why the highest incidence of lung cancer for U.S. black males is in Pittsburgh, Pennsylvania, center of the basic steel industry.

The rubber industry also employs disproportionate numbers of black workers in the most dangerous areas. A nine-year mortality (death) study of 7,000 rubber workers found that nearly 60 percent of black rubber workers were employed in compounding and mixing areas. These workers are exposed to a number of cancer-causing chemicals, including beta-naphthylamine, benzene, asbestos, and various nitrosamines. Recent studies of rubber workers have shown increased death rates due to stomach, colon, bladder, and prostate cancer. Interestingly enough, U.S. blacks have the highest death rate due to prostate cancer in the world!

## What Can Be Done?

Gauley Bridge and the hundreds of less-publicized incidents facing black workers every day haven't significantly lessened since passage of the Occupational Safety and Health Act in 1970, which guarantees every worker a safe and healthful working environment. Many black workers still have no way of knowing what they're exposed to and possible effects, until the damage is done. Although we suspect that blacks' increased incidence of heart disease, hypertension, pneumonia, and other diseases might be due in part to environmental (including workplace) factors, not enough research has been done in this area to demonstrate a clear connection. Meanwhile black workers continue to suffer from a combination of hazardous job conditions and discriminatory employment practices.

What can be done? Research aimed at identifying hazards of jobs employing large numbers of blacks is sorely needed, as are efforts to train black workers in the recognition and control of job hazards. Black health professionals and physicians need to be trained to identify occupational diseases, take work histories, and become more involved in the area of occupational health. Finally, the black community needs to become more aware of this problem, for it is the community that ultimately shoulders the burden for the dead and disabled. □

## LETTERS

*continued from page 5*

work or itchy kids, are vulnerable to the sort of amusing yet cruel joke your comment on Conley's marriage typifies. Mindful of this, what you describe as being "too bad, too bad" for Jim Conley is equally bad for you and your readership. Antagonist responses, whether combative or cavalier, employ rather than challenge methods of dehumanization, and educate nobody.

Ted Dooley  
Allston, MA

Dear SftP:

I just read my second ever copy of *SftP* and was generally favorably impressed. Your News Note entitled "Investigating Menstrual Cramps," however, seemed grossly misleading. My major area of concern is that you give people the idea that "these products" (i.e. ibuprofen, indomethacin, etc.) are "free of side effects except in people with asthma or gastro-intestinal ulcers," when they are known to *cause* serious gastro-intestinal disorders. People with serious arthritic problems frequently stop them against their doctor's advice because they don't tolerate the GI side effects well. (Costs are quite high as well.)

Another, less serious, area of concern is the impression that prostaglandins are one specific variety of substance found in one particular part of the body and having one specific type of action (which can therefore be controlled by "specific inhibitors of prostaglandin synthesis") as opposed to a class of substances found throughout the body — some types of prostaglandins oppose the actions of other types of prostaglandins.

In general your publication is quite good, but please check your interpretations more closely. You might also consider mentioning the fact that many people who are overweight find their cramps much improved when they return to a more nearly ideal weight.

Pat Blochowiak, MD  
Milwaukee, WI

### *Editorial Committee Response:*

*The information on using nonsteroidal anti-inflammatories for the treatment of menstrual cramps was taken from Science, and the conclusion that they are remarkably free of side effects is theirs. For the full article, which discusses several studies and includes some of the differences between the individual drugs in this category, consult Science, vol. 205, pp. 175-176, 1979.*

*These products are rapidly gaining acceptance. Many women find them much better at relieving cramps than anything else they've tried, and the high per-tablet cost is (somewhat) offset by the fact that they're only taken once or twice per cycle. However, although many feminist practitioners are prescribing them, the FDA has not yet approved them for this use.*

## Oversight

In the Nov./Dec. 1979 issue of *SftP* we inadvertently neglected to acknowledge the Monsoon Publishing Company in Hong Kong for granting us permission to reprint from *Hong Kong Journal* Brenda Lansdown's article, "Sharing Science in the Classroom."

## Corrections

The diagram of the menstrual cycle on p. 33 of the Jan./Feb. issue mistakenly shows two peaks for the LH level; the second, smaller peak should have been omitted. Also, we apologize for misspelling the name of one of the authors of the article in which the chart appears ("Reclaiming Reproductive Control"); her name should read *Jeanne Hubbuch*.

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# NONIONIZING RADIATION: UN Sung VILLAIN?

by Ross Flewelling

All of us . . . everywhere, right now . . . are immersed in a sea of *nonionizing* electromagnetic radiation. From AM, FM and CB radio transmissions, to radar and microwave relay tower emissions, to medical diathermy and electrosurgical units in hospitals, to the prolific industrial and military uses — nonionizing radiation incessantly invades our lives.

The sun naturally bathes us in such radiation. But today artificial sources creates levels a *million* to a *billion* times higher than natural ones, and increasingly evidence reveals that such radiation poses significant health and environmental hazards. The National Institute of Occupational Safety and Health estimates that about 20 percent of the industrial work force is exposed to some 35 million radio frequency sources. Recent measurements show that the vast majority of this working population is exposed to dangerously high levels.

Ionizing radiation (especially in its relation to nuclear weapons and power) has stimulated a great deal of public concern over the last several decades. Mounting political struggles have revealed not only grave public and workplace dangers, but also the intimate intermingling of government, military, and corporate interests. There is every reason to believe that these same revelations will be mirrored in the rising concerns over nonionizing radiation in the decade ahead; it is already an issue of economic and political importance.

## Pervasion of Uses

The wild proliferation in uses of nonionizing radiation is due to four fundamental properties: it is fast, it is penetrating, it carries and delivers energy, and it has been presumed safe.

Because microwaves and radio waves travel at the speed of light (nothing travels faster) they are ideal for long-range detection and communication. Electromagnetic waves were first shown to exist when the German

physicist Heinrich Hertz in 1888 produced an electric spark in a device and detected it almost instantaneously across the room. By 1901 Guglielmo Marconi sent a message across the English Channel by wireless telegraphy, and by 1933 *radio detection and ranging* (radar) rapidly spurred the development of radio technologies because of its great usefulness in warfare.

In the 1890s a second major branch of applications developed, taking advantage of other fundamental properties: penetration and energy transport. Nikola Tesla, J.A. d'Arsonval and others noted that radio waves and microwaves penetrate deep into biological materials and simultaneously heat tissues through, suggesting various medical uses: for "diathermy" (literally, "heating through") in heat therapy and for "Bovie" surgical units which instantaneously cut and cauterize human flesh. These two properties — penetration and heating — have also led to widespread uses of nonionizing radiation in industry for heating, gluing, sealing, heat tempering and much more.

Table 1 summarizes many of the common uses of microwave and radio wave radiation, most of which exploit the properties of detection and communication or of penetrative heating and energy transport.

*Natural* microwave and radio wave radiation is emitted by the sun and by electrical activity in the atmosphere. However, the ubiquitous use of electronic technologies in this century has given rise to an *artificial* radiation bath which increases the exposure over natural background of the general population by a factor of more than a million, and of some particular populations by a factor of more than a billion. Such proliferation was based on a belief that nonionizing radiation was harmless — a belief rooted in ignorance.

## Biological Effects

The very factors which make electromagnetic radiation useful also make it dangerous. Since it is invisible we are not aware of being irradiated; yet the radiation penetrates deep into our biological tissue. As the radiation interacts with the tissue, biological molecules are set into rapid motion as they absorb the energy of

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*Ross Flewelling is a member of the East Bay Science for the People, a worker in the Department of Physics at the University of California, Berkeley, and a longtime student of illogical positivism. He acknowledges many useful comments on this article by members of the East Bay SftP.*

TABLE 1:  
COMMON USES AND SOURCES  
OF NONIONIZING ELECTROMAGNETIC  
RADIATION

**Extent**

*Military:* 20 million radar and microwave sources (1975).  
*Industrial:* 35 million sources, exposing about 20 percent of the work force (1980).  
*Communications:* 30 million Citizen Band radios (1979), 120,000 microwave communications towers (1972), 15,000 shortwave transmitters (1972).  
*Other:* 10 million microwave ovens (1979), 15,000 diathermy units with about 2 million people treated annually (1972), 40,000 circuit miles of overhead extra-high voltage AC electric transmission lines (1972).

**Uses**

**Industry**

*Food:* Drying, heating, sterilization in industrial food processing.  
*Forest Products:* Hardwood and paper drying, destruction of fungus and woodworm.  
*Mining:* Curing and breakdown of concrete, heating of oil shale.

*Chemical:* Plasma chemistry processes, curing of resins and rubber products, sealing of plastics.  
*Agriculture:* Treatment of seeds, destruction of insects, protection of plants against frost, drying of grain.  
*Other Industrial:* Drying of match heads, film and leather; manufacture of drugs; melting of explosives; repair of asphalt pavements.

**Other**

*Medicine:* Diathermy, electrosurgical units, blood warming, thawing of frozen tissue, diagnostic microwave techniques.  
*Scientific:* Microwave and radiowave sources, plasma heating, particle accelerators.  
*Home and Community:* Microwave ovens, shoplifting detectors, burglar alarm systems, garage door openers, automobile speed detectors, toys.  
*Energy Transmission:* Power line radiation, Satellite Power System microwave transmission.  
*Communications:* Satellite communications, radar, microwave relay, radionavigation, radio and TV communication.

Source: Taken in part from J.M. Osepchuk in *Fundamental and Applied Aspects of Nonionizing Radiation*, S. Michaelson et al., eds. (New York: Plenum Press, 1975), p.419.

the radiation. Thus the primary mechanism for the interaction of nonionizing radiation with biological systems is the *thermal effect* of heating up the body. That is exactly why microwave ovens cook food.

The biologic effect of such heating is to create *thermal stress* in the whole body, or parts of it. The first several listings of Table 2 are examples of some biological consequences of heating. At extremely high exposure levels (above 100 mW/cm<sup>2</sup>) the human body will suffer severe thermal stress (hyperthermia and hyperpyrexia) which, if prolonged, can result in death. Exposed to these high levels even for a very short time, nearly all laboratory animals die. At a power density of 100 mW/cm<sup>2</sup>, for example, a rabbit will die in about 100 minutes and a rat in less than 30 minutes. For these reasons almost all countries regard 100 mW/cm<sup>2</sup> as a dangerous radiation level — a level common inside microwave ovens and near the radiating beam of high-power radar or similar antennas.

TABLE 2:  
SOME BIOLOGICAL EFFECTS OF  
NONIONIZING ELECTROMAGNETIC RADIATION

<i>Biological Effect</i>	<i>Test Animal</i>	<i>Min. Effect Level (mW/cm<sup>2</sup>)</i>
Severe thermal stress/death	Human (1 hr) Rat, Mice (140 min)	100 30
Cataract formation/eye damage	Rabbit (Human) <sup>a</sup>	80-100
Testicular damage	Rabbit (Human)	5-10
Altered neuron firing	Rat, <i>Aplysia</i>	5-10
Altered action of drugs	Rat, Mice	5
Altered metabolism function	Rabbit	5
Altered thyroid function	Rabbit	5
Neurotransmitter release in brain	Rabbit, Guinea pig	.5-25
Cerebral calcium flux changes	Cat, Chick <sup>b</sup>	.5-1
Behavioral modifications	Rat, Monkey	.15-5
Behavioral and cardiovascular changes	Human <sup>c</sup>	.01

<sup>a</sup>Experiments were carried out on rabbits, but the levels given are those estimated for the human population.

<sup>b</sup>Effects at these low levels were only noted when the fields were modulated at extremely low frequencies.

<sup>c</sup>Results of Soviet and East European studies, regarded as controversial in the United States.

Data are taken from a variety of sources. Especially good references are S. Baranski and P. Czerski, *Biological Effects of Microwaves* (Stroudsbury, Pa.: Dowden, Hutchinson & Ross, Inc., 1976), and S.F. Cleary, "Survey of Microwave and Radiofrequency Biological Effects and Mechanisms," in *The Physical Basis of Electromagnetic Interactions with Biological Systems*, HEW (FDA) 78-8055, 1978.

At lower levels, *cataract formation* or other eye damage (e.g., accelerated aging) may result from exposure to radiation of about 80-100 mW/cm<sup>2</sup> or more, apparently due to excessive heating. Testicle irradiation resulting in temporary infertility or impotence will occur at about 5-10 mW/cm<sup>2</sup>. Permanent *testicular damage* can be expected at similar, but certainly at higher, levels. Such radiation levels are in fact common, as can be seen from Table 4.

In the late 1950s, one group of scientists in the United States concluded that below about 10 mW/cm<sup>2</sup> no general heating of the adult human body occurs. The present U.S. "safety level" was thus established, based on the belief that heating was the only significant mechanism for biological interaction. Since then, experimental and clinical evidence — first reported in Eastern Europe and now largely duplicated in the U.S. — clearly demonstrates that biological effects occur at lower levels. The scientific community is now embroiled in a debate on a crucial question: Are there *nonthermal* mechanisms for the interaction of nonionizing radiation

with biological systems? Although nonthermal mechanisms are not now understood on a theoretical level, many scientists presume there are "subtle" ways that electromagnetic waves of various frequency may interact with particular biological molecules (such as DNA or proteins) or with particular molecular systems (cell components, cell membranes, etc.)

While the theoretical debate continues, laboratory evidence mounts, linking biological effects to exposure levels below 10 mW/cm<sup>2</sup> (see Table 2). These effects include: altered firing patterns of nerve cells, altered action of particular drugs, altered metabolism and thyroid functions, and a variety of behavioral (primarily motor function) changes. Eastern European reports of low-level (below 1 mW/cm<sup>2</sup>) effects would expand this list enormously, but some U.S. scientists and administrative personnel dismiss these results, claiming improper experimental or clinical procedures. On the other hand, U.S. scientists have been *unable to disprove* the Eastern European results, and all but the last of the effects listed in Table 2 *are* widely accepted by the scientific commun-

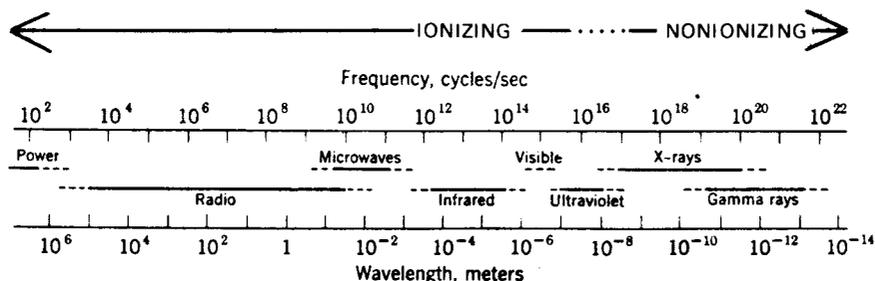
### THE ELECTROMAGNETIC SPECTRUM

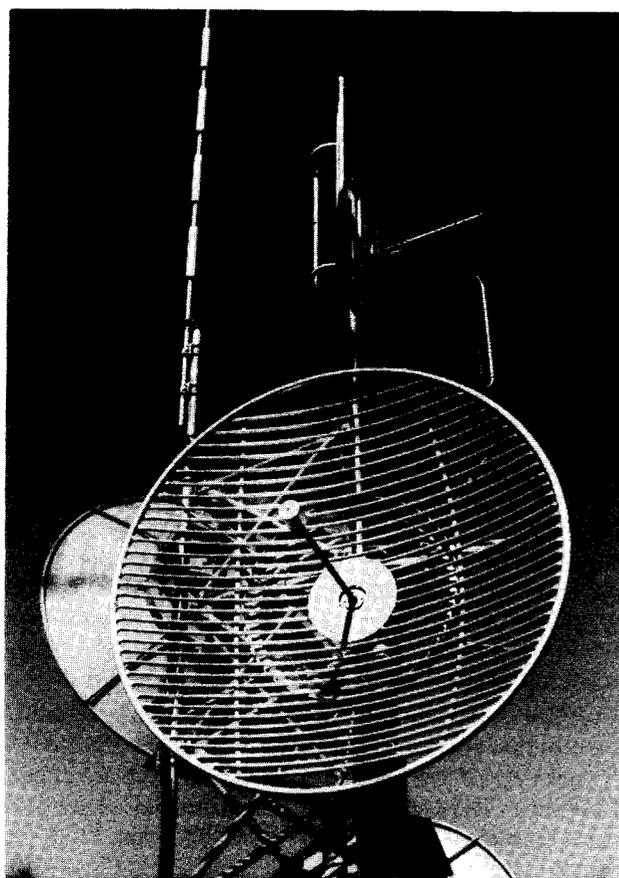
A century ago physicists developed a model of the electromagnetic field in which every charged particle is presumed to possess an electric field extending outward in all directions. Accelerating the particle will create a disturbance in the electric field, which then creates a magnetic field disturbance — the two together traveling outward at the speed of light (300,000 km/sec) as an *electromagnetic wave* (or "radiation", or just "light"). This is the source of radiation from the sun or a lightbulb, where heat jostles charged particles; or in a radio or television transmission, where electrons are forced to vibrate back and forth in an antenna.

The fundamental property of these waves is that they transport energy. The continuous range of energies (or of frequencies or wavelengths) is usually represented by the *electromagnetic spectrum* (see accompanying figure). High frequency (short wavelength) waves — e.g., X-rays and gamma-rays — carry a great deal of energy which enables them to rip apart molecules and knock electrons out of atoms. This is called *ionizing* radiation. Biologically important molecules (such as DNA) or components of biological cells can be destroyed by these high frequency waves.

*Nonionizing* radiation — e.g., radio wave and microwave — is low frequency (long wavelength). It does not carry enough energy to break up molecules or knock electrons out of atoms. Nonionizing radiation does however heat up biological tissue and may also interact with biological systems in ways not yet fully understood. Outdoor and indoor electric power lines as well as infrared and visible light are also in the domain of nonionizing radiation. (These pose their own health hazards but will not be discussed in this article.) The dividing line between ionizing and non-ionizing radiation lies in the ultraviolet.

The single most important factor in quantifying non-ionizing radiation is the amount of energy carried by a wave hitting a surface area per unit of time. This *power density* (or "intensity") is normally measured in terms of "mW/cm<sup>2</sup>" (read "milliwatt per centimeter squared"). For example, the power density that cooks food inside a microwave oven is between 500 and 1000 mW/cm<sup>2</sup>. The power density of electromagnetic radiation a few centimeters from mobile unit radios (Citizen Band, police, ambulance, etc.) is often effectively 10 to 200 mW/cm<sup>2</sup>.





ity in the U.S. Clinical studies in the Soviet Union show behavioral and cardiovascular effects on humans at levels as low as 0.01 mW/cm<sup>2</sup>. Because no effects are found below this level, 0.01 mW/cm<sup>2</sup> is the USSR safety level — one thousand times lower than the present 10 mW/cm<sup>2</sup> U.S. safety level.

### The 'Safety Level' Controversy

Biological effects, such as those listed in Table 2, serve as the basis for establishing "safe levels of exposure." Table 3 summarizes the standard for occupational (8 hour) exposure in various countries. The United States has adopted the *least* stringent standard (10 mW/cm<sup>2</sup>) in the world, while the USSR has the most stringent (0.01 mW/cm<sup>2</sup>) — differing by a factor of one thousand. Also listed for comparison are the USSR general population standard (0.005 mW/cm<sup>2</sup>) and the U.S. microwave oven emission standard (5 mW/cm<sup>2</sup>).

The U.S. 10-mW/cm<sup>2</sup> standard had its beginnings in the mid-1950s, based on the paucity of information on the tolerance of the human body to thermal increases. As H.P. Schwan — one of the godfathers of the 10-mW/cm<sup>2</sup> level — put it, "A figure of 10 mW/cm<sup>2</sup> absorbed energy appears as *tolerable* and is, therefore, suggested as a *tolerance* dosage. This value should not be exceeded except under unusual circumstance."<sup>(1)</sup> (Emphasis added.)

From its inception the U.S. standard was meant to be a *tolerance limit*, just beyond which adverse biological effects would be expected. Thus in the U.S. if a worker is exposed to an intensity of 1 mW/cm<sup>2</sup>, this is regarded as acceptable even though such a level may cause discomfort — including headaches, warming sensations, uneasiness or other similar responses (which are exactly the symptoms reported by the Soviets and East Europeans for low levels of radiation). The 10-mW/cm<sup>2</sup> standard is peculiar in that it allows for *no factor of safety*. For ionizing radiation a safety factor of 300 has often been employed.

By comparison the USSR has based its standard on a *no effect* criterion: below 0.01 mW/cm<sup>2</sup> there are no reported biological effects due to nonionizing radiation. Countries such as Czechoslovakia and Poland have employed a criterion of *maximal comfort*: while behavioral effects have been observed below 0.1 mW/cm<sup>2</sup>, it is believed that healthy adults can work comfortably at these levels. It must be emphasized, therefore, that the U.S. standards is a result of the relatively lax attitude toward health and safety.

***The U.S. "acceptable level of exposure" to nonionizing radiation is a tolerance level which includes no factor of safety. There is at present no standard for exposure to the general population in the U.S., and the standard that applies to workers is a voluntary standard — without the force of law.***

TABLE 3:

**STANDARDS FOR OCCUPATIONAL  
(8 hr) EXPOSURE TO NONIONIZING  
RADIATION**

Maximum Permitted Radiation Intensity* (mW/cm <sup>2</sup> )	Country -Agency
0.005	USSR (general population)**
0.01	USSR
0.025	Czechoslovakia
0.2	Poland
1.0	Sweden
(5.0) from MW oven	U.S.-BRH <sup>a</sup> : 5cm
10.0 (1 proposed)	Canada
10.0	Great Britain
10.0	U.S.—ANSI <sup>b</sup> -OSHA <sup>c</sup> -ACGIH <sup>d</sup>

<sup>a</sup>Bureau of Radiological Health

<sup>b</sup>American National Standards Institute

<sup>c</sup>Occupational Safety and Health Administration

<sup>d</sup>American Congress of Governmental Industrial Hygienists

\*Apply to limited frequency ranges, typically between 300 MHz and 300,000 MHz.

\*\*Several countries have more stringent standards for the general population than the occupational (8 hr) standards listed here; the U.S. has no standard for the general population.

Today, with a growing wealth of experimental work and increasing public awareness, dissatisfaction with the U.S. standard is mounting and reaches throughout the scientific and administrative spheres. Moris Shore, director of the Division of Biological Effects at the Bureau of Radiological Health, commented in 1977,

There are mistakes that have been made in the past, and I would hope that these could be avoided. A specific example is the certification of safety of 10 mW/cm<sup>2</sup> for indefinite human exposure in the absence of any studies in animals or in man that tested the chronic or lifetime effects of exposure to 10 mW/cm<sup>2</sup>. Such certification, based on ignorance, strains the credibility of a level that is recommended as being adequate to protect health and safety, particularly of the general population.(2)

### Overexposure Abounds

There is good reason to believe that the U.S. standard is far too high — by a factor of ten to a hundred, perhaps as much as a thousand. What are the actual environmental and workplace exposures in the U.S.?

Table 4 summarizes some of the many possible exposures to nonionizing radiation. Note that even in terms of U.S. standards, more than half of the listings on this table record work and living environments in which people are continually (and often unknowingly) *overexposed!* Overexposed populations include military personnel, industrial radio frequency workers, patients, nurses and doctors in close proximity to radiating units, Citizen Band radio operators, some users of microwave ovens, some populations very close to FM radio antennas, and personnel near the Satellite Power System, should it be developed.

*Industrial radio frequency equipment* is particularly dangerous. In one study of 82 radiofrequency sealers in 12 plants, over two-thirds of the operators (all women, some pregnant) were overexposed. The investigators of that study noted that health and safety personnel at the relevant plants were not even aware that a hazardous condition could exist. About 20% of the U.S. industrial work force is estimated to be exposed to such radiation.

A limited study of *electrosurgical ("Bovie") units* — used in every operating room in the U.S. to cut and sterilize flesh — found field levels near or above the U.S. acceptable standard. Similar studies have revealed that *Citizen Band (CB) radios* — of which there are about 30 million in the U.S. — also pose immediate health hazards to users and bystanders. Levels for hand held units

TABLE 4:  
SOME EXPOSURE LEVELS TO NONIONIZING RADIATION

Source	Exposure Population/Notes	Exposure Levels in mW/cm <sup>2</sup>	
		Typical	Max. Values
Industrial Radio Frequency: gluers, dryers, heat sealers	Workers/Operators (measured at eye and waist)	90% ≥ 10*	1000*
Industrial Plastic Sealers sealers, all operators were women, some pregnant)	Workers/Operators (At 12 plants with 82 sealers, all operators were women, some pregnant)	60% ≥ 10*	500*
Electrosurgical Units (measured 16 cm from unit)	Operating room personnel, patients	10*	70*
Citizen Band Radio unit personnel**	Users, bystanders; police, fire, emergency mobile unit personnel**	2.5W at 12 cm _____ 11 4.0W at 12 cm _____ 18 4.0W at eye _____ 100	180
Satellite Power System: proposed	Workers near receiving antenna, nearby areas (about 2 km away)	20	
Microwave Ovens	Home, work, restaurant users	0.1—1	10
Broadcast Radiation: AM, FM, TV	Near Transmitters:		
	3% of FM stations (86),	on roof . . . . . 1—21	21
		on ground . . . . . .03—4	4
	Urban Population:	.00003	.003
	General Population:	.000005	
Microwave Radiation:	American Embassy in Moscow	.002	.02
Natural Background Radiation (sun and atmosphere)	Entire Population	10 <sup>-7</sup>	

Sources: National Institute of Occupational Safety and Health (1975, 1979), Bureau of Radiological Health (1977, 1979), and Environmental Protection Agency (1975, 1977, 1978, 1979).

were measured or estimated to be anywhere from 10 to 100 mW/cm<sup>2</sup> (or more) at eye level. (Over time, levels above 80 mW/cm<sup>2</sup> are known to cause cataracts.) Mobile unit radios pose similar, if not more severe, health hazards.

There are about 10 million *microwave ovens* in use: in the home, at work, in restaurants and hospitals. In 1973 the Consumer's Union labeled all microwave ovens "Not Recommended" because of excess radiation — in some cases above 20 mW/cm<sup>2</sup>. Microwave ovens must be recalled by the manufacturer if they exceed emissions of 5 mW/cm<sup>2</sup>. Recent safety improvements have resulted in withdrawal of Consumer's Union "Not Recommended" label on models built after 1976. Typical emissions in recent years run about 0.1 - 1.0 mW/cm<sup>2</sup>, yet some ovens still radiate above 5 mW/cm<sup>2</sup>. The Bureau of Radiological Health (FDA) has found that fewer than 1 percent of the post-1975 ovens emit at these higher levels. However, with a total of 10 million ovens in use, this could mean that as many as 100,000 microwave ovens presently in use emit radiation above the 5-mW/cm<sup>2</sup> standard. In fact, in March of 1979, 2600 Roper and Sears brand microwave ovens were recalled by the Food and Drug Administration because of excess leakage.

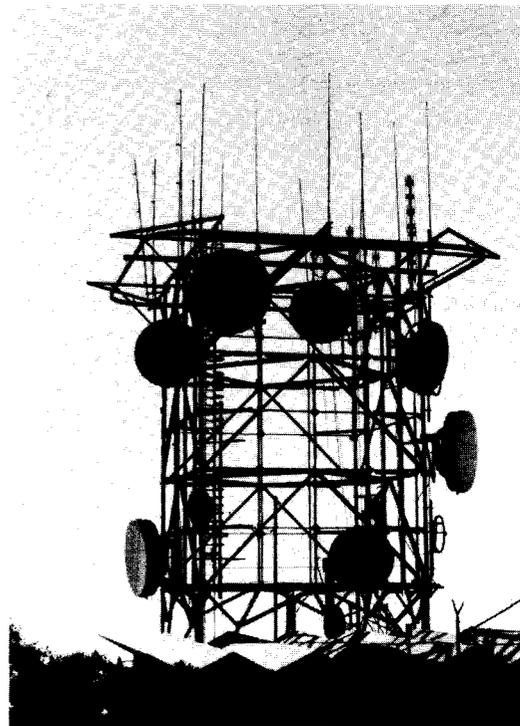
The most widespread exposure of the general population results from *AM, FM and TV transmissions* (see Table 4 for examples). Although these exposures are in general below the level of any known biological effect, particular populations — primarily those near transmitting antennas — may be dangerously overexposed.

There has been a good deal of attention paid by the media to microwave radiation trained on the American embassy in Moscow. What has been emphasized is the possibility of associated health hazards. It is interesting to note (see Table 4) that the maximum reported levels of this radiation are well within the U.S. limit of 10 mW/cm<sup>2</sup> — less than that encountered continuously in some U.S. office buildings!

### **SPS: An Issue for the 1980s?**

A new technology very possibly on the way is the *Satellite Power System* (SPS), often referred to as the Solar Power Satellite. It will consist of earth orbiting satellites, each utilizing a wall of solar cells to convert solar energy into electrical energy. The energy will be transmitted down to earth via microwave beams. The gigantic receiving antenna on earth, 17 km by 13 km, will have a microwave power density of 20 mW/cm<sup>2</sup> at least 2 km from its center. In addition, there will need to be a 2 km buffer zone around the perimeter of the huge antenna in order to reduce radiation levels to 0.1 mW/cm<sup>2</sup>.

Each antenna will require 55,000 acres. With a plan to develop 60 SPS sites (to produce a hopeful 20% of the



U.S. energy desires by the year 2000) a total of 3.3 million acres of land will be required — all restricted because of dangerously high microwave power densities. Workers at the sites will have to be continually shielded from the radiation, and any living organism venturing within the area will be endangered. Bird migration patterns, for example, could be significantly affected. In November 1979 the House of Representatives gave the go ahead for preparatory development — the projected cost of the entire project ranging from \$500 billion to \$1 trillion.

### **Political and Economic Issues**

Ostensibly, a nonionizing radiation safety level is a scientific issue involving two determinations: What experimental data should be accepted as the most relevant? And, if effects are discerned, when does an effect constitute significant harm? But these are not objective scientific questions.

The very fact that a wide range of standards exists throughout industrialized countries points to this conclusion. Between countries and within countries there is a discrepancy as to what constitutes "proper" scientific procedure or as to what constitutes significant information. Thus Eastern European and Soviet researchers report biological effects at very low levels of radiation, based on experimental and clinical studies which many U.S. scientists reject through claims of improper scientific procedure. In the Soviet Union, for example, a condition of "microwave sickness" is diagnosed among workers from their subjective complaints

of headaches, nausea, uneasiness, etc., when exposed to very low levels (0.1 mW/cm<sup>2</sup>) of radiation. Such a diagnosis in the Soviet Union is a basis for having additional protective shielding installed or for being transferred out of the work environment. But in the United States such complaints are not considered sufficient to assess a deleterious health condition.

The dividing line between effect and harm is also a subjective one. A microwave intensity above 10 mW/cm<sup>2</sup> certainly heats the body, but then so will a hot bath. Scientists who believe heating is the only effect of low level radiation will claim experimental work that concludes otherwise is probably faulty and did not take proper account of this or that factor. Other scientists believe there may be other mechanisms (nonthermal) which we do not presently understand but which may very well exist. This group accepts the experiments showing effects at low levels and therefore concludes that harmful effects are likely.

The issue is also an economic one. It may very well cost millions, if not billions, of dollars to clean up electromagnetic pollution. As indicated in Table 4, industrial radio frequency devices have been found to expose workers to levels far above 10 mW/cm<sup>2</sup>. With some 35 million such devices in operation, the economic cost of correcting this problem alone is staggering.

The military, by far the largest single user of nonionizing radiation, has argued that compliance with standards demanding lower exposure levels would threaten national security. Typical ship radar emits at levels of 10 mW/cm<sup>2</sup> out to about 25 feet (much farther for high-power radar). If the "safety level" were placed at 0.1 mW/cm<sup>2</sup>, the safety distance would extend to over 200 feet and would seriously interfere with on-board personnel movements. At one of the earliest conferences on the subject, a Naval scientist declared, "Restrictions have been imposed upon the Army, Navy and Airforce because of radio frequency hazards. This is a serious situation. Every restriction results in a reduced capability of our fighting forces, and therefore fleet commanders oppose the restrictions. They emphasize we cannot afford the restriction."(3)

Paul Brodeur, writer for *The New Yorker* and author of *The Zapping of America*, has concluded that the issue of nonionizing radiation is nothing less than a "microwave cover-up":

[T]he federal government, the military, the vast electronics industry, and all of the academic and research institutions financed by the military-electronics industry complex have been standing on their collective head to avoid conducting meaningful epidemiological studies on the health hazards posed by microwave radiation. People in the military-electronics industry complex don't want to know the extent of the problem. If they knew about it they might have to admit they knew about

it, and then might even have to do something about it, which would cost a lot of money both in terms of litigation and preventive measures.(4)

### Out of the Crisis

Nonionizing radiation is an example of a presumed benevolent technology which, because found useful for military and corporate purposes and for social benefit, has become intertwined in our lives to a potentially dangerous level. When it first gained widespread use some 30 to 50 years ago, little work was done to explore its biological and environmental consequences. While the responsibility for that failure in technology assessment is deeply rooted — and perhaps muddled — in the American tradition, the continuing irresponsibility of the last 20 years is clear. The military and corporations have vested economic and operational interests. Certainly the consumer is not to blame. Those responsible for this reckless proliferation — the military and corporations — should therefore be the ones to pay for independent research into adverse effects, improved safety shielding and redesign, and substitution of safer technologies for dangerous ones.

Given this history, decision making power must rest with the general public and with the affected workers. "Safety level" issues and even the "need" for a particular technology must be subject to this kind of review. For this the public needs clear and precise information on the current and proposed uses, the effects, and the levels of nonionizing radiation exposure. Unions and workers must understand the technology, be aware of its effects, and know where and at what levels they occur.

It is an illusion that any technology is passive — that technology can be scientifically objective, that technology is socially and politically neutral. Every technology is in a dynamic relation with its social and economic conditions — each embodying, revealing, redirecting the other. People are a part of that process. Recognizing first that the illusion of a passive technology obscures the dynamic relationship, we must then actively engage in that relationship in order to change it. Failure to do so in the case of nonionizing radiation has led to our present crisis. □

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4. Paul Brodeur, *The Zapping of America: Microwaves, Their Deadly Risk, and the Cover-Up* (New York: Norton Company, Inc., 1977), p. 188.

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# resources

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## RESOURCES ON OCCUPATIONAL HEALTH

### RESOURCE GROUPS

**BSSRS** (British Society for Social Responsibility in Science): Prints *Hazards Bulletin*, pamphlets on noise, oil, vibration, hospital hazards, etc.; has a book on asbestos (listed under books); has subgroups on Hospital Hazards, and Women and Work Hazards (9 Poland St., London, W1V 3DG, England).

**LOHP** (Labor Occupational Health Program): Publishes *LOHP Monitor* and several books, including *Working for your Life* which deals with women's work hazards; has produced several films, including *Working Steel* and, most recently, *Working for your Life* which is based on their book (2521 Channing Way, Berkeley, CA 94720).

**OCAW** (Oil, Chemical and Atomic Workers): Produced many educational materials on hazards, including an excellent poster on asbestos and a slide-show, *Asbestos: Fighting a Killer* (1636 Champa St., Denver, CO 80202).

**OSHA** (Occupational Safety and Health Administration): Published "A Guide to Worker Education Materials", an extensive list of resources on occupational safety and health, and *Pocket Guide to Chemical Hazards*; also other free materials (200 Constitution Ave. NW, Washington D.C. 20001).

**Public Media Center**: has produced many radio programs on occupational health issues and does work on publicizing occupational health issues (2751 Hyde St., San Francisco, Ca 94109).

### COMMITTEES ON OCCUPATIONAL SAFETY AND HEALTH (COSH GROUPS)

**Bay Area**: Bay Area Committee on Occupational Safety and Health (BACOSH), c/o Lentz, 5531 Kales Ave., Oakland, CA 94618.

**Chicago**: Chicago Area Committee on Occupational Safety and Health (CACOSH), 542 South Dearborn, #502, Chicago, IL 60605. (312) 939-2104.

**California**: Electronics Committee on Occupational Safety and Health (ECOSH), 867 West Dana #201, Mountain View, CA 94041. (415) 969-8978 or 969-1545.

**Boston**: Massachusetts Coalition for Occupational Safety and Health (MassCOSH), P.O. Box 17326, Back Bay Station, Boston, MA 02116. (617) 482-4283.

**Western Mass.**: Massachusetts Coalition for Occupational Safety and Health (MassCOSH) — Western Region, 323 High Street, Holyoke, MA 01040. (413) 536-3736.

**Minnesota**: Minnesota Area Committee on Occupational Safety and Health (MACOSH), 1729 Nicollet Avenue South, Minneapolis, MN 55403. (612) 291-1815 (Tom O'Connell).

**New Jersey**: New Jersey Committee for Occupational Safety and Health (NJCOSSH), 80 Central Avenue, Clark, NJ 07066. (201) 381-2459 (Mike McKowne).

**New York**: New York Committee on Occupational Safety and Health (NYCOSSH), P.O. Box 3285, Grand Central Station, New York, NY 10017. (212) 577-0564 (Deborah Nagin).

**North Carolina**: North Carolina Occupational Safety and Health Project (NCOSH), P.O. Box 2514, Durham, North Carolina 27705. (919) 286-2276.

**Philadelphia**: Philadelphia Area Project on Occupational Safety and Health (PHILAPOSH), 1321 Arch Street, #607, Philadelphia, PA 19107. (215) 568-5188.

**Rhode Island**: Rhode Island Committee on Occupational Safety and Health (RICOSH), P.O. Box 95, Annex Station, Providence, RI 02901. (401) 751-2015.

**Western N.Y.**: Western New York Council on Occupational Safety and Health (WNYCOSSH), 59 Niagara Square Station, Buffalo, NY 14201. (716) 693-0165.

**Wisconsin**: Wisconsin Committee on Occupational Safety and Health (WISCOSSH), P.O. Box 92565, Milwaukee, WI 53202. (414) 962-2096.

## BOOKS

*Bitter Wages: The Ralph Nader Study Group Report on Occupational Accidents and Diseases*, by J. Page and Mary-Win O'Brien (New York: Grossman Publishers, 1973).

*Crisis in the Workplace: Occupational Disease and Injuries*, by Nicholas A. Ashford (Cambridge, Mass.: MIT Press, 1976). A critical look at the OSHA law.

*Expendable Americans*, by Paul Brodeur (New York: Viking Press, 1974). Exposé of asbestos problems at a Tyler, Texas plant.

*Help for the Working Wounded*, by Thomas Mancuso (Washington, D.C.: International Association of Machinists, 1976). Questions and answers for workers about occupational health.

*Asbestos Killer Dust: How to Fight the Hazards of Asbestos and Its Substitutes* published by BSSRS Publications, 9 Poland St., London W1V 3DG, 1979. A worker/community guide.

## FILMS

"Song of the Canary"—Discusses worker sterility from DBCP (a pesticide) and brown lung cotton worker victims; and the corporate cover-up. 16mm, color, 58 minutes. \$65/rental, \$650/purchase. Available from: Song of the Canary, P.O. Box 315, Franklin Lakes, NJ 07417.

"Working For Your Life"—Women's work hazards in both traditional and non-traditional occupations. 16mm, color, 57 minutes. \$65/rental, \$475/purchase. Available from: LOHP Films, 2521 Channing Way, Berkeley, CA 94720.

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## Omission

In the list of editors for the January/February 1980 issue we neglected to include the Midwest editorial committee. They edited the article, "Is there a Gay Gene? Does it Matter?" We apologize for this omission. There are now three editorial groups which regularly do the editorial work on the magazine, taking responsibility for entire issues or for individual articles.

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