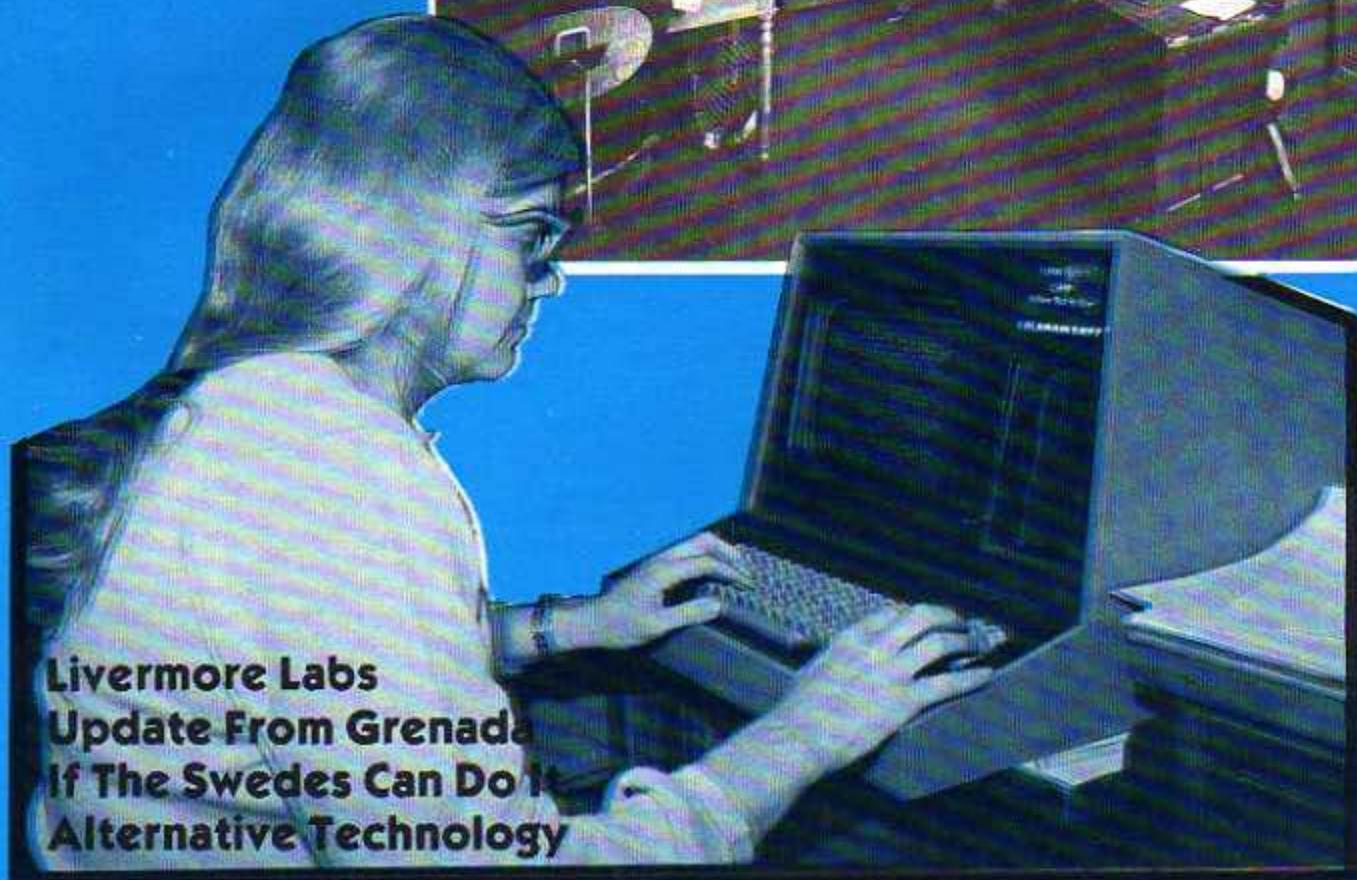


SCIENCE FOR THE PEOPLE

Vol. 13 No. 3

\$1.75

Workers Face Office Automation



**Livermore Labs
Update From Grenada
If The Swedes Can Do It
Alternative Technology**

news notes

MICROPROCESSORS: WIDENING THE U.S.—U.S.S.R. MILITARY GAP

The U.S. has always claimed a qualitative advantage in advanced technologies to make up for a quantitative disadvantage compared with the Soviet Union, and the microelectronics industry has been a major area of American superiority. It seems, however, that the gap is not as wide as it used to be, so the American military-industrial complex is doing something about it.

The development of integrated circuits (ICs) was initiated by the military, but the commercial uses of ICs so fertilized the semiconductor industry that, in the mid-1970's, the military accounted for no more than 4% of IC research. Further, the military's special needs could only be met by expensive small production runs, so they were forced to use less advanced technology. Finally, the Soviet Union has apparently caught up to being only four years behind the American semiconductor industry.

The U.S. response, in part, is a six year research program, to be completed in 1984, to develop faster, more compact ICs. This Very High Speed Integrated Circuit (VHSIC) Program will spend over \$200 million. The major portion will be spent to increase the processing speeds a hundredfold. Presently, the most advanced ICs have components and lines with sizes on the order of 5 microns (a micron is 10^{-6} m). Another goal of the VHSIC Program is to develop production techniques that will reduce these dimensions to .5 microns in order to fit more computing power into a given space. This is not possible with lithography using visible light, so new techniques using x-rays and other radiation with shorter wavelengths than visible light are to be developed.

This increased speed and density allow for improved reliability of ICs — a major concern of the military. They allow for increased redundancy and self-diagnosis and correction of malfunctions. Expected military applications of the

technology include improving the accuracy of missiles by coordinating information from several different target-seeking devices. Another military application is to replace some costly single-purpose aircraft with pods, which contain all the special electronic equipment and can be attached to multi-purpose fighters.

Potential peaceful applications will be limited by the military. They fear that widespread availability of the VHSIC technology will make it possible for the Soviets to borrow it. Thus, in addition to restrictions on the exports of chips utilizing the new technology, controls on the domestic dissemination of information on design and fabrication techniques have been proposed.

—*Information from: Military Review LXI, pp. 43-50 (Jan. 1981).*

INFANT FORMULA CODE COULD SAVE MILLIONS OF LIVES— NESTLE FEARS LOSS OF PROFITS

In late January, the executive council of the World Health Organization met to draw up a code to be approved at the World Health Assembly in May which would be a code of conduct for companies exporting baby formula to the Third World. UNICEF Executive Director Jim Grant estimates that a strict code could save "a million lives a year".

The formula manufacturers, led by the giant Swiss-based multinational Nestle, currently pull in one billion dollars a year from formula sales in Third World countries. Bottled formula has now replaced mother's milk for an estimated six million Third World babies.

According to Doug Johnson, national chairperson of the Infant Formula Action Coalition (INFACT), the formula companies are "pulling out every gun they can to shoot down the code". The coalition has coordinated a boycott of Nestle's products to pressure the company to stop pushing formula in coun-

tries where poverty and unsanitary water often make formula a lethal substitute for breast feeding.

In his syndicated column on January 21, Jack Anderson charged that some of the guns being pulled out in defense of the formula manufacturers are real ones. Anderson stated that the manufacturers' "hysterical campaign" against groups advocating breast feeding "has reportedly led to deadly excesses in Guatemala, where death squads of the military regime have been executing rural health workers for, among other things, encouraging breast feeding." Anderson reported that the right-wing government was suspected of authorizing the killings as a way to maintain "the profitable kickbacks government officials allegedly get from the sale of baby formula".

An internal memorandum written by Nestle's vice president Ernest Saunders which was leaked to INFACT, reveals the company's anxiety over the boycott and the lengths to which it is prepared to go to counteract it. Saunders contends that "the basic strategy for dealing with the boycott is working." This strategy appears to consist of trying to buy favorable public opinion by placing articles in major journals, hiring third-party spokespersons, and hiding behind organizations like the Ethics and Public Policy Center (EPPC), a right-wing think-tank. Saunders gloats over the success of Nestle in using an ostensibly neutral think-tank to brand church critics as "Marxists marching under the banner of Christ".

The Ethics and Public Policy Center funded Herman Nickel, Washington editor of *Fortune* magazine, to conduct "a comprehensive study of the infant formula issue." Nickel wrote an article entitled "The Corporation Haters" that appeared in the June 18, 1980, issue of *Fortune* and was subsequently reprinted and distributed by Nestle. The corporation showed its appreciation by donating \$25,000 to the EPPC, whose presi-

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about this issue

Science and technology — who controls, who benefits, and who suffers? Such questions increasingly intrude on the lives of all of us, as our industrialized society continues to develop ever more sophisticated technology, frequently with questionable aims and undesirable effects. It comes as no surprise that these are the questions that have formed much of the core of *Science for the People* magazine. We continue this focus in this issue.

In offices across the country, much of the work done by clerical workers is now being automated. While office automation *could* be used to decrease the amount of boring, tedious work, leaving current workers freer to perform more interesting and creative tasks, the actual effects are that workers are losing their jobs and the jobs that remain are becoming *more* tedious. This is the subject of the article "Race Against Time: Workers Face Office Automation". Included is a short article about recently discovered hazards associated with video display terminals, an important component of the automated office.

While office automation is another glaring example of negative consequences of technological development, two articles in this issue point to the positive effects which result when the people whose lives and livelihoods are most affected by the developing technologies have a say in how the development proceeds. In the article about revolution and technology in Grenada we see how a revolutionary political system can provide the means for the people to construct technology that is truly appropriate for meeting their needs. "If the Swedes Can Do It . . ." is an example of worker control — in this case through a strong union — stimulating the develop-

ment of a technology that is more conducive to their well-being. Both examples are worthy of considerable attention as case studies of science (and technology) for the people.

In addition to case studies, both positive and negative, we must also develop a theoretical approach so as to have a context in which to understand those case studies. To this end we present two articles analyzing the appropriate technology movement. In "The Politics of Alternative Technology" and "Is Appropriate Technology the Solution for the Underdeveloped World?" we examine the role of technology in the development and dependency process. Both articles present strong challenges to the popular notion that appropriate technology as defined by the developed world can provide a solution to the problems of the Third World.

Could one think of a technology run more amok than nuclear weapons technology? Apparently its developers have gone a little mad too, as evidenced by the side show at Lawrence Livermore Labs on Earth Day. In the article about Earth Day at Livermore Labs we see how the unbelievable horror of nuclear technology has caused the technologists themselves to engage in little games of reality denial.

The abortion issue is an especially timely example of how the control of technology is withheld from the people affected. Our patriarchal society is currently on the offensive to put women "in their place". The article "Cook County Hospital — Back to Coathangers?" tells the story of the closing of the Cook County Hospital abortion clinic. This article should be of concern to every woman and man who believes in reproductive freedom and a woman's right to choose when and whether to have children. We hope that by reading about the threats to availability of abortion in this country, our readers will become active in the movement to preserve and increase access to abortion for all women, rich and poor alike.

IN MEMORY OF FREDA SALZMAN

On Wednesday April 1, 1981, Freda Salzman, a long time and very active member of Science for the People died. She was 53 years old and had struggled with breast cancer for the past two years. Freda was a theoretical physicist and a teacher, whose work in Science for the People took her some distance from general relativity and black holes which she studied in her academic research at the University of Massachusetts in Boston. She was a loving teacher and was married for 33 years to her husband George, also a physicist, and had two grown daughters, Amy and Erica. We in the Boston Chapter of Science for the People will miss her dearly, for she was a kind and gentle soul, as well as one of the most stalwartly committed and dedicated members of the organization.

Freda was one of the very early foremothers of Science for the People, having begun her involvement back in 1971, and her contributions to and impact on the organization and its members has been powerful. She was most actively involved in the long reorganization struggles of 1974-1976 and in the continuing struggles against sexism both inside and outside of the organization. She also contributed greatly via her writings and public lectures on sociobiology and sexism.

Freda was instrumental in starting the first women's group in Science for the People back in the days, just a few years ago,

when raising women's issues was thought by many to be politically incorrect. She was among the first to introduce the topic of sexism as an important issue within Science for the People and to persist until this subject became O.K. to speak of, to think about, and to work on in the organization. Freda had a tenacious adherence to her beliefs and she did not give up when she believed that she was right. She hung in there. Indeed she persisted when many others dropped out. Some members say that it was because of her steadfast persistence that the Sociobiology Study Group was transformed from a group asking the questions, "What is sexism?" to one whose primary focus is now on this very issue.

Freda was very dedicated to her work in Science for the People. She was one of those few persons who could always be depended on to "be there" and to give of her time, her energy and her self. In the old days (a mere 10 years ago) she would have been described as a "bag holder", i.e. one of those reliable, who could always be counted on to take up the bag of unwanted tasks that needed to be done and to do them.

We will all miss this gentle foremother and role model and we also remember and rejoice in the good knowledge, the caring and the sense of humanity she gave to us and to Science for the People.

—Pat Brennan

WORKERS FACE OFFICE AUTOMATION

by Working Women

“People will adapt nicely to office systems if their arms are broken, and we’re in the twisting stage now.”

**William F. Laughlin
IBM Vice President**

The American workforce is undergoing enormous changes as clerical work replaces manufacturing employment as the base of the economy. Now clerical work is being transformed by automation of the office through the use of computers. What is the effect of automation on the job itself, on the American economy, and on the office worker? Office workers are in a race against time trying to answer these questions before irreparable harm is done.

In the early 1950’s there were barely 1,000 computers in the United States; by the end of 1980, industry experts estimate that 10 million mini-computers will be at work across the country. The widespread use of the computer has been made possible by the introduction of micro-processors in the 1970’s. A single “computer on-a-chip” in 1985 may have 25 times the capacity of a computer which filled an entire room 15 years ago.

In addition, micro-processors have reduced computation costs 100,000 fold since 1960. In fact, if computers are compared to cars in terms of cost and technology, M.I.T. estimates that the production of a Rolls Royce would cost \$2.50 and the car would run for 312,000 miles on a half gallon of gasoline.¹

Already extensively used in the offices of the federal government, multinationals, and financial institutions, mini-computers, with their low cost, high power, and small size, make it possible for medium and small businesses to introduce office automation. According to *Technology Review*, sales of small business computers are expected to triple by 1984, creating a \$10 billion market. If total computer sales continue at their annual growth rate, which is now 12%, the computer industry predicts that its revenues will be the largest in the world by 1990, outstripping both auto and oil giants.²

By the end of 1979, clerical workers numbered 18 million, accounting for 18% of all employment. Since women hold 80% of all clerical jobs, clerical employment accounts for 35% of the country’s 42 million working women, according to the Bureau of Labor Statistics.

Over 50% of the 20 million new jobs projected by 1990 will be in white collar work: managerial, professional, technical, sales, and clerical. The U.S. Department of Labor estimates there will be 4.8 million new

jobs for clerical workers — such as bank tellers, secretaries, typists, and computer/peripheral equipment operators — making clerical work the fastest-growing occupation in the 1980’s. Of the estimated 3.5 million offices in the U.S., about 1.5 million are considered large enough for some form of office automation.³ IBM estimates that, by 1985, 40% of the total workforce will be employed in jobs primarily involved in information processing.

A report by Siemens, the West German high technology firm, estimates that 40% of the work done in the office today will be suitable for automation by 1990. Occupations which are targeted for automation include file clerks, bookkeepers, secretaries, typists and bank tellers all of which are at least 90% female.

The move to electronics is “a way to enforce discipline and standardization in the office,” says one business expert.⁴ “Business can finally monitor and measure the clerical function,” adds another.⁵

Future office workers could become as physically restricted as their blue-collar counterparts on the assembly line with the introduction of conveyor belts to move documents and files through modular “cockpit-like” work stations, as predicted by *U.S. News & World Report* (9/18/78). White collar shift work is increasingly getting the most out of the new machines, and piecework (pay per line-of-information processed) is beginning to appear.

Across the country, clericals working at video-display-terminals (VDT’s) averaged only \$7 a week more than conventional typists in 1979; in many Sunbelt cities, they averaged even less than typists.⁶ But numerous studies show that typing speed increases from 50%

This article is adapted with permission from a report written by Working Women.

Working Women, National Association of Office Workers, is a membership organization with affiliates in twelve major cities across the country and members in 45 states, working to win rights and respect.

\$5/year membership dues entitles you to the bi-monthly newsletter and reduced rates on Working Women publications. Please mail to Working Women, 1224 Huron Road, Cleveland, OH 44115.

For a copy of the full report, Race Against Time: Automation of Office Work, send \$4 (\$3 for members, \$7 institutional rate) to Working Women.

VIDEO DISPLAY TERMINALS POSE NEW HEALTH HAZARDS

Perhaps not since the typewriter has a machine changed office work as much as the video display terminal. VDTs (sometimes called CRTs for cathode-ray tubes) are the television-like screens that display information stored by computers to workers in a wide variety of jobs, from newspaper reporters to airline reservation clerks.

More than three million of the machines are now in use, and another four million will be by 1984. Most are being incorporated into the existing workplace without adequate design considerations or attention to the health needs of the workers who use them. What may be good lighting design for a paper-handling job may be inadequate or even bad for a VDT operator.

The government has not yet set standards to protect these workers, but at the request of many trade unions, NIOSH (the National Institute for Occupational Safety and Health) has begun research that should lead to some.

The Symptoms

The most common complaints among VDT operators are:

- Eyestrain, with such symptoms as soreness, redness, stinging, itching, and general discomfort;
- Pains in the neck and back;
- Dull headaches;
- Blurred vision;
- Dizziness and nausea;
- Problems with eyeglasses and contact lenses;
- A general feeling of tension and irritability.

Eye Fatigue

Eyestrain is uncomfortable and annoying; daily eyestrain may cause temporary deterioration of vision. A feeling of eyestrain often results from fatigue of the muscles that control the movements of the eye and those that regulate the amount of light that is allowed to enter. Viewing at close range for long periods of time can be particularly tiring.

VDT operators should take periodic rest breaks in open areas away from their machines.

During the breaks, it is a good idea to do simple body and eye exercises. Most important, however, is giving the eyes an opportunity to view at greater distances.

Another ideal situation is to alternate an hour of screen work with an hour of another kind of work that allows viewing from a greater distance, as well as more body movement.

Glare

Eyestrain is also caused by glare on the VDT screen resulting from light reflected from windows and shiny surfaces, or from office lighting that is too bright or badly positioned. The glare makes it difficult for the eyes to see the information on the screen. It may also cause neck and back pains if the operator contorts her body to avoid the glare.

The best remedy for glare is a screen made of nonreflective glass. Glare can also be prevented by installing blinds or awnings on nearby windows, relocating machines for better light exposure, relocating lighting fixtures, installation of indirect lighting or reducing lighting without making it difficult to read printed copy.

Contrast Glare

Eyestrain may also be caused by viewing a screen against a background that is too bright, such as a white wall or a window. The pupils, which control the total light entering the eyes, adjust to the bright background rather than to the darker screen. Images on the screen become difficult to see. Some operators compensate for this by putting their heads down to block the light and raising their eyes to see the screen. This can cause back and neck aches. Another poor solution is the use of sunglasses.

The best solutions are dimming the lights, changing the location of the machine, painting or covering the facing wall in a color or texture that reflects less light, and installing a simple partition or screen behind the machine.

Screen Size and Color

The size of the screen is of great importance to the viewer's comfort. It is best to have a large screen with a viewing distance of more than two feet and a character height of at least 3/16 of an inch.

Research has not yet established the best colors for screens and characters, and different operators show different preferences. However, the colors generally recommended are a dark green screen with lighter green or yellow characters, or a black screen with white characters.

Posture

Sitting in a fixed position for a long time is tiring and may cause muscle strain. This is particularly true of VDT

to 150% when word-processing equipment is used,⁷ in addition, computer vendors claim that document production can be increased by as much as 500%.⁸

Contrary to business assertions that automation will upgrade most jobs, successful automation means that large numbers of employees will perform the tedious, quick but accurate work of data entry. A Federal study in the 1960's found that 70% of the new automated jobs in a large bank were low-rated, and that one bank reduced the average pay for certain clerks by 22% after automation.⁹

Interchangeable data entry operators are already absorbing the jobs of many file clerks, keypunch operators, bookkeepers and bank tellers. While such semi-skilled clerical jobs abound, skilled clerical jobs are being eliminated. The Word Processing Plan of IBM calls for the elimination of the personal secretary, who performs the most varied tasks in clerical work, and is highest paid.

IBM claims that "soaring clerical wages" are a major incentive for office automation and cites the 68% increase in the average secretary's pay from 1965 to 1975.

operators, who hold a constant head and neck as well as eye position. However, some postures are less fatiguing than others.

The most comfortable viewing position is with the eyes looking slightly downward. Therefore, the height and

Machine Maintenance

VDTs should be checked at least twice a year, with periodic replacement of tubes. A full record of the machine maintenance should be kept and should be available to workers.

work. One researcher has found that as the machines proliferate their operators sometimes become even more alienated from their jobs than assembly-line workers — another good reason that employees should strive for variety in the workday.

Heat from the machines and their bad positioning in overcrowded offices can also cause stress. Especially to be avoided is the seating of a worker with her back too close to the back of another machine, or the arrangement of workers in clusters facing each other.

Stress may also arise from the intense concentration often required in working with VDTs. Pauses while the operator waits for information to appear on the screen are not restful, but often particularly stressful.



Ann Arbor Sfp

This article was reprinted with permission from the Women's Occupational Health Resource Center (WOHRC) News. Much of the material was adapted from the pamphlet "Health Protection for Operators of VDT's/CRT's" published by the New York Committee for Occupational Safety and Health. Copies of the pamphlet are available for 50¢ each from: NYCOSH, Box 3285, Grand Central Station, New York, N. Y. 10017.

WOHRC is currently doing research on optimum working conditions for VDT operators, and has designed survey forms which can help you to evaluate your workplace. For copies of the forms write to WOHRC, School of Public Health, Columbia University, 60 Haven Avenue, B-1, New York, N. Y. 10032.

WOHRC will hold a conference, "Issues in the Occupational Environment: Working Women — Designs for Workplace Health," May 7, 1981, New York City.

angle of the screen should be adjustable to accommodate operators' different heights and preferred angles of viewing.

Ideal is a machine with a detached keyboard and a fully adjustable stand. The detached keyboard enables the operator to move the screen or to raise or tilt it without changing the keyboard position.

Like other sedentary workers, VDT operators should also be concerned with the chairs they use. Sitting on poorly designed furniture may lead to back problems, varicose veins, and hemorrhoids. Care should be taken to avoid sitting with the spine curved backward.

Eyeglasses and Contact Lenses

Workers who wear corrective lenses often have additional difficulty in using VDTs, and should inform their eye doctors that they work with them. It may be necessary for such workers to be fitted with special lenses designed to focus at the normal viewing distance from eyes to screen.

Stress

In addition to eyestrain and postural problems, VDT operators are subject to many stressful conditions common to all office work: noise, pressure, overcrowded work spaces, and uninteresting

However, the cost of living between 1967 to 1977 increased 86%. In banking and insurance, among the most automated industries, wages for clericals are 8% to 19% below the national averages by occupation, according to the Department of Labor.

The very first operational computer, the ENIAC, which was used to perform the calculations for the atomic bomb in 1944-45, was successfully programmed by 100 women who were hired to do what was mistakenly identified as "clerical" (and thus "women's") work. As computer programming occupations were de-

finied as technical and professional, they became overwhelmingly male. Although women re-entered programming in the 1970's they remain only 19% of all computer specialists and are concentrated in the lowest-skilled and lowest-paid computer jobs as applications programmers and coders.

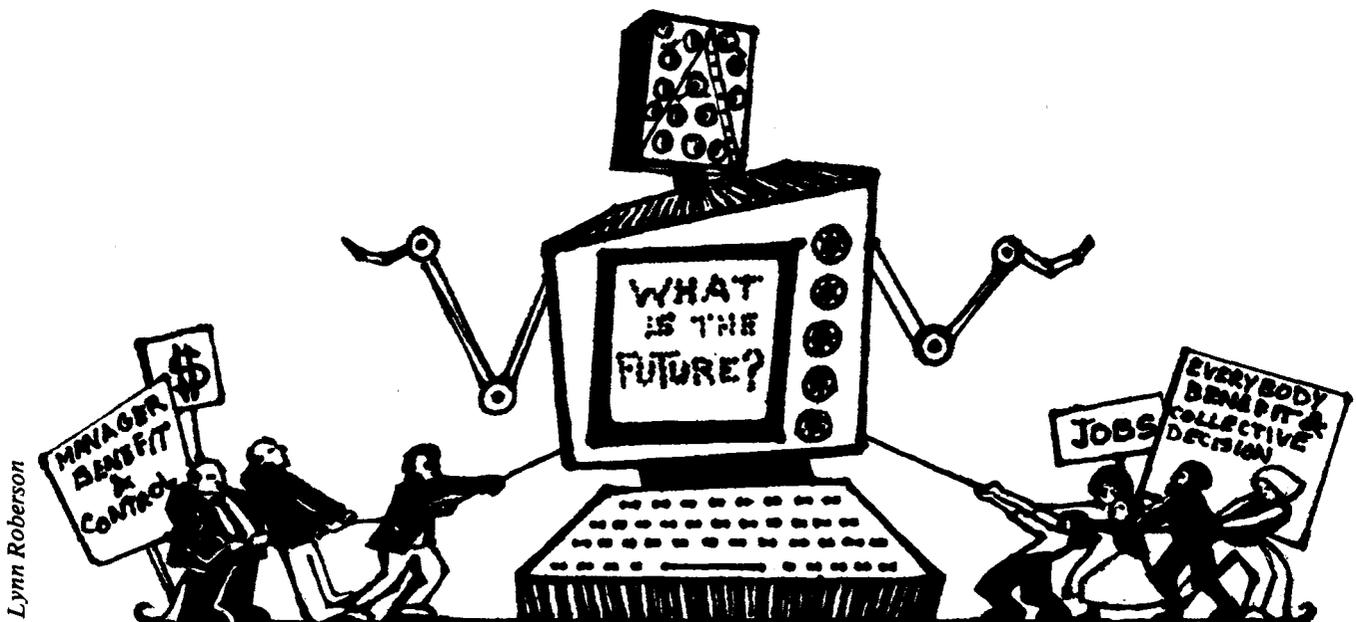
The majority of computer-related clerical positions are held by women: 95.6% of key punch and key entry operators; 62% of computer/peripheral equipment operators; and 75% of all office machine operators are women.¹⁰

A sociological study of five large employers in 1977 found that when computerization was introduced, the proportion of low-level clerical jobs remained the same, and that clericals were rarely upgraded to fill new skilled jobs. The study found that the automated clerical jobs were more mechanical and narrow, and that "the main avenues for clerical workers are either horizontal or downward."¹¹

In the 1960's the U.S. Department of Labor found that banks could handle the same volume of work with reductions in labor requirements of 40 to 50%.¹² In 1976, the Bureau of Labor Statistics found that employment growth in banking had slowed in relation to increased volume of transactions. From 1960 to 1973, banking transactions increased 8.3% a year, and employment grew at an annual rate of 4.5%. But from 1973 to 1976, employment growth slowed to 3.2% a year while banking transactions continued to rise sharply at a 7.2% annual rate.

Studies in France and Great Britain predict enormous employment displacement in the future. A report prepared for the French Ministry of Industry by adviser Simon Nora predicts 30% displacement in the banking and insurance workforce. British economists believe office automation could lead to permanent unemployment levels of up to 20%.¹³ In addition, ten other countries have initiated major studies on the effects of office automation. However, the U.S. Department of Labor currently has no method for calculating the impact of automation on employment projections.

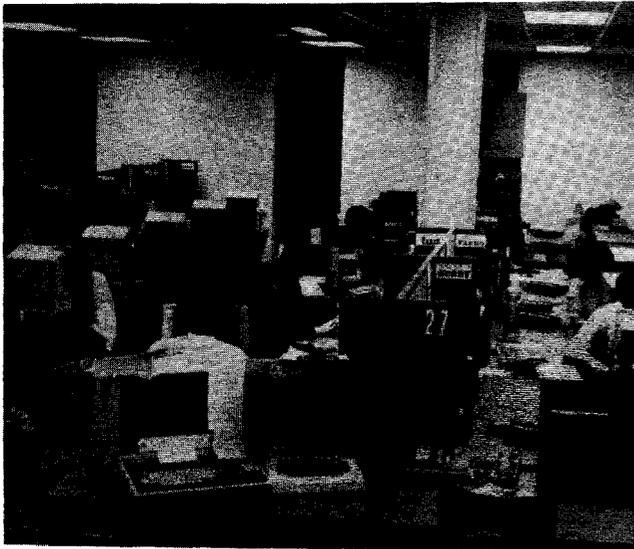
Clerical workers rank second-highest as victims of stress-related diseases, including coronary heart disease (CHD), according to a 1977 NIOSH study of 130 occupations. According to recently released findings of the Framingham Heart Study, women clerical workers with children and blue collar husbands are almost twice as likely to develop CHD as men.¹⁴



Although employment in certain occupations — such as bookkeepers, stenographers, and many types of clerks — will level off or decline, the overall need for clerical workers is apparently absorbing the potential employment displacement effects of automation in clerical-intensive industries such as banking and insurance. However, the design of technology at this point is mainly determined by what management wants — and it is already clear computers are sold by promises of reduced labor. "What can't be automated will be done by executives and by part-time employees," predicts Larry Wells of Creative Strategies International, a California consulting firm.

An estimated seven to ten million people work on VDT's, the key units of office automation. Recent studies link VDT's to eyestrain, migraine headaches, nausea, lower and upper back pain and occupational stress (see box). Studies in Austria and Sweden indicate that adequate break time and redesign of jobs are essential if health risks are to be reduced for VDT operators.¹⁵

Unless occupational safety and health findings are taken into account, office automation will integrate stress-causing factors directly and permanently into clerical jobs. The health of clerical workers could be severely threatened by rapid pacing of work enforced by



computer monitoring, increased job dissatisfaction due to less varied work and lack of advancement opportunities, and eye and muscle strain from VDT's in poorly designed jobs.

The resistance to office automation by secretaries and managers alike is widely recognized as a factor that has slowed the rate of penetration by automated office systems. Despite rapid advance, office technology is still incomplete. Fierce competition between the major computer companies will spur the drive for new innovations. IBM and Xerox sink annual sums of \$1.5 billion or more into research and development efforts.

Although the pace of technological innovation seems overwhelming, office workers and managers will continue to have an impact on the penetration of automation into the office. IBM's Vice President William F. Laughlin told *Business Week* in 1975, "People will adapt nicely to office systems if their arms are broken, and we're in the twisting stage now,"¹⁶ making it clear that his company does not have endless patience with those who might resist the office of the future.

Women office workers are engaged in a race against time. Unless clericals organize to influence automation in the 1980's — while the technology is still being developed — the health, well-being, and employment of women office workers will be sacrificed for the sake of management's constant quest for "corporate progress."¹⁷ □

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Working Women

NATIONAL ASSOCIATION OF OFFICE WORKERS

National Offices

Midwest Office	East Coast Office	Washington, D.C. Office
1224 Huron Road Cleveland, OH 44115 216/566-9308	140 Clarendon Street Boston, MA 02116 617/247-4943	2000 Florida Ave., N.W. Washington, DC 20009 202/797-1384

Local Affiliates

9 to 5

140 Clarendon Street
Boston, Mass. 02116
617/536-6003

Rhode Island Working Women

100 Washington Street
Providence, R.I. 02903
401/331-6077

Hartford Working Women

57 Pratt Street
Hartford, Conn. 06103
203/525-4793

Women Office Workers

680 Lexington Ave.
New York, N.Y. 10022

Women Employed in Baltimore

128 West Franklin Street
Baltimore, Md. 21201
301/837-3830

Pittsburgh Working Women

4th and Wood Streets
Pittsburgh, Pa. 15222
412/261-3714

Cleveland Women Working

1224 Huron Road
Cleveland, Ohio 44115
216/566-8511

Dayton Women Working

141 West 3rd Street
Dayton, Ohio 45402
513/228-8587

Cincinnati Women Working

9th and Walnut
Cincinnati, Ohio 45202
513/381-2455

Seattle Working Women

1118 5th Avenue
Seattle, Wash. 98101

Women Organized for Employment

127 Montgomery
San Francisco, CA 94104
415/982-8963

Los Angeles Working Women

304 S. Broadway, No. 534
Los Angeles, Ca. 90013
213/628-8080

Working Women has joined the Service Employees International Union to lead a nationwide organizing campaign to organize the nation's 20 million clerical workers. The newly created bargaining unit is titled District 925 (as in nine-to-five).

THE POLITICS OF ALTERNATIVE TECHNOLOGY

by David Dickson



Oxym America

One of the most significant by-products of the economic recession currently affecting almost all industrialized countries is that it has eclipsed much of the concern expressed at the beginning of the decade about the destructive impact of current patterns of technological growth. It is almost ten years since a set of computer models developed by Dr. Jay Forrester for the Club of Rome demonstrated that there were finite material limits to growth. The Club of Rome study legitimated concerns that had been expressed by environmentalists and other groups for a number of years, and led directly, in the U.S. at least, to stringent regulation aimed at curbing the worst excesses of industrialization. Yet as the economic situation has worsened, concern for the state of the environment has also faltered. On the one hand, excessive environmental regulation is itself blamed for poor economic performance, for example

where air pollution standards have forced the closure of companies which claim that they cannot afford to comply. On the other hand, the U.S. public is increasingly being told that it must make a choice between the quality of life and economic growth, with the clear message that to neglect the second is to invite escalating inflation, poor industrial performance, and eventually economic and social collapse. Where, then, should one begin an analysis of technology?

The last decade has seen a virtual revolution in ideas about the role of technology in the development process. According to most development economists,

David Dickson is the Washington correspondent for Nature and a member of the Radical Science Journal collective. His book, The Politics of Alternative Technology, was published in 1975 by Universe Books.

technology was considered to be an essentially neutral determinant of development, and the more advanced technology a country could introduce in the shortest possible time, the more rapidly was a general rise in the standard of living likely to take place. More recently, the willingness to look at technology, not merely in terms of its capacity to generate surplus value but also of its appropriateness to local conditions, has been an important step forward in development thinking.

But there is another side to the argument which often gets overlooked, namely the extent to which both domestic and international patterns of technological growth reflect underlying power relationships between the various parties involved. The technology itself therefore comes to embody particular forms of social control. At the international level we see this in terms of the conditions which the rich countries are able to impose on technology transfer, for example so-called "black box" arrangements which prevent a recipient country from knowing the details of a technology which it is receiving. But the control is also exercised through hierarchical social relationships which are built into the productive system itself. Conventionally, criticism of the exploitation of the Third World by industrialized countries has focused on the imbalances of the economic transfers which are channeled through trading relationships. But we now also find economic surpluses from the Third World being channeled to the rich countries and used to expand international capital through a different route, the internal operations of an increasingly interdependent global system of production. To understand how these new forms of dominance operate, we must look at the way the distribution and control of technology maximizes the creation of profits, while promoting hierarchical and authoritarian ways of organizing work in the developing countries, and diverting efforts to meet social needs directly. Discussion of the role of technology in development, and in particular of the place of appropriate technology in this discussion, must therefore be located within the broader context of the strategies chosen by multinational corporations and banking institutions to create an international environment in which they can operate with minimum disruption and maximum profitability.

In the past such political issues were rarely raised in "technology and development" debates, partly because of the supposed neutrality of technological development. But the history of technology transfer shows that the neutrality assumption is frequently questionable. In many cases, the technology transferred from the developed to the developing nations remained under the control of multinational corporations, who are more concerned about exploiting cheap labor and low taxation than in meeting local social needs. And even where enterprises were developed under local control, much of the surplus generated had to be used to pay for license rights or for the import of necessary raw materials, while the profits were concentrated in the

pockets of elites. Thus where the principle of accelerated technology transfer was turned into practice, the result was frequently patterns of technological development inappropriate to local resources and needs — for example, consuming scarce capital but ignoring plentiful labor — or which distorted the balance of productive activities to meet the interests of outside investors.

Appropriate Technology

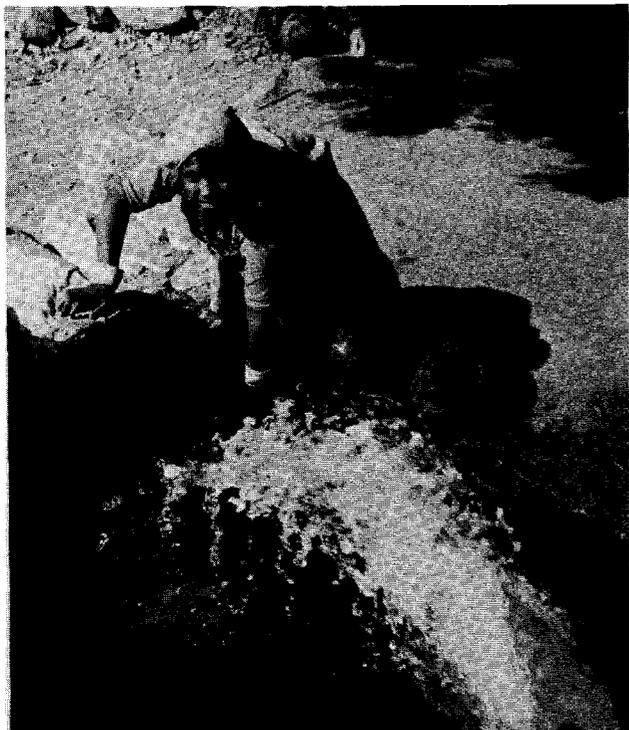
Some have reacted to this situation by focusing on the technology itself, arguing that problems could be avoided primarily by designing and introducing appropriate or "intermediate" technologies more directly compatible with local resources and needs. Based on ideas developed by E.F. Schumacher from the writings of Gandhi, and pioneered in the mid-1960s by the London-based Intermediate Technology Development Group, intermediate technology offers a solution to the problems brought about by technologies of a less appropriate nature, where these may either be insufficiently sophisticated to make best use of available knowledge and resources, or too advanced to operate satisfactorily within the limitations that such resources necessarily impose. In its crudest form, the idea of intermediate technology is to provide a technological capability midway between traditional craft technologies and the sophisticated devices offered by Western suppliers.

Yet appropriate technology can be interpreted as meaning more than just a technical fix, namely as including a strategy for reducing dependency on outside interests. During the early 1970s an awareness began to emerge within many developing nations that inappropriate technologies and distorted patterns of technological development were the results, not of individual mistakes made by industrial managers and development planners, but of structural imbalances within the global economy to which they had tied their fortunes. One obvious target was the activities of large multinational corporations, whose technology transfer programs were designed more to meet the interests of stockholders in the developed countries than the social needs of the countries in which they operated. Another was the actions of multilateral aid agencies such as the United Nations Development Program and the World Bank, which frequently seemed to concentrate on providing outside expertise than on building up indigenous technological capabilities. Each, it was argued, encouraged patterns of technological dependency which, far from promoting a greater equity between the developing and the developed parts of the world, merely reinforced the traditional dominance of the latter over the former.

In the general economic sphere, discontent with the new forms of economic dependence provoked attempts to change the rules of the game by demanding the creation of a New International Economic Order. Supporters of this idea put forward a number of proposals for radical changes in the way that the world econ-

omy is organized; the results, it was hoped, would substantially increase the benefits of participation accruing to the developing countries. Particular attention was given to the area of technology transfer, and demands from the Third World included a strict code of conduct designed to force multinational corporations to provide technologies more appropriate to host country needs, and international support for changes in patent laws and other measures designed to lower the cost of technology transfers to the "South".

When first presented with these demands, the initial reaction of the industrialized countries was to reject them out of hand. Any efforts consciously to distort



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international market mechanisms, they argued, would only introduce inefficiencies into the global economic system. It was therefore in the best interests of the developing nations to encourage the maximum growth of the overall system — and this meant accepting the economic and technological logic which the global trade system imposed upon them. Advocates of appropriate technology were either ignored as irrelevant, since rapid industrialization — it was argued — would only be achieved by promoting the rapid transfer of the most sophisticated technologies to Third World countries. Or they were criticised for trying to impose on these countries a second-best solution, to fob them off with second-rate solutions to their technological problems.

Yet the industrialized countries soon began to realise that, even if the developing countries lacked economic power on the world scene, their recently won po-

litical independence enabled them at least to control the economic operations and enterprises within their borders. Anxious to preserve access to raw materials necessary for their own continued growth, as well as to expand their foreign markets for industrial goods, the developed countries soon began to shift ground and indicate a willingness to open negotiations on topics such as a possible code of conduct for international technology transfers. Furthermore, during the late 1970s a growing number of economists within the developing countries began to argue that the economic growth of the Third World was itself an essential element in the health of the global economy. This meant that the developing countries were no longer seen merely as neutral suppliers of raw materials and consumers of finished goods, but as important vehicles for securing the overall efficiency of the global economy through maximizing the production and circulation of an economic surplus. It was therefore argued that it was not only in the humanitarian interest of industrialized countries, but in their economic and political interests as well, to encourage the strength of developing country economies, hoping that they would provide some of the dynamism to help fend off a general global recession. Such, for example, has been one of the strong arguments put forward by the World Bank to justify low interest loans to the developing countries, as well as the report of the Brandt Commission which sought means of escaping the stalemate into which North-South negotiations seem to have fallen.

The Bandwagon

An important element of this new ideology is a growing awareness of the pragmatic arguments in favor of appropriate technologies. It soon became obvious to both development economists and industrial planners that if a technology was introduced in a country in an insensitive way that not only failed to work successfully, but also disrupted existing social processes, then however advanced or otherwise desirable the technology it was not likely to help the general development effort. It was not only the intermediate technologists who could point out the ridiculousness of introducing an automated plastic-sandal factory into a country where shoe-making and mending were an important craft industry and source of employment. One of the first established institutions to accept the technical logic of the appropriate technology argument was the Development Center of the Organization for Economic Co-operation and Development — the O.E.C.D. — which published a series of papers under the guidance of Nicolas Jequier in 1976 called "Appropriate Technology—Problems and Promises", followed last year by an "Appropriate Technology Directory", both of which are impressive compilations of the arguments in favor of taking factors

IS APPROPRIATE TECHNOLOGY THE SOLUTION FOR THE THIRD WORLD?

by Ricardo Navarro

One problem with the A.T. (appropriate technology) movement is that appropriate technology is usually not clearly defined, sometimes meaning different things for different people. Frequently it is thought of as technology which is small scale or of an intermediate size, labor intensive, light capital, and uses renewable resources. Such technology is considered "appropriate" and its use is promoted without questioning its direct effectiveness or indirect consequences for the development of a country or region. While it is true that several of these new technologies carry a human dimension greater than conventional technologies, it is also true that their use involves considerable danger, since they may represent a subtle new form of economic exploitation. Furthermore, the A.T. movement contributes to creating the impression that appropriate technology is a necessary and sufficient condition to get the poor countries out of the underdeveloped state.

Does this mean that, what people call "appropriate technology" is necessarily a bad movement? The answer is no. But in order to be a good movement it has to meet some requirements. Any technology is appropriate for something, and we must discuss what it is that we want the technology to be appropriate for. Do we want a technology appropriate for exploiting a particular natural resource, or appropriate for concentrating the power and well being of a few, or appropriate for strengthening the ties of economic dependence of one country on another

country, or appropriate for maximizing the profits of a multinational corporation? There are a lot of technologies appropriate for achieving those goals and some people would argue that they are also "appropriate technologies."

How do we limit our definition of A.T. so that it is "appropriate" for people, and its conception does not become corrupted and misused by the international capitalist system to exploit the poor people of the world? It seems to me that a straightforward definition is, a technology is appropriate if and only if **IT CONTRIBUTES TO THE LIBERATION OF THE OPPRESSED PEOPLE IN THE WORLD.** With this definition, appropriate technology is the technology which is oriented towards placing a country in a position of being capable of satisfying the needs of the people (physical, spiritual and social needs). But that satisfaction is not only a technological problem; it is also, and more importantly, an economic problem. It is the structure of an economic system that allows small sectors of the population to accumulate huge profits, leaving large groups of people without the resources to satisfy their basic human needs. Therefore, to talk about appropriate technology, we must concomitantly talk about an "appropriate economic system", that is, a system in which the economic forces are efficiently oriented towards satisfying human needs.

The fact that an "appropriate economic system" is a requirement for "appropriate technology" to exist, by no means implies that nothing can be

done on technological grounds until a given country has a desirable economic system. A lot of experience can be gained by developing pilot projects to see the performance of a new idea or the cultural problems of the adoption of a given technology — but always bearing in mind their limitations. Furthermore, if my definition is taken seriously, there is always the possibility of developing a technology that in and of itself helps create the conditions for the installation of an "appropriate economic system". But it is crucial that no false expectations be created by letting people believe that technology has the answers to their social problems. Technology certainly will help, but a social change might be an indispensable requirement for development.

In summary, no technology is appropriate for a country, when there is an "inappropriate economic system"; on the other hand, an appropriate economic system will not grow and develop if it is not sustained by appropriate technology, that is, technology that makes efficient use of resources, and contributes to accelerating the process of national and human liberation.

Ricardo Navarro is President of the Centro Salvadoreño de Tecnología Apropriadada (CESTA) in San Salvador, El Salvador. CESTA is a non-profit independent organization, in charge of promoting the implementation of technologies appropriate to the social and economic conditions of the country.

from the social environment into consideration when deciding what type of technology should be introduced into a particular development situation.

The interest of the O.E.C.D. has been the prelude to similar initiatives from other international development bodies. The World Bank, for example, shifted its policies in the late 1970s away from merely concentrating on factors which influence economic performance to the need to build up a social infrastructure which could guarantee this performance, and in many cases this meant developing an indigenous capability to produce food or power through techniques that could exploit locally available resources. In a similar vein, many large multinational companies realized that they were likely to sell more of their products abroad if these products

could be tailored to the specific needs of one country or another, and therefore started to produce goods which were "appropriate" to local market conditions, such as the solar heaters produced for India by the Grumman Corporation, or the Ford Motor Company's efforts to produce a car designed specifically to operate in Third World conditions.

Further evidence of the extent to which what was a novel idea ten years ago has now entered the mainstream of development thinking is provided by the report of the Brandt Commission, published earlier this year. This report states in supporting the need for appropriate technologies in Third World countries, that there is an "urgent need to provide new incentives to develop appropriate technologies and, almost more im-

portantly, to make them known to everyone". Finally appropriate technology thinking has even penetrated the spheres of the Trilateral Commission, the organization formed by New York banker David Rockefeller to coordinate the response of private, industrialized-world institutions to the demands being made on them by the newly emergent economic powers in the Third World. In an article in the Commission's regular magazine, *Dialogue*, Dr. Umberto Colombo, head of Italy's Nuclear Energy Commission, argues that appropriate technologies are "indispensable for the survival of hundreds of millions of people who would otherwise be completely left out of the development process."

Such arguments illustrate a fundamental shift in attitude that has occurred within the industrialized countries towards the type of technological strategy that they feel the developing countries should adopt. There has been a relative weakening of the idea that the rate of development can be maximized only through transferring highly advanced technologies and letting the effects trickle down through the society; at the same time, Dr. Schumacher's ideas that technology should be tailored to specific social and environmental conditions have slowly gathered force. But this process has coincided with a completely separate one within the developing countries themselves. The more they have tasted the fruits of scientific and technological progress, the more effectively they have been able to recognize and articulate demands for greater control over those fruits and the processes which produce them. Frequently this had led to direct challenges to the multinational ownership and control of productive enterprises, and in forums such as the United Nations the developing countries have been able to use their political power as sovereign states to compensate for their economic weakness in demanding a fairer share of the rewards of "progress."

The Reaction

The developed countries have reacted to this by maintaining their commitment to supporting growth in the Third World, but at the same time by doing what they can to ensure that the *patterns* of growth present a minimal challenge to the operations of private capital. If the technical norms which structure technology transfer agreements are those determined by the demands of "efficient" production, then the political norms structuring the same process dictate that private capital should retain the right to organize and control production. The economic and political aspects of technology transfer coincide in this way to ensure that the creation of private profit is maximized; and one of the main problems with this is that it implicitly undermines any attempt to create a development strategy in which the search for private profit, and the forms of social exploitation and control which this frequently entails, are not allowed to dominate all other considerations.

Appropriate technology does not escape this dilemma. Intermediate technologists, in particular, like to argue that technology is politically neutral. At the same time, however, those Western institutions which are increasingly beginning to support appropriate technology ideas clearly have a political as much as an economic goal — even if they are not prepared to accept it as such — namely to develop a rational system of global production and consumption which, eventually, provides optimal conditions for the continued expansion and dominance of private capital.

There is for example, the frequently heard argument that one of the values of appropriate technology lies in its ability to stimulate and encourage local entrepreneurial talent. To quote Dr. Colombo of the Trilateral Commission, "The main function of appropriate, low-cost technologies would be that of helping initiate a process of development by stimulating the innovative forces that exist in any community, and that would be penalized by an industrialization process based on capital-intensive, large-scale technologies which, in a narrow market economy, have a higher productivity than the more labor-intensive, smaller-scale technologies suitable for decentralized economies." In other words, appropriate technology as Dr. Colombo sees it is essentially a formula for small-scale, rather than large-scale, capitalism, of the type which needs to be encouraged.

Such an approach to appropriate technology feeds directly into a foreign policy which stresses a desire by the industrialized countries to remain in control of the

Continued on page 32

UPCOMING SPECIAL ISSUES OF SCIENCE FOR THE PEOPLE

The SftP West Coast Editorial Committee is now completing a special issue of **Science for the People** on the theme of Military Research, U.S. Foreign Policy and New Weapons Systems for May/June 1981. **TELL YOUR FRIENDS AND COWORKERS TO BE SURE AND GET THIS EXCITING ISSUE OF SCIENCE FOR THE PEOPLE!**

The Nov./Dec., 1981 magazine will focus on Computers, Automation and Work and the March/April, 1982 magazine will focus on Racism in Science. The Boston Editorial Committee is now soliciting ideas, articles, reviews, outlines for potential articles and commentaries on both of these timely and important subjects. Material should be sent to: Boston Editorial Committee, Science for the People 897 Main St., Cambridge, MA 02139 or call (617) 547-0370 for further details.

Experiment in Development

UPDATE FROM GRENADA

An Interview with Grenadan Consul General Joseph Burke

SftP: We are told in the press here that the revolution in Grenada was actually a coup by a small group of people led by Maurice Bishop. How do Grenadans see it?

Burke: We have to bear in mind that in the years since 1973 the political awareness of the people of Grenada has been worked on. The New Jewel Movement went up and down the length and breadth of our country pointing out to people the atrocities under Eric Matthew Gairy and what the Movement felt was a better way of running the country. While it is true to say that on the morning of March 13th, it was a small group of some 46 people who actually initiated the revolution, it is also true that as far back as 1974-75, in particular, the New Jewel Movement was able to put thousands and thousands of people on the streets of St. George's. It was only when the Mongoose Gang of Eric Matthew Gairy (the Mongoose Gang was a gang similar to the Tontons Macoutes in Haiti) started beating and shooting people (the father of our Prime Minister himself was killed in one of those massive dem-

Joseph Burke,
Consul General of Grenada
141 East 44th Street, Suite 905
New York, N.Y. 10017



onstrations) that the demonstrations cooled off. In Grenada, we have members in the present government who were members of the opposition in the past government. These people were elected even during Gairy's reign when he massively rigged elections. So, these people represent a vast number of the people in our country. Another thing that people might not be aware of is that we have a very young population, a population in which the youth of our country felt starved of identity. People had qualifications and could not find jobs because they did not support Eric Matthew Gairy. It is false to say that the revolution in Grenada was a deed of a minority of people in the country. We have massive support. I would venture to say that now we have the support of at least 90 percent of the population in Grenada behind the revolution. It is a popular, people's revolution.

SftP: How do people participate in the ongoing revolution, in the eco-

nomie decisions, the political decisions, and so forth?

Burke: If you were to go to Grenada now, one of the things that would strike you most is the feeling of satisfaction, the identification that people make with the government. You would hardly hear people talk about "they" referring to the government. They talk about "we". That is because they are part of the decision-making process of our country. The U.S. Ambassador to the Caribbean, Sally Sheltern, based in Barbados, made mention of the fact that our Prime Minister goes on the air and tells people everything! The reason why he does this, and the reason why weekly we have dozens of meetings going on simultaneously in our country, is the fact that we want to keep our people aware of all the issues pertaining to Grenada. People have the opportunity to air their views, to make recommendations, and, may I tell you, in Grenada, you don't have to have a long wait to see a minister.



It's a small society and our ministers are popular, they are of the people. They mingle with and among the people and they hear for themselves a lot of the suggestions, grievances, or criticisms in Grenada. We have a Women's Desk, and complaints or suggestions are being fed through the Women's Desk on the woman question, or indeed on any question. Weekly, there are meetings in all the parishes where decisions and suggestions are channelled to the government. You really have a participatory system going on in Grenada. Immediately after the revolution, for example, 26 of our schools were renovated through voluntary labor. People just kept turning out and refurbishing the schools, painting, doing whatever work there was to be done. All voluntarily. This is how they show their feeling of being a part of what is going on. On weekends we get people fixing roads, cleaning drains, and so on, and the admixture of sexes and ages is really tremendous. This, in effect, is how the people act out their feeling of identity with what is going on in the country.

SftP: How are those projects organized or decided on? Has the revolution created a system of com-

munity organizations and labor organizations or something like that through which people participate?

Burke: From 1973, 1974, 1975, mobilizing the community was a major feature of the NJM's work. Yes, we have any number of organizations, we call them cells, throughout the country that meet regularly. We have a Farmers Club, 4-H, political groups, a women's organization, a teacher's organization, a parent-teacher's organization, any number, any variety of organizations and so on. Information is being channelled through those groups. You have a constant dialogue taking place. It was because of the organizing of the community that when the revolution struck, the NJM was able to just go ahead and call the vast number of our people out and they came massively in support of the revolution.

SftP: Are the economic plans and economic decisions also worked through the people there and the popular organizations?

Burke: Certainly, certainly. One example is the land reform that we have been pursuing. Now, in Grenada we have a lot of idle land. At the same time that the lands are idle we

have young people in the country idle and we're shackled by a large bill for the importation of foodstuffs. We feel it is time for us to increase our production, make our nonproductive lands productive, thereby creating employment opportunities for our people and, at the same time, cutting down on the importation of foodstuffs. We set about by getting the people in every parish and every village to identify, for example, large portions of land that have been underutilized. So they pinpoint those lands to the commission. Once that has been done, the commission considers the recommendations and grievances that come from the people and makes recommendations with regard to the utilization of those lands. Persons owning the lands would be informed of the findings and asked to present a plan which would indicate that they plan to increase production from the land. If they don't want to do that, they are asked to lease the land to the government or to sell the land . . . The government would then turn those lands over to cooperatives within the various parishes. Those cooperatives will, with the aid of the government of course, turn those idle lands into production. So that is one example where you have people participating in what is in fact the basis of our economy.

SftP: Here in the United States there has been a lot of debate about this choice that developing nations are supposed to face between immediate but limited improvements in the standard of living and continued sacrifices by the people in order to build up the industrial infrastructure for later sustained improvements in the standard of living.

Burke: I personally do not agree. I do not see a clear-cut line of a country opting for immediate improvement in the standard of living or continuing to sacrifice for an improvement in the standard of living later. I see those things running concurrently and in the case of Grenada

The island of Grenada, a small oval-shaped volcanic island some 34 km. long and 19 km. wide, is located about 160 km. north of the Venezuelan coast, just south of Barbados. Of the population of 102,000, over 8 percent live in the capital of St. George's, a large port located on the south-west coast.

Since its discovery by Columbus on August 15, 1498, both France and Britain have tried to lay claim to the island. Prior to colonization the island was dominated by the war-like Carib Indians, who had earlier killed off the Arawaks, a more peaceful tribe. In 1649 the French governor of Martinique bought Grenada and established a settlement at St. George's. The French held control of the island for more than one hundred years, finally relinquishing it to the British in 1762. Except for a brief period of French occupation in the early 1870's, Britain held control of the island until it became an independent state in the British Commonwealth in 1967, with Eric Gairy being named as prime minister. Independence as a nation came in 1974. In 1978 a revolution, led by the New Jewel Movement (NJM), threw Gairy out of power.

During its tenure as a British colony, Grenada served as a source of sugar and spices, of which nutmeg was the most important, and became known as the Isle of Spice.

Although the world's largest producer of nutmeg today, it was initially developed as a sugar colony. The British set up huge plantations of sugarcane and, in the late 1700s, started importing large numbers of slaves from Africa to work in them. This fact, coupled with the destruction of the native Indians, helps explain the present-day composition of the population, where over 95 percent are of African or mixed descent. Although slavery was abolished in 1833, the Africans and their descendents continued to be exploited rather fiercely, having no real choice but to work on the British-owned plantations. This exploitation continued after independence, under Gairy's despotic rule. Only since the revolution have the lives of the broad masses of people been substantially improved.

Historically, the major crops have been bananas, sugar, cocoa, and nutmeg. After the emancipation of the slaves in 1833, sugar production declined and gave way to the growth of the banana industry. Bananas were the dominant export until 1969. Since then, production has declined while coconut meat and other coconut products have become more important as exports. Today, the two most important exports, and those for which Grenada is known, are nutmeg and cocoa.

I think this is what is happening. We have been observing an immediate improvement in the standard of living. We have created more employment opportunities, we have begun processing our own fish, and we have begun to diversify the production of food crops, so we have already seen an immediate improvement. We have a scheme where we assist people in repairing their homes to make them more livable. At the same time, we are embarking on developing industries. We are not going to make the mistake of some countries where they talk about having industrial development but mean that parts from more industrialized countries would be shipped to their country to be assembled, because we see that if you do this, you are playing into the hands of the countries from where the parts are coming. They could manipulate and create unemployment or what have you. We in Grenada know that we have an agricultural country, and whatever industry we try to develop will be centered around agri-industrial development. We see immediate improvement in the standard of living

and a long term improvement in the standard of living going side-by-side. We do not see that you have to suffer now so as to benefit later.

SftP: Are you receiving aid from other countries for your development plans? Is there any cooperation in development between you and other nations?

Burke: Of course. We have been getting quite a lot of assistance. Let me say that the Organization of American States (OAS) has been very forthcoming. What happened in the last administration, we understand, is that they were unable to produce any type of plan or program and therefore were not able to get the type of assistance from the OAS they might have. Since the revolution, we have been able to produce proposals for that organization and they in turn have given us a lot of assistance in the areas of health, education, family planning, and things like that. Also we have been able to secure a lot of assistance from countries in our region. Panama, for example, is helping us to improve our livestock industry.

Venezuela has come in with much assistance with regard to the building of our international airport building. Cuba by far has given us the most assistance with regard to the building of our international airport. They have also given us assistance with regard to improving our health system and have helped us with our water supply system. For the fields we have gotten grants from countries like Iraq and Libya. We have gotten assistance from Kenya, Nigeria, and Canada. The point I'm making is that we have been able to show to these countries that we intend to introduce programs which would serve to benefit the masses of our people, and to a large extent they have been very responsive. For example, we intend to develop a fishing industry and we realize that we must have facilities for refrigeration. Czechoslovakia has promised to come to our assistance in that respect. We have a very bright team of people in the government, good men and women. They are able to show programs geared towards improving the lot of the masses of our people, and countries have been responding.

SftP: At the present time, what does the New Jewel Movement see as the role of science and technology in development?

Burke: I mentioned that we are going to develop a new fishing industry. A lot of the people we have sent away on scholarships, rather than indulging, as in the past, in law and medicine, are engaged in studies centered around agri-industries, canning, preserving fish, agronomy, soil mechanics, and engineering. We see technology as being very important to us in Grenada, especially in the field of energy. We have a very windy country and we feel that we should be able to generate electricity from wind power. We think that, being in the tropics, we could capitalize on solar energy, and so we're looking at those possibilities. We are studded with rivers, not anything as big as in the United States, but nonetheless rivers and waterfalls, and for a number of years there has been a lot of talk of developing hydroelectric power, and we are also looking into that. Bear in mind that we are a small country looking at various ways in which we hope to improve on our energy. You can see that the introduction of science and technology in those areas would be very important to us, as well as in fishing, in agriculture, in the development of electricity, in medicine, and in other areas. But I don't think we are going to be thinking of better ways of assembling motor cars.

SftP: How would you characterize your approach to developing technology and a scientific base in your country? Are you importing technology from developed nations, developing indigenous technology or what has been called appropriate technology?

Burke: It's both. Really, we do not have to import much, because a lot of our own nationals live in the United States, they live in the United Kingdom, they live in Canada, and they are involved in science and technology. So, we see it is important to encourage, to try to bring

back into Grenada some of our own people so they can apply their skills. In that way we are not really importing technology. With regard to local technology, if I may use that term, already we have begun to see that evolving. For example, we have started smoking some of our fish and salting some of our fish. If you were to look at recent issues of our *Free West Indian* newspaper, you would see that some of our young people in fact invented an oven for the curing of our fish. Not only invented it, but they have already improved on it. So we are working on both aspects. Naturally we will need assistance. Right now we are putting in a new international airport, and we need to bring in technology from the outside. We do not see it as either one or the other.



Graphic Courtesy of "Grenada News"

SftP: What can we do to help, either as Americans or as people with scientific and technical backgrounds?

Burke: Generally, I would say people can help by firstly learning more about what is happening in the Caribbean as a whole and in Gren-

ada in particular. The formation of Friendship Societies, a St. Louis-Grenada Friendship Society or whatever, with a view to assimilating and disseminating information about our country is very important. Tourism plays a great part in the economy of our country and these organizations could also organize tours, trips, and what have you, to Grenada. Perhaps more directly, in sending materials to be used in schools. Already we have had quite a lot of assistance from the United States in the form of video and audio equipment to be used in public education in the field of health and in general education. Things that you might think simple, like pens, pencils, notebooks and textbooks to be used in our schools. Medical equipment, any amount of antibiotics, aspirins, disposable syringes, things like that, wheel chairs, bed clothing, any sort of medical item could come in useful. Also we would like, if skilled persons could take a week or two and come to Grenada and give some assistance on a consultative basis or in practical terms, especially people in the field of education, we know you get long vacations in the United States, you can come down to Grenada and give some assistance in our education program. Any number of things. What I would suggest is communication could be sent to our office in New York, directly to Grenada, or to our office in Washington, D.C., if any person or any group of persons think they are able to give assistance in any way. Of course, to be more direct, money is always handy, and bear in mind that the American dollar is worth 2.7 of our dollars. A few thousands of dollars could go a very long way towards improving the lot of our people. We have started to put up day care centers, so any type of equipment that could be used with preschool youngsters — playpens, plasticenes that children could use for making various forms, drawing equipment — all these sorts of things could be very, very useful for us. □

More Than Better Pay

IF THE SWEDES CAN DO IT. . .

by Matt Witt

In some ways, it was just like an American or Canadian sawmill, with conveyors moving past the saws which reduced logs to cants, cants to boards.

But to the visitors from the International Woodworkers Association (IWA), there was something very different about this sawmill in Sweden.

It was so quiet that they didn't need ear plugs in much of the mill, and they could actually talk to each other over the sound of the machines.

It was so clean that no dust had accumulated on the floor or equipment.

Bright lights reduced both the stress on workers and the chance of accidents.

Enclosed booths for machine operators looked like offices, with comfortable seats and little or no vibration in the floor.

It wasn't paradise, but the work environment in the Anebyhus Company's sawmill was much better than in mills in North America. And it was just one of many impressive work sites visited by eight IWA members and staff and two government officials during a two-week study tour of the wood products industry in Sweden.

(The tour, which was made possible by a grant from the German Marshall Fund, also included visits to West Germany and Austria.)

IWA group members met dozens of local and national officials of government, management and unions, who taught them not only about wooden shoes, fermented herring, and Swedish drinking songs, but also about the Swedes' highly effective program for job safety and health.

The North Americans had a chance to see with their own eyes work environment improvements in sawmills, logging, board plants, and pulp and paper mills. And they were able to ask probing questions about the laws, union contracts, and overall philosophy that made those improvements possible.

The Swedish system they saw has three main features.

First, Swedish workers have won real power to prevent hazards, as well as the training to enable them to use that power.

Second, the unions have a major voice in research programs on safety and health problems. Those programs are conducted through cooperative efforts of employers, manufacturers of industrial equipment, university researchers, government experts and rank-and-file workers. Research generally is designed to find specific solutions which can be put into practice.

Third, the Swedish unions are trying to improve the total work environment — not just safety and health in the narrow North American sense. They recognize that physical safety hazards, health hazards such as noise and chemical exposure, and stress from heat or cold, speed-up, or boredom are not separate, unrelated problems. They are aware, for example, that noise, stress, or chemically-induced headaches may contribute to accidents, and that stress over long periods of time is often a health hazard.

The Swedes are concerned not only about injuries and illnesses but also discomfort and lack of job satisfaction. They believe that all workers — not just corporate executives — are entitled to as humane a work environment and as much control over their jobs as possible.

A Real Role For Workers

In North America, labor-management "cooperation" on safety and health is usually an empty slogan because the employers have virtually all the decision-making authority. But in Sweden, cooperation works because the unions have real power.

The key to the Swedish system is the safety committee. Under a combination of national laws and contracts, every Swedish workplace with 50 or more employees must have a labor-management safety committee — *with more than half of the committee members elected from the union.*

This article was reprinted with permission from the Supplement to the International Woodworker Newsletter, of the International Woodworkers of America.

Matt Witt is currently of the American Labor Education Center, an institute for publications and training programs for workers. He was formerly a staff member of the United Mine Workers and editor of the Mine Worker Journal.

In smaller workplaces where the workers feel a committee is necessary, one must be created. Otherwise, a "regional safety representative" from the union plays the same role as the union committee members in a larger operation.

The union-dominated committees (or the regional representative) have the right to:

- **Veto any plans for new machines, materials, or work processes** for safety and health reasons. For example, at forestry operations visited by the IWA group, the union safety committee members were involved in choosing the model of chain saw the company would purchase. Pentachlorophenols are no longer used as wood preservatives because of worker complaints. Workers at a logging company said they have refused to work with the herbicide 2,4D in situations in which thinning could be accomplished manually with brush cutters.

- **Decide how to spend the company safety and health budget.** The size of that budget is negotiated at each operation, and was considered too small by each local union the IWA group visited. But union control meant that the budget was being spent on solutions to the most serious work environment problems — control of noise, dust, and chemicals — rather than being siphoned off for projects to improve productivity.

- **Approve the selection and direct the work of the company doctor, nurse, safety engineer, or industrial hygienist.** At the Ala Company sawmill, for example, the fact that the doctor and nurse report to the safety committee seemed to allow them to worry more about the health of the workers than about company profits.

"We have the advantage that when we treat a worker, we know what his working conditions are," explained Dr. Bertil Jonsson. "And it is part of our job not just to treat the patient but to recommend ways to change the working conditions so the health problem won't happen again."

- **Review all corporate medical records, monitoring results, and other information on hazards.** The Swedish unions have made access to information such a high priority that often when the group met with top company officials and a local union safety committee member at the same time, the managers would refer most questions to the union representative because he was more knowledgeable about safety and health.

"The whole idea of the Swedish system is that workers have the right to be involved in workplace planning and design so hazards can be *prevented*," explained Denny Scott, the IWA researcher who led the study tour.

"The system is set up to minimize the number of cases in which workers must either accept hazards or lose wages while something is corrected," he said.

To monitor conditions on a daily basis, enough union safety stewards must be elected to cover each work area on each shift at all Swedish workplaces with five or more employees. These stewards, as well as indi-



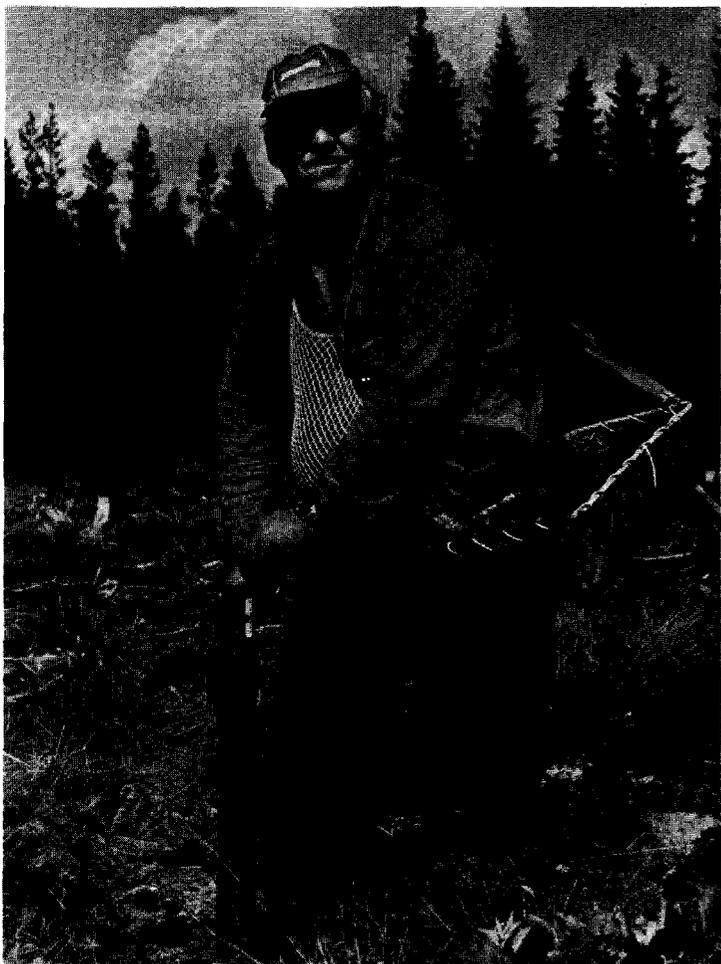
Earl Dotter

vidual workers, have the right to shut down any dangerous operation until it can be corrected — without fear of punishment. The mere threat of shutting down an operation seems to be quite effective, because stewards have had to actually use that power only about 25 times per year since it was established by law in 1974.

Union stewards, safety committee members, and regional representatives have the right to determine how much time they need to carry out their duties. Although chosen by the union, all are paid from employer funds.

Providing training for these union personnel is considered a cost of doing business in Sweden. In 1972, the unions won passage of a law creating a national Work Environment Fund. It is financed by a 0.1 percent payroll tax on all employers, and guided by a union-dominated board.

The Fund has paid for the training of more than 4,000 safety stewards from the Swedish Woodworkers union, which represents 67,000 workers in sawmills, board mills, and other wood products manufacturing plants. Training has been provided to about 2,000 stewards from the Forestry Workers union, which has 25,000 members.



Earl Dotter

Classes are given during normal work hours, with employers paying lost time. In the two-and-a-half years ending in June, 1979, woodworkers' employers paid \$1 million in lost time wages for safety training. Forestry employers have been required to spend more than \$700,000.

The 40-hour basic courses cover such topics as workplace planning, noise, ventilation, toxic substances, illumination, "ergonomics" (the science of fitting the job to the worker rather than the worker to the job), and "psychosocial factors" such as job satisfaction.

Courses are taught in "study circles" rather than with the formal classroom approach usually used in North America. Trained study circle leaders, who generally are workers rather than safety technicians, guide the discussions.

Safety stewards say the study circle method teaches them to work together and to rely on experts only for technical advice. Written materials and film strips explain basic principles, which are then applied by the students during special workplace inspections. A study circle graduate goes back to work with lists of conditions which must be corrected.

Lennart Olsson, chief safety steward at a large government-owned hardboard mill, told the IWA group that the basic course "worked very well."

"It used my own workplace as the subject matter," he said. "That's the best way to learn."

Practical Research

Both the forestry and woodworking industries have national work environment research committees, run jointly by the employers and the unions. Much of the research is financed by the union-dominated, employer-financed Work Environment Fund. The committees review all proposals from researchers to the Fund. The Fund is now spending more than \$1 million to teach Swedish union representatives both to evaluate those proposals and to develop more of their own.

One work environment research group has been working in 15 sawmills, a similar group has concentrated on woodworking factories such as furniture and prefab housing plants, and a third has worked in forestry under another \$1 million Fund grant.

These groups have succeeded because they include not only engineers, professors, doctors, and psychologists, but also representatives of the unions, employers, and equipment manufacturers. They have demonstrated methods for controlling noise, dust, chemicals, and other hazards, as well as for redesigning jobs to make them less stressful.

In contrast to the North American system, in which research is mainly distributed to other researchers, the Swedish groups' achievements are being explained to the unions' regional safety representatives — at Work Environment Fund expense — and the representatives will, in turn, educate local union stewards.

Bengt Ager, a professor who has served as leader of these research groups, told the IWA visitors that, "We are forming a circle of communication between those who study and design industrial equipment, those who make it, those who buy it, and those who use it every day."

Throughout their two-week tour in Sweden, IWA group members had many chances to see how the process Ager described has paid off in reducing workplace hazards:

- **Noise and dust.** The Swedish standard for average exposure to noise over an eight-hour shift is 85 decibels — only half as damaging to the ear as the 90 decibels allowed in the U.S. and Canada.

Noise control in logging has been achieved mainly by mechanization. With smaller trees to work with than in western North America, the Swedes are able to do much of their falling, bucking, loading, forwarding, and hauling by machine. Operators are provided fully air-conditioned cabs which reduce noise and dust and allow them to do the job comfortably and efficiently in all seasons.

At the Anebyhus sawmill, work environment researchers have helped the safety committee make dramatic improvements. Acoustical tile and a concrete-wood sound absorbant mixture are used on the ceiling and walls to reduce the spread of sound from conveyor belts. For purposes of both noise and dust control, saws are completely enclosed in housings the size of small rooms, which are entered only for maintenance. Wood dust levels in the mill air are below one milligram per cubic meter.

Saw blades at Anebyhus are chosen for the best design for noise control; adjustments in the angle of the teeth can mean a reduction of 5 decibels when cutting, 10 when idle, according to research engineer Anders Soderqvist.

"A lot of things we saw, like controls for your noise or your dust, were simple, things anybody could understand," reported tour member Joel Hembree of IWA Local 3-536.

"Research doesn't have to be some complicated thing, only for what you'd call 'experts,' " he said. "A lot of what they're doing is just common sense. And if they can do it, so can we."

At a Wood Research Center established by the employers and unions in order to find cheaper hazard control methods for small businesses, the IWA group was shown a demonstration system for exhausting dust from a saw. The guard was placed as close as physically possible to the blade so dust would have no way to escape. The suction hose was placed below the saw at the point where the blade's centrifugal force was throwing off the dust. Suction occurred only when the saw was cutting; when it was in idle position, the suction cut off.

This system effectively reduces both dust and noise levels. There is less noise from ventilation when the saw is idle. Proper placement of the suction hose means that ventilation noise when the saw is cutting is also reduced because the amount of air needed is less.

"We are not preoccupied with standards, standards, standards," said Rolf Ottosson, employer representative on the center's board. "Standards are necessary, but they only tell you the state of scientific knowledge today, and they may always become more strict tomorrow when our knowledge changes. So we are trying to use our design expertise now to *anticipate* problems and to find ways to modify our processes in the best way possible."

● **Accidents.** The Swedish National Safety Board, similar to OSHA in the U.S. and the provincial workers' compensation boards in Canada, does issue standards, and its research shows that they make a difference. For example, chain saw-related hand and wrist injuries in the logging industry were reduced by 90 percent between 1967 and 1976, primarily as a result of new requirements for hand guards. A foot and leg injury reduction of more than 50 percent was achieved in one year through the introduction of chain brakes.

Researchers from the College of Forestry didn't have to dig very far to find that slips and falls while climbing onto equipment are a major cause of injuries. Employers traditionally have argued that the only answer to the problem is pep talks to encourage workers not to be so "careless." Ladders leading up to the cab are often either not provided or jerry-rigged so that they are easily broken. With some prodding, Swedish manufacturers have solved the problem. They now build into logging machines a set of hydraulic stairs which is raised and lowered automatically as the machine is turned on and off.

"In the past, we only worried about the work environment after a machine was built," said Ake Ullman, safety director for the Osa forestry equipment company. "Now we find we can discuss work environment ahead of time and put it right in at the design stage."

● **Physical stress.** Studies in the forestry industry confirmed workers' reports that large numbers of loggers, especially older workers, suffer back problems. Employers, union members and researchers together developed a system for using one log as a bench and then falling other trees on top of it. Under this system, buckers don't have to bend over as far.

Noting that this technique might not always be practical, tour member Verna Ledger, IWA Region I safety director, commented, "The point is not whether we can adopt every solution the Swedes have found. The point is that we can adopt their way of thinking and then find our own answers."

"Their concern for older workers and people with back trouble is typical of their concern for the total work environment and for the total worker," she said. "That's what we have to learn from."

● **Psychological stress.** At the Ala Company sawmill, the IWA group saw a booth in the trimming plant that was constructed for use by two operators monitoring a conveyor belt. The two-person booth protected the workers from noise and dust without forcing them to spend an entire shift totally isolated from other people.

When IWA tour members entered the booth, the workers were talking and listening to a radio. The operators' controls were embedded in the arms of their chairs, so that the workers' arms were supported all day. The two men rotated with a third worker who was physically handling lumber on the belt, so that each operator was in the booth for 40 minutes and outside it for 20.

At a large, cooperatively-owned forestry company, schedules of eight hours' work plus a total of an hour for lunch and breaks had been changed to reduce operator stress. Under the new system, each operator worked three hours on the machine, three hours off it, and then three hours on.

Workers told the IWA group that because of the three-hour break they could produce as much in six hours on the machine as in eight under the old system.



Earl Dotter

One of the company's shifts began three hours after the other, so the equipment was in use for 12 hours.

"You can't keep cutting or bucking for an entire shift without getting tired and making mistakes," said a young worker operating a limber-bucker. "It's bad for your health because of all the pressure, it's bad for safety, and it's bad for production."

● **Unsafe payment systems.** A wildcat strike by Swedish forestry workers in 1975 ended the piece rate system in many companies. A Work Environment Fund study found that the new hourly rate system resulted in 30 percent fewer accidents and 35 percent less lost time. Yet there was no evidence of a decline in productivity.

● **Uncomfortable protective gear.** Swedes, like workers all over the world, do not like to wear uncomfortable protective clothing. College of Forestry researchers surveyed 2,000 loggers to find out their specific complaints. Not surprisingly, the workers said their hard hats were too heavy, eye protection blocked their vision, and ear muffs created too much pressure. Fol-

lowing the survey, equipment manufacturers were persuaded to design much more comfortable gear than is generally used in North America.

Work Environment and Politics

Why have Swedish employers accepted expensive work environment programs? One reason is that they had to. The basic structure of the system was created under the labor-backed Social Democratic party, which until 1976 had been in power for 44 years. About 90 percent of Swedish workers are unionized, compared to 20 percent in the U.S. and 31 percent in Canada.

Most employers also see work environment improvement as a way to reduce absenteeism, wildcat strikes, and other results of worker unrest. When many North American employers resort to the stick, their Swedish counterparts often try to use the carrot.

"When we have a national absentee rate of 10 percent, we have to start asking questions about the motivation of the 90 percent who do come to work," said Dr. Rolf Lindblom, a work design specialist for the Swedish employers' confederation. "What can we do to make work more rewarding, more satisfying, and with less danger?"

In addition to increasing worker motivation and productivity, some employers hope that work environment improvement will take the steam out of growing union demands for control over the Swedish economy. A new law provides for "co-determination," or employer consultation with unions in making business decisions, and the Swedish labor movement is proposing eventual union control of all of the country's businesses, 90 percent of which are now privately owned.

"Our goal is to reduce conflict," said C.G. Sandberg, an employers' confederation psychiatrist. "Whenever there is a concentration of resources, or power, you get a 'we and them' psychology. We want to improve communication, to solve problems people have, so this kind of conflict will not occur."

Ironically, Swedish unionists see the work environment movement as part of their overall drive toward "economic democracy." They want not only to save lives, but to improve the *quality* of life on the job as well.

"The fight to have more power in the workplace was the logical next step for Swedish workers," said Birger Viklund of the Swedish unions' Work Quality Center.

"For decades we fought for political democracy — the right to participate in government," he said. "Then we fought for social democracy, or security for every person to have a job, health care, and a place to live. Now we want economic democracy, which means not only a larger share of the wealth but also more control over working conditions.

"We don't believe that a few people should have all the control over decisions that affect the lives of so many." □

EARTH DAY AT LIVERMORE IS LIKE BROTHERHOOD WEEK AT AUSCHWITZ

by Adrienne Aron



Ever since Three Mile Island, which forced me to confront my previously unacknowledged anxieties about radiation, I have arranged little exercises for myself, to avoid lapsing back into denial — denial of the issue's magnitude and importance, denial of the ways in which it was affecting my life, denial of the tricks I was using to avoid looking at it. As a psychologist I know the value of these little exercises, and as a resident of the San Francisco Bay Area it wasn't hard to plan an afternoon trip to Lawrence Livermore Laboratory (LLL), where scientists not only design nuclear weapons, but lobby for their proliferation. If one was after reality, here was a choice spot.

Throughout the earthquakes, isotope leaks, and health studies that have given the little town of Livermore international renown, Lab officials have insisted that the public has no reason to fear the radioactive materials created and stored there: they are safe from earthquakes, harmless when leaked, and not responsible for the elevated cancer rates among laboratory employees. When the press was led through the plutonium facility, reporters were advised that the scientific community does not share the lay public's fear of radioactive substances. Lab scientists expose themselves and their families to these alleged dangers every day. Would they do that if the dangers were real? Certainly I wouldn't. And that is what brought me to Livermore. I wanted to find out how these folks were calculating their risks and how, through the Lab's information media, the public was being helped to make realistic calculations of its own.

The information media were expanded on the day of my visit, for in addition to the lavish Visitors Center, there was a temporary exhibit on the premises, established for the commemoration of Earth Day. As befitted an Earth Day exhibit, I saw a number of tables holding pictures, charts, microscopes, wind-run devices, and cages with small animals. Looking just past the fair-ground, though, to the barbed wire that encircles thick, windowless buildings which block the view of the green hills beyond, I noted that these fine exhibits, celebrating

Adrienne Aron is a member of the East Bay chapter of SftP and lives in Berkeley.

LLL's scientific contributions toward a safer environment and a healthier life, seemed strangely incongruous. Was I mistaken, or was this the place where workers were dying of melanoma, plutonium was leaking out the smokestacks, and weapons were being designed that threaten to destroy the whole world? The guards and the forbidding buildings told me I was not mistaken, yet this whole outdoor display for Earth Day belied it: Lawrence Livermore Laboratory was depicted here as a friend of the earth, without so much as a slingshot in its pocket. Here in the backyard of the weapons laboratory there was no mention of war, and in clear view of the chimneys there was not a word about plutonium.

All the data I had previously examined supported the view that a discharge of toxic radioisotopes, whether from bombs, power plants or storage sites, is certain to lead to cancer, probably cancer epidemics. LLL scientists testifying to Congress in 1973 had admitted that "one pound of plutonium-239 represents the potential for some nine billion human lung cancer-doses. It presents a major carcinogenic hazard for more than the next thousand generations." Given all that, I expected Earth Day to feature some reassuring information about safety improvements at the Lab, especially since a plutonium leak had been discovered just a week before. Seeing nothing of the kind, I remarked on the oversight to a scientist tending one of the tables. "Oh, plutonium," she said with a big smile and a wave of the hand, "that's just an alpha emitter; you can stop it with a piece of paper."

What?

I knew what she meant: unlike gamma rays or x-rays, alpha radiation does not penetrate through the body. A piece of paper *will* stop it. So will the outer layer of human skin. But to parlay this into a cavalier dismissal of plutonium's lethal capabilities seemed to me sheer madness, for I knew, as she must too, that an invisible, microscopic speck of the stuff, weighing as little as a millionth of a gram, was enough to kill either of us if the air blew it around that piece of paper and into our lungs. Lodged there, its bombardment of surrounding tissue would in time produce a malignant pulmonary tumor; if carried away by the blood, the insoluble particle would generate a cancer wherever it finally settled: in

the lymph nodes, liver, spleen, adrenal glands or reproductive organs. This scientist was suggesting, though, that plutonium poses no threat . . . a curious idea. Then she went on to say something even more curious, something which hinted that the real problem with plutonium is not radiological contamination, but rather its unpopularity.

Commenting on the subject's omission from the Earth Day exhibit, she pointed out that nobody likes radiation — as if low popularity ratings were sufficient reason to exclude a villain from the show. In my business excluding unhappy thoughts from consciousness is called *denial*, but here at Livermore I was trying to learn how people in the science business are thinking, and they seemed to be thinking in terms of box office receipts. Had I come to the laboratory, or the theater?

Nobody Likes Radiation

Applied to me, the scientist's point was well taken. I don't like radiation. At Livermore's Earth Day, had the pictures of suffering firs, there to illustrate "Smog Effects on Individual Trees", been instead pictures of Hiroshima victims, captioned "Radiation Effects on Individual Human Beings", I would not have found that pleasant. Similarly, at the Visitors Center I could enjoy the recording that began, "Has your nose ever twitched from a strange smell? Have you ever inhaled a lung full of air that made you cough? These are examples of pollution . . ." It would not have been enjoyable to hear a talk on the devastating pollution resulting from a nuclear blast. And it is a comfort to see that when the nuclear villain does appear at the Lab, he is upstaged by good guys like Patriotism. This happens more than once in the propaganda film on LLL shown in the auditorium, but is particularly vivid when the detonation of a nuclear "device" is shown and we see the circular crater of its aftermath. As this image fades out, the circular shape of the Jefferson Memorial fades in. Had the camera turned to close-ups of cremated and blinded animals near the crater, the effect would certainly have been grotesque.

In this drama of modern life we are living, the part of the villain Radiation is always morbid, and it is not surprising that we should prefer having the spotlight shine on more upbeat things. The only surprise is that the Lab is providing the stage and directing the performance.

At Livermore there is no shortage of upbeat characters to distract attention away from the villain Radiation. But all of them, oddly, seem to have issued from a medieval morality play, as personified principles of righteousness, dazzling the spectator by vanquishing evil. The first to catch my attention, Communication, was featured in a back issue of LLL's monthly magazine, *Newslines*, which I picked up at the Visitors Center. In an article on Three Mile Island we learn that "Communication during the episode fell apart," making it im-

possible for truth to win out, and "creating the false impression that a near catastrophe was narrowly averted." "It is that impression," the author concludes, "not the event itself, that was the disaster . . ." This conclusion, it should be noted, is based on statements by Ernie Hill, who sits on the Atomic Safety and Licensing Board of the Nuclear Regulatory Commission (NRC), and who was evidently hoping that Communication, a popular scapegoat, would steal the show at Three Mile Island. But even I, with a long history of falling for tricks like that, found the performance embarrassing. Communication Breakdown just can't upstage Core Melt-down, even when the NRC so orders it.



Aerial view of Livermore Lab.

Public Relations Office, Livermore Lab.

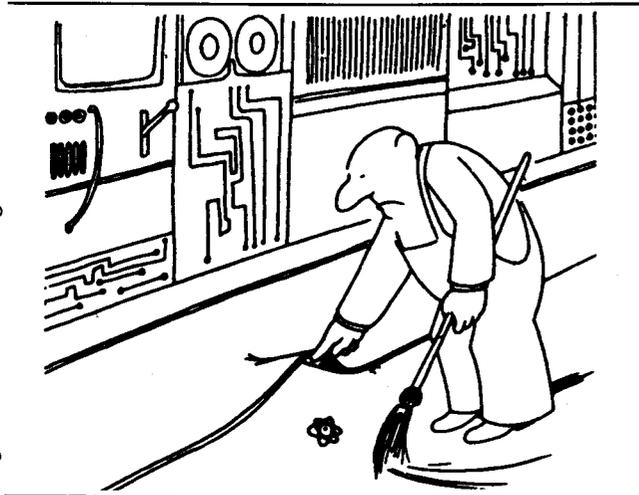
Another symbolic principle of righteousness I encountered was the character Goodworks, who dominated the scene of Earth Day. Thanks to the literature available at the Visitors Center I was able to learn that Goodworks, representing all the Lab's research in the biomedical and environmental sciences, received only 5% of its \$368 million 1980 budget. Considering that Goodworks is called upon to appear in every public performance the Lab stages, and usually does an excellent job of attracting attention away from the villain, I'd say she's underpaid.

Hazards, a quick change artist, is a character who plays bit parts and is good at improvisations. Just when it seems inevitable that Radiation will slip into view, Hazards begins to speak. Under the direction of Bob Kelley, manager of the plutonium facility, Hazards performs as both Botulism, the pernicious toxin a million times deadlier than plutonium, and Arsenic, which remains lethal forever and lurks about in pesticides. Hazards is a leveler, giving equally scary countenances to all the bad guys, radioactive or not.

Wondering if this lack of discrimination among hazardous substances was justified, I asked Bay Area Physicians for Social Responsibility (PSR) whether in their opinion radiological contaminants warranted special attention. Their answer led me to see the character Hazards as a very significant member of the cast, whose role is not only to distract but also to deceive.

Whereas most other poisons have antidotes, PSR points out, most radiological contamination does not. Most other poisons are relatively local, endangering mainly those who manufacture and use them, whereas radioisotopes can destroy and disfigure whole populations and contaminate entire land masses for hundreds of thousands of years. While most other poisons can be safely stored and controlled, radioactive materials are certain to get out of control because the only thing which keeps them safe are the containers in which they are housed: the 55 gallon waste storage drums with a life expectancy of twenty years, already leaking; the power plants built on earthquake faults; and the accident-proof facilities like Three Mile Island and Lawrence Livermore Laboratory.

Sanger/Sueddeutsche Zeitung/Munich



Hazards, it seems, makes furtive appearances on the stage, aware that Truth is always gunning for him and if he sticks around he'll be shot down. My last glimpse of him was when I called the Lab and asked Bob Kelley if he thought there might be some link between the plutonium in his facility and the high melanoma rate on the premises. "Oh no," he said, "No, it's probably going to be something like fluorescent lighting that's responsible."

The last and saddest anachronism in the LLL cast is called Fate. Versatile, Fate acts differently when playing your fate than when playing mine, taking into account our respective habits, ages, genetic makeups, pleasures, and so on. Fate's task is to get us to believe that it's something about us, rather than something about radioactive substances, which imperils our lives. If we are Lab employees who like to eat lunch outdoors, for example, perhaps we are bringing upon ourselves the

The Lawrence Livermore Laboratory, with a 1980 budget of \$368 million and prospects of greater endowments by the Reagan administration, is operated by the University of California for the United States Department of Energy. One of only two national sites for the design of nuclear weapons, it consists of a one-mile-square complex of buildings, protected by an elaborate system of gates, guards and enclosures. In April, 1980, the California Department of Health revealed that malignant melanoma, a deadly form of skin cancer, strikes employees of the Lab five times more often than it strikes people in the surrounding area. Usually a rare disease, ranking about tenth in reported forms of cancer, melanoma was found to rank first in diagnosed malignancies among Lab employees. Although the epidemiological study was widely publicized, no mention of it could be found at the Visitors Center, the Lab's lavish facility for providing science education to the public. The Lab's monopoly on information emanating from the Visitors Center insured that only pro-nuclear/pro-weapon propaganda was available.

The U.C. Nuclear Weapons Labs Conversion Project, a citizens group, has been working since 1976 to sever the Lab's connection to the University, convert the whole apparatus to peaceful endeavors, and inform Lab employees and the general public of the dangers presented by nuclear weapons. With a lawsuit instituted in 1980 the Project broke the Lab's monopoly on information and won the right to place literature in the Visitors Center and to sponsor bimonthly events in the Center's auditorium. A forthcoming issue of *Science for the People* features an article on the work of the Labs Conversion Project.

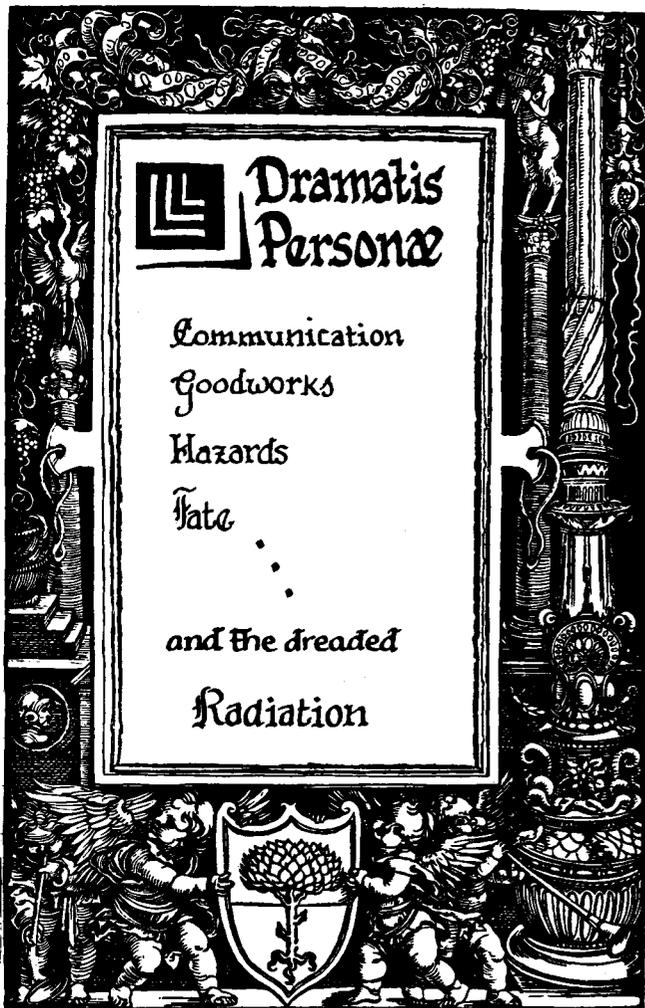
fatal melanoma by imprudent overexposure to the ultraviolet rays of the sun. The scientist who was ready to fend off plutonium with a piece of paper told me,

Let's face it, we live in a dangerous environment. The foods I eat are liable to kill me. If I lived in the desert I'd be exposed to cosmic rays. As a chemist, I'm in a profession with the highest incidence of lymphoma of any occupation. If I were a farmer I'd have skin cancer to worry about.

Plainly, she knew about Hazards. I was soon to learn, though, that she is influenced more by the role of Fate, for when I asked whether she goes for frequent examinations to monitor her health and her exposure to radiation, her answer was, "No, my real concern is my own genetic makeup; heart disease runs in my family, and that's what I need to consider."

This gentle, intelligent woman had begun with the expression, "Let's face it." But it seemed to me she wasn't facing it at all. To face it, I thought, she would have to look squarely at the strong possibility of an accident at the Lab, and at the number of people who, regardless of their occupation or family history or personal habits, would perish in its wake. A mere speck of plutonium, once lodged in the body, begins to kill that body by hitting surrounding tissue with alpha radiation. The body might last twenty years, but 24,000 years from now that same speck of plutonium will still be around, and will still have 50% of its original potency. How long

Adrienne Aron



will we be around, I wondered, if the nuclear industry and the weapons lobbyists of LLL have their way? Not long, I reckoned, unless our scientists throw away their paper plutonium guards and stop blaming their genes for their vulnerabilities to destruction.

I went to Livermore looking for some lessons in reality, and came away alarmed. Hoping to find the advocate's defense of radiation, I found discussions of Communication, of Good Works, of Hazards, and of Fate — probable themes for a medieval morality play, but hardly what one expects from an ultra-modern scientific establishment. As I have explained, I went to LLL with a special agenda, related to my profession and my personal history. What I discovered is that Lawrence Livermore Laboratory has a special agenda too. But it isn't related to scientific inquiry and rational calculation.

In the nuclear era, with the omnipresent threat of intentional or accidental holocaust, a certain amount of denial is necessary, for if we attend to the nuclear problem with an intensity appropriate to its magnitude, we could attend to nothing else. But just as we must guard against being overwhelmed by it, so too we must be

careful of accepting reassurances from irrational sources. The nuclear industry's often repeated rhetorical question, "Would our scientists and engineers expose themselves and their families to these materials if they were dangerous?" invites the listener to trust uncritically the rationality of scientists and engineers, and to ignore what is known about the substances themselves. If one looks closely, though, at the thought processes of the scientists and engineers, one learns that, yes, they *would* expose themselves to extreme dangers, because they have succeeded in building a pretend world where workers stop cancer with paper shields, bosses hypothesize that fluorescent lighting is a stronger carcinogen than plutonium, and danger means whatever you feel like having it mean.

My worry at this point is that the real world will blow up before that pretend world collapses. □

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No Choice for Poor Women

COOK COUNTY— BACK TO COATHANGERS

In a stunning setback to the poor and minority women of Chicago, Cook County Board President George Dunne unilaterally stopped all abortion services October 9 at Cook County Hospital. Stating, "The hospital should not be an abortion mill," Dunne has forbidden the medical staff to perform any abortions except to save the life of the mother. This eliminates both elective and medically necessary abortions.

Besides its obvious racist and discriminatory nature, the decision is seen by hospital workers as another attack on the ability of the hospital to provide top quality services that its patients need. Ironically, Dunne cited the severe nursing shortage and implied that the eight nurses from the hospital's abortion clinic would be reassigned to the intensive care unit. In reality, County Hospital has had over 300 unfilled nursing positions for months. Meanwhile, Dunne has refused to recognize the existing unions of nurses and other hospital workers and delayed signing of a bill which would increase wages near the standard and enable the hospital to recruit more nurses. Dunne's other claim, that this would merely comply with the Hyde Amendment and an even more restrictive Illinois law, is equally preposterous. Neither federal nor state law forbids any county or municipal area from funding full abortion services and County Hospital *never* billed for Medicaid abortions anyway simply due to redtape.

Cook County Hospital, Chicago's only public hospital, has performed 3500 abortions yearly. Prior to the legalization of abortion in 1973, an entire 50-bed ward at County was devoted solely to treatment of "septic abortions," women with bleeding or infection due to self-induced or back alley abortions. Two of the city's

This article was adapted with permission from the Reproductive Rights Newsletter, Fall 1980. For orders or subscriptions write RRN, 1032 West Altgeld, Chicago, IL 60614. RRN is published by the Reproductive Rights National Network, 41 Union Square West, New York, N. Y. 10003.

The "New Right vs. Women's Rights", a pamphlet by Women Organized For Reproductive Choice, examines the interconnections between the anti-choice movement and the New Right. Includes a two-page chart showing the ties between these two groups. The authors take a look at the tactics, goals, and progress of the New Right. Especially timely since the 1980 elections.

Available from Women Organized For Reproductive Choice, Box A 3423, Chicago, IL 60690 for \$2.00 single copy, \$1.50 for 10 or more copies prepaid.

nine private abortion clinics have agreed to provide abortions to low-income women on a sliding scale, at least temporarily. For thousands of poor women in Chicago, however, there is essentially no longer any reproductive choice. Within a week of the stoppage, a young Latina woman was admitted to County with an uterine infection secondary to an attempt at self-induced abortion. Meanwhile sterilizations at the hospital continue to be funded.

A coalition to fight for abortion at the public hospital was formed the same day Dunne's order went into effect. Members of the coalition include Chicago Women Organized for Reproductive Choice (R2N2), Illinois Welfare Rights, Midwest Women's Center, Planned Parenthood, National Abortions Rights Action League, Religious Coalition for Abortion Rights, the Lawyer's Guild, house staff and nurses from County Hospital, and lawyers from the woman's law project of the Legal Aid Foundation (who argued Williams vs. Zbaraz before the U.S. Supreme Court at the same time as the McRae Decision).

On October 20 over 200 angry women and men from the community and the coalition packed the regularly scheduled County Board meeting to demand that Dunne's order be reversed. Although the issue of abortion cutbacks was originally not even on the meeting's agenda, members of the pro-choice coalition forced the Board to allow them to make statements condemning Dunne's action which were widely covered on TV and radio. Eventually the Board deferred the final decision to a subcommittee and agreed to hold public hearings.

The spirit of the public hearings on November 24, 1980 was dampened by the Chairperson of the Hospital Subcommittee's statement, "These women (pro-choice) can ventilate their feelings but no amount of emotionalism is going to change our minds." During the hearings a number of Board members voiced their concern for women whose pregnancies were a result of rape or incest, for young pregnant girls, and for women whose pregnancies would expose them to undue health risks. Despite these concerns, the Board voted to uphold Dunne's decision.

How does this affect the poor women whose main access to health care is Cook County Hospital? Out of desperation, a small percentage of women are resorting to illegal abortions. At least five women have been admitted to Cook County Hospital for complications due to self-induced or illegal abortions since Dunne's deci-

sion. A large percent of women are scraping up enough money to pay for a legal abortion. The rest are having babies. But the statistics do not really show the impact this decision has had on the lives of the women, the loss of control over their lives, their feelings of desperation and fear.

After the hearings, the *ad hoc* coalition joined a permanent coalition of women's organizations, the Illinois Pro-Choice Alliance, to continue the struggle to reinstate abortion services at County Hospital. The first step of the Pro-Choice Alliance is to meet with County Commissioners who are seen as being sympathetic.

With pressure from the community, it is hoped that abortions will be allowed for rape and incest victims and for medical necessity. The medical committee of County Hospital is preparing a medical-necessity clause based on the McRae Decision to present to the Commissioners. Viewing the abortion service cutback as a denial of a public health right, the Committee to Save Cook County Hospital is continuing its support, by discussing the issue at public meetings and writing articles in its newsletter. By organizing both within the hospital and in the community the coalition is building a firm base from which to launch further attacks at Dunne and the Board of Commissioners. □

Hey, We're Looking Good!!!

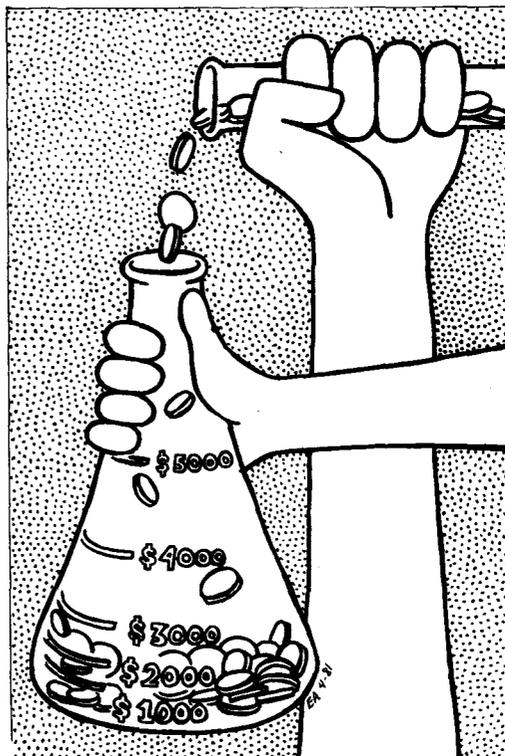
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IDEAS FOR BEGINNERS

Marx for Beginners, by Rius, 1976.

Freud For Beginners, by Richard Appignanensi and Oscar Zarate, 1979.

Einstein for Beginners, by Joseph Schwartz and Michael McGuinness, 1979.
Pantheon, New York, N. Y.

In our society, science and philosophy are generally the province of an elite corps of intellectuals. Brandishing their Ph.D.'s and publications, scientists and other intellectuals often disdain public attempts to scrutinize such aspects of the practice of science as cancer research and recombinant DNA work. From the perspective of the scientific elite, the methods, ideas, and results of scientific work are beyond the ken of the public; hence assessment of the work of scientists ought to be left to the scientific experts themselves.

This view would be justified if scientific ideas were in fact wholly inaccessible to the public and their representatives. Some knowledge of science is necessary if people are to evaluate the merits and social problems of scientific work. Otherwise, we end up with the sensationalist carping of the *National Enquirer* brand. However, what follows from this is not that scrutiny of science must be left solely to the experts, but that there is a serious social need for popular scientific education. Political decisions concerning scientific and technological matters cannot be both democratic and rational unless scientific knowledge is widespread.

The problem goes deeper. Serious intellectual discussion presupposes a stock of fundamental ideas. The works of Marx, Mill, Freud, and other thinkers provide a conceptual background to contemporary debates. These debates often seem on the surface to surround

concrete issues such as the ERA or the genetic basis of IQ, but inevitably a host of philosophical and scientific issues lurk in the background. Again, serious popular political discussion requires knowledge.

In this context, the series of books inaugurated by Rius' *Marx for Beginners* should be very welcome. Using a kind of comic book format, these books attempt to give a lively but accurate outline of the central ideas of influential thinkers. In addition to the works on Marx, Einstein, and Freud reviewed here, the "Beginners" series includes introductions to Mao, Lenin, and Trotsky, an anti-nuclear handbook, and, from Pathfinder Press, Rius' *Cuba for Beginners*. Their ample illustrations and comic irreverence provide a pleasant contrast to the usual academic treatments of these subjects. Accordingly, one would hope to find in the series a valuable contribution to the obvious need for popular scientific and political education.

However, these popularizations face inevitable dangers. Simplification is essential, but it may come at the price of loss of accuracy and intelligibility. Lightness of treatment is attractive but risks reducing the difficult subjects treated to triviality. A gloss on complex matters may engender an illusion of understanding which is politically debilitating as complete ignorance. Most seriously, concentration on exposition of ideas rather than criticism can lead to complacent acceptance rather than the sort of critical evaluation essential to political issues such as the place of science in society. *Marx*, *Freud*, and *Einstein for Beginners* all fall prey to some of these dangers.

Rius' *Marx for Beginners* was originally published in Spanish in Mexico, and later the first English version was produced by the Writers and Readers Publishing Cooperative in Britain. (That edition is republished by Pantheon, which explains why the workers are pictured making such utterances as "blimey" and "ell".) Rius set out to provide a "digest" of Marx's ideas, philosophical as well as economic. The attempt is noble, but the work has serious defects which limit its educational and political value.

Suppose you had a friend who was curious about basic socialist ideas, perhaps in relation to the role of science in society. What would be the result of giving your friend Rius to read? He or she would spend an hour or two enjoying the lively illustrations and picking up an initial acquaintance with abstract terms like "dialectics", "proletariat", and "surplus value". Ideally, your friend would then be stimulated to read more of Marx and think carefully about the applicability of Marx's ideas to contemporary society. More likely, assuming your friend found Marx's ideas somewhat appealing, he or she might start to acquire a point of view commonly called "orthodox" Marxism. This view, codified in the writings of Engels, sees Marxism as the culmination of philosophy, transforming it into a study of political economy in the interest of the working class. The resulting theory of historical materialism describes the inevitability of the supersession of capitalism by socialism and communism.

This is obviously not the place to attempt a critique of orthodox Marxism. I raise the issue to indicate that the Marx of Rius' book is very much the Marx of

Paul Thagard teaches philosophy at the University of Michigan-Dearborn. He is a member of the Ann Arbor chapter of SftP.

Engels' *Socialism: Utopian and Scientific* and *Ludwig Feuerbach and the End of Classical German Philosophy*. Overwhelmed by the horrible task of summarizing Marx's diverse and difficult writings, Rius has resorted to giving us a digest of Engels' digest. Although Engels was Marx's close friend and long-time collaborator, it is debatable whether the view of Marx's thought promulgated by Engels is the most useful today.

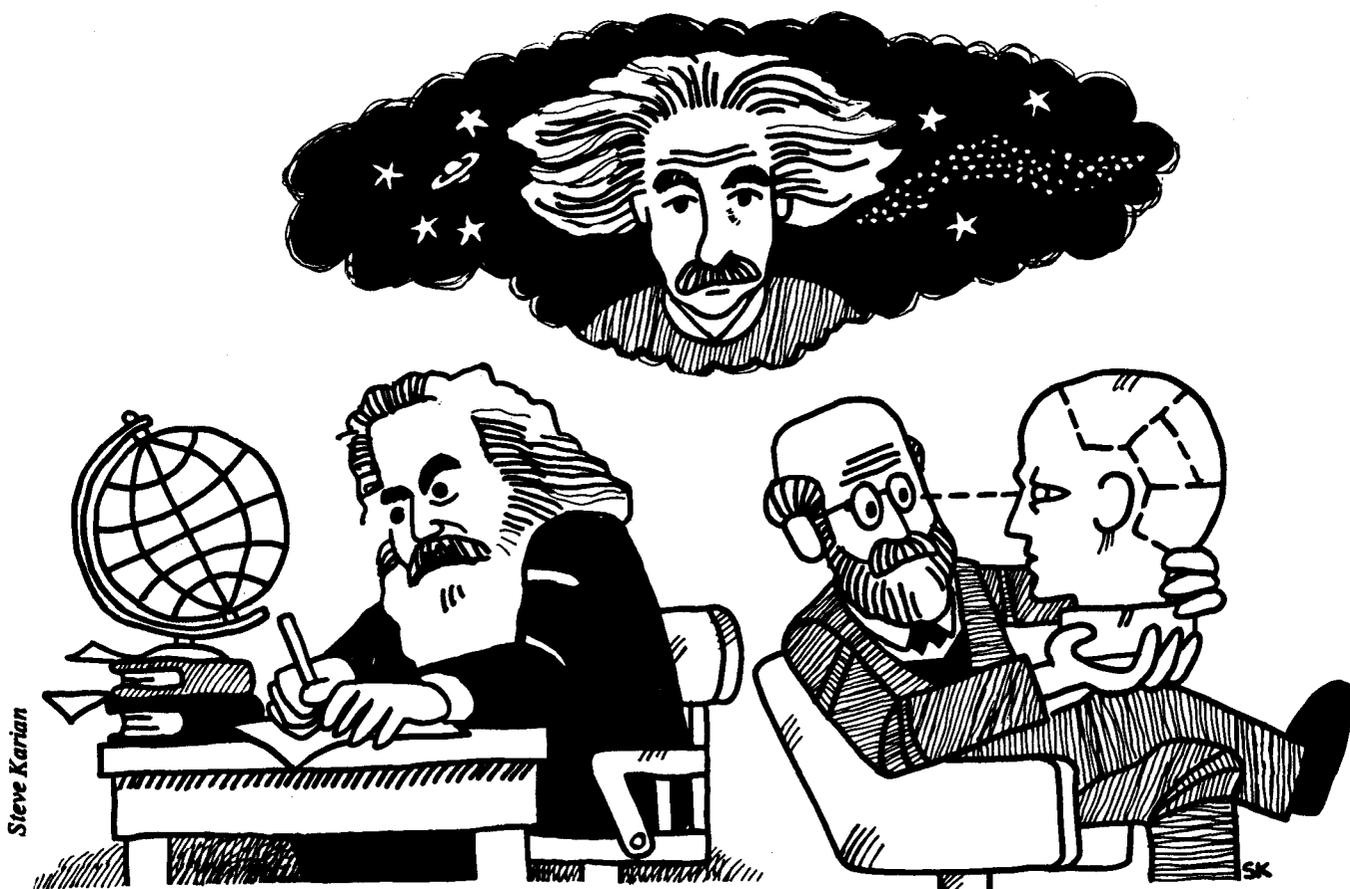
Still, perhaps Rius is not to be faulted for his orthodoxy, since having a synopsis of orthodox Marxism is valuable too. But consider the effect that Rius' book might have on your inquisitive, socially concerned friend. Rius' orthodoxy comes through not only in the strictness of the historical materialist line, but in the *tone* of the survey. Marxism is presented as a solid, worked out, and historically confirmed theory of history. Your friend ought to be greatly impressed by the explanatory power and philosophical richness of Marx's basic ideas, but not at the cost of abandoning critical reflection about social theory. While Rius' exposition encourages one to look critically at capitalist societies, it

discourages looking critically at societies which proclaim themselves to be inspired by Marxist ideas. Rius gives no hint of any possibility of need for revision or even development of these basic ideas.

This is most striking in Rius' account of philosophy. He spends twenty pages romping through the history of philosophy, from Xenophanes to Hegel. Marx then arrives as the philosopher who, by trying to change the world rather than merely interpret it, clears away the metaphysical rubbish of two thousand years. The magic words "historical materialism" solve all the old confused problems. What actually happened was that Marx, who passed from youthful philosophical essays to the overwhelming task of developing his theory of capital, never found time to write a philosophical treatise. Engels took up the task to some extent, but all we have from him are polemics such as *Anti-Duhring* and rough notes such as *Dialectics of Nature*. Dialectical materialism has largely existed as Engels' sketches and Soviet textbooks derived from them. My objection to Rius is not so

much that he presents Marxist philosophy as the supersession of all previous philosophy, but that he falls into the stultifying intellectual attitude that the basic philosophical ideas have all been worked out. Marx's economic ideas, on surplus value and the development of capitalism, are treated with similar reverence. Even a comic book on Marx should hint that it would be amazing if Marx got *everything* right. Part of education at every level should be the encouragement of critical evaluation of theories and authorities. Rius' dogmatism does even more than his orthodoxy to flaw *Marx for Beginners* as an educational and political tool. You would be doing your friend a disfavor to present Marxism as a *creed* rather than as a set of powerful but revisable scientific and philosophical theories.

Freud for Beginners and *Einstein for Beginners* are very different from Rius' book, since their subject matter is not explicitly political. Both give intelligible and entertaining accounts of the leading ideas of their subjects. Both are highly inventive in using amusing illustrations



Steve Karian

and humorous asides to lead the beginners through difficult concepts, from the Oedipus complex through the theory of relativity. From a political point of view, the interest of these books lies in the general importance of the ideas of Freud and Einstein for intellectual background, and also in the attempt to locate their thought in its social and political context. Freud is placed in anti-semitic Vienna and Einstein's work is related to the rise of electrical industries and the later development of the atomic bomb. Such placements are useful in reminding the reader that ideas do not develop in isolation from their surroundings. But the books do not develop the social connections in a substantial way, so they will likely prove disappointing to anyone who wants to use them as a basis for discussion of the role of science in society.

Freud for Beginners, like *Marx*, regrettably lacks a critical attitude. The authors seem to expect that the reader will absorb the content in a big chunk, not pausing for questions, let alone criticisms. Such an attitude is almost justified in the case of *Einstein for Beginners*, since relativity theory has passed difficult tests and remains virtually unchallenged. But the much more open-ended and contentious nature of the ideas of Marx and Freud obligates the authors to include at least a few hints to stimulate the reader to go from asking "Do I understand it?" to "Is it true?"

I hope that my harping will not be taken as implying a general judgement on the idea of introducing complex ideas in a popular format. On the contrary, I would like to see further books in the series, perhaps "Genetic Engineering for Beginners" (well, a different title could

be found), or "Darwin for Beginners". The latter would be a wonderful opportunity to make some of the connections between science and society which the books on Freud and Einstein only allude to. Darwin's notion of natural selection was inspired in part by the political ideas of Malthus, and subsequently had an enormous influence on capitalist ideology, still surviving in the more sophisticated form of sociobiology. I would hope that such a book would also surpass the volumes on Marx and Freud by encouraging the reader to go beyond beguiling pictures and clear expositions to consider the ideas reflectively and critically. Only then can the popular education which the *Beginners* series promises be viewed as helping to meet the real political need for greater public access to science and philosophy. □

Politics of Alternative Technology

Continued from page 14

restructuring of international patterns of production. It is an idea characterized by what former President Carter's National Security Adviser Zbigniew Brzezinski called the "stable management of global change". Its purpose is to mould the debate between the rich and poor countries — or between the North and the South — in a way that ensures that the outcome conforms to the interests of the global centers of economic power. Having agreed that a new agenda needs to be negotiated between the two sides in terms of their respective approaches to the development process, part of the strategy of the industrialized nations is to attempt, where possible, to ensure that the terms of reference under which each agenda item is discussed tend to coincide with these interests. This is as true of the appropriate technology debate as it is of more conventional trade and technology transfer negotiations. Dr. Colombo writes that "In the context of the North-South negotiations, scientific and technological policy should be given adequate attention, as it is a necessary ingredient in managing complexity and change". The key question, of course, is: In whose interests will such complexity and change be managed? And how do the techniques of management reflect the interests that they serve?

As Dr. Colombo suggests, the developed countries are concerned that they should retain control of the way production is organized and controlled in the developing countries, so as to ensure that any surpluses generated should make their way back to the owners of private capital, usually in the developed countries. If we see technology as a *process* rather than merely a set of *products* — and by this I mean as a combination of techniques and the social relations that they embody —

then controlling the forms taken by technological development will ensure that social relations develop that are appropriate to the financial interests of outside investors. One could describe technology transfer policies as providing the scaffolding for a system which can be used to exploit through its internal operation, rather than through the more conventional trade relationships that dominate the market-place.

Many multinational companies explicitly acknowledge such a strategy, although perhaps more in discussing their own production needs than in putting forward their arguments for appropriate technology. Although many were initially opposed to outside "political" interference in the technology transfer process, such corporations have more recently emphasized that they are willing to adopt a more flexible stance, and to discuss how their operations may be brought closer in line with the goals, needs and resources of a host country. At the same time the corporations stress that the price of their cooperation must be the willingness of the host country to accept the way in which the company operates. Not only must there be a guarantee of a stable political environment — i.e. one which is favorable to foreign capital and to the removal of profits — but a host country is frequently also required to accept and respect the particular way that a company has decided to exploit and control the dissemination of technical knowledge, in terms of who shall have access to it and on what terms.

As a result, even where the notion of appropriate technology is absorbed into a development strategy, unless strong countermeasures are taken, the pattern of growth of such an economy can be successfully manipulated without the more obviously inequitable imbalances of trade relationships. Frequently this seems to be done with the active participation of Third World

elites, ready to reap the domestic profits. And often official government policies in the industrialized countries towards technical aid provide the environment in which this strategy can operate. At the time when multinational corporations were opposing demands for a New International Economic Order, the developed countries fell in line with the general argument that equitable relationships with the Third World could be adequately maintained through traditional channels of trade and aid, and that the political balance of economic power was irrelevant in a situation where everyone, it was argued, shared a common interest in maximizing the efficiency of the overall system. Now that even the industrialized nations have begun to realize that some conscious restructuring of the global economy may be desirable, the result has been that the new need is not to oppose but to steer this restructuring process — and the strategies of government have changed accordingly.

The US, for example, has explicitly made use of its position of technological dominance to demand that, if other countries require access to its store of technical knowledge, this will only be granted on the condition that the political rules are respected. In other words, technical knowledge must be respected as private property, so that its allocation and use can primarily be determined by the private capital which owns and therefore controls it. Productive efficiency in the developing countries is promoted in this way, even where forms of appropriate technology are used to provide the material bases, such as food, shelter and energy, on which the reproduction and expansion of capital depends. But the net result is a system that can, unless conscious steps are taken to prevent it, primarily serve the economic and political interests of elites in both the developing and the developed nations.

Conclusions

Various conclusions seem to emerge from the historic failure to produce any significant change in how applying science and technology to development is perceived. For example, however much agreement there is on the need to build up indigenous research and development efforts, these are likely — unless countermeasures are taken — to be undercut by the strategies of multinational corporations who choose specifically not to decentralize their R&D activities, preferring merely to transfer the results of their research from a research base in the developed countries. Various reasons are given for this, ranging from the difficulty of recruiting adequately trained research staff to fears that foreign governments might demand access to the results of this research — a form of nationalization of knowledge whose threat drove both I.B.M. and Coca-Cola out of India — and that this would eliminate the competitive advantages of proprietary protection. The main argument used is that it is more efficient to concentrate research facilities near the centers of command in the developed countries, with greater access to research re-

sources; but one of the principal purposes is to minimize the vulnerability of the knowledge produced to any political challenge to the rights of ownership and control by international capital. The effect is to discourage efforts at establishing research capabilities within the developing nations, particularly in areas where these might conflict with multinational strategies. And even where a domestic research effort is mounted, for example into technologies designed to meet specific local agricultural or energy needs, the resources available to these are minimal compared to the resources devoted to more mainstream technological developments.



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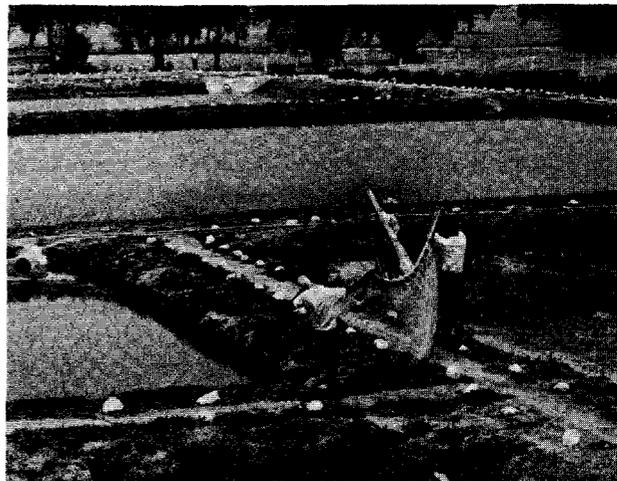
A rotor type wind mill used in development project in Ethiopia.

The second conclusion concerns the price of access to technology. In recent years the developed countries have begun to realize that their store of what is referred to as “intellectual capital”, generated by more than a century of industrially-oriented research and development, has become an important factor in determining their international economic strength. One result of this recognition is that, rather than liberalizing the access of the developing countries to this intellectual capital by making it more freely available, the developed countries

are being tempted in the opposite direction, demanding a higher price to exploit its full commercial potential. They place emphasis on a need to develop a "free market" in technology, with the price supposedly set by classical ideas of supply and demand, but equally reflecting the dominance by the developed countries of the technological marketplace — and their preference, from the economic point of view, to export advanced, capital-intensive technologies with high margins of profit, rather than the relatively unprofitable small-scale, labor-intensive technologies which many developing countries really need, but on which the profit margins are that much smaller.

These two tendencies implicit in the global political economy — to control the dissemination of research results, and stress those which promise the greatest profitability — mean that the general terms in which the debate is framed pose limits on any alternative patterns of technological development which are likely to receive support. This is even true in official discussion about the New International Economic Order, where stress is again frequently placed, even by the developing countries themselves, on economic performance, to the exclusion of broader social and ecological factors from decisions about technological strategy. But in many of the debates about alternative and appropriate technologies the need is stressed for experimentation with new forms of control of the technologies of production and consumption (even if this particular dimension is frequently ignored in some of the intermediate technology debates, which concentrate on what is claimed to be more pragmatic concerns). The need is for both production and consumption decisions to be opened up to collective participation and decision-making, thus directly challenging the authoritarian and hierarchical forms of control which tend to be embedded in technologies exported or adapted directly from the industrialized world.

Alternatives are also needed to the antagonistic attitude which these technologies frequently assume towards the integrity of the natural environment. Again, however, the debates about appropriate technology as framed by international capital concentrate primarily on the material parameters of social need and resource availability. However important these may be — and I do not want to be misinterpreted as implying that I do not believe these to be important — the equally important political component, that can frequently mean the difference between success and failure, may be discarded or conveniently ignored, and the idea that appropriate technology should be based on a new concept of harmony between human actions and the social and natural environment is relegated to the "irrelevant" sphere of metaphysics. Where there is a challenge to capitalist forms of control, this is banished to the fringes of the appropriate technology debate; the husks which are left are easily co-opted by institutions that



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promote on a global scale the social relations of capitalist production, neglecting the extent to which these may be at the root of the problem of "inappropriateness".

My basic argument, then, is that however important we regard the need for appropriate or intermediate technologies in Third World countries — and indeed frequently in the industrialized world as well — we can only talk about appropriate technology as part of a development strategy if we do so in the context of global patterns of technology transfer, and their underlying political determinants. With the growing internationalization of production, we seem to be witnessing a shift from a system of international trade between supposedly independent partners, to one in which countries are bound together through multinational banks and corporations and their investment strategies in a common exercise to generate greater profits. Rather than providing greater equality between all those engaged in this exercise, the system tends to magnify the inequalities that already exist, as illustrated by the growing gap between rich and poor nations, and between the elites and the masses in many developing countries themselves. Furthermore, this growing technological interdependence has also tended to institutionalize the control mechanisms by which international capital is able to dictate the policies and strategies that best serve its interests. Unless new ways are found to break the cycle of what I would call internal technological dependency, the developing countries are likely to find their technological policies determined by this fate. What is required is not merely forms of technology which are genuinely appropriate to local needs, aspirations and human and material resources, but the ability to place these in a political context which will demand greater control, by both producers and consumers, over the directions of technological development. It is in the process of struggle for this control, to take technological choice out of the hands of the banks and the multinational corporations and place it in the hands of the people who are most affected by it, that a truly appropriate technology will be conceived and born. □

News Notes

Continued from page 2

dent, Ernest W. Lefever, also attacked the Nestle boycott in a *Wall Street Journal* article on January 14, 1981.

While Nestle official Saunders urged the company to seek out other "third party rebuttals" and to "fully exploit" the *Fortune* article, nutrition experts joined INFACT in condemning the corporate propaganda. In a letter to the *Wall Street Journal*, the chief of pediatrics at the Kaiser Permanente Medical Center in California condemned Lefever's piece for having "glossed over the significant medical issues". In Third World nations, he argued, "poor, often contaminated water, no adequate refrigeration and poor distribution . . . result in a prepared formula which is frequently contaminated and which is unable to be stored properly." The end result is "dehydration (sometimes fatal) and malnutrition".

Leah Marguiles, director of the Infant Formula Program of the Interfaith Center on Corporate Responsibility, called the *Fortune* article "grossly irresponsible" and challenged its readers "to visit an emergency dehydration ward in any Third World country. I do not think they will come home and tell the churches to stop challenging corporations toward greater social responsibility in their business practices."

INFACT and church groups active in the boycott plan to be "very interested and involved in the effort to see a very strict code endorsed by the World Health Assembly in May.

Nestle has indicated that it will be equally active in lobbying for a weak, industry-approved code. Former WHO assistant director Dr. Stanislaus Flache was hired last August by the International Council of the Infant Food Industry and has been using his contacts to lobby for the industry position. And Senator Strom Thurmond, after reading Lefever's *Wall Street Journal* article, reportedly wrote to UN ambassador Jeanne Kirkpatrick urging her to place the U.S. government firmly against a strict code.

Meanwhile, Johnson says INFACT will "continue monitoring industry violations" of a code the manufacturers had accepted in October, 1979. To date, Johnson reported, "we've documented

over 600 violations." Consequently, in Johnson's view, "it will be an important moral victory if a code passes in May. But it will not be enforceable and there is no guarantee the industry will abide by it. So we're going to keep on stepping up direct action, stepping up the boycott. Because that's clearly the only thing Nestle will pay any attention to."

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ALCOA BULLDOZES SACRED ABORIGINAL LAND IN AUSTRALIA

The Gunditj-Mara tribe of Australian Aboriginal people hold a piece of coastal land in Victoria, Australia, to be sacred. It is the site of their "dreaming" and of historical relics. For Aborigines, as for indigenous people elsewhere, land means everything: it is their livelihood and spiritual sustenance. Now the American ALCOA corporation is literally bulldozing the people off the land, with the help of State and Federal Governments in Australia.

ALCOA wants to build an aluminum smelter that would use expensive electrical energy subsidized by the taxpayers in a hazardous smelting process that would not meet U.S. environmental standards. The Australian Supreme Court won't even hear the Aborigines' case because they have "no standing" in white Australian law. The Australian people rejected the plant at another site, so the State Government connived with ALCOA to dump it on sacred Aboriginal land. The Federal Government refuses to do anything, though they have the power. In fact, they relaxed regulations to make it possible. Even though the site is in Prime Minister Malcolm Fraser's electorate, he refuses even to meet with a Gunditj-Mara delegation. For the winner of this year's B'nai B'rith prize for human rights abroad, this is gross hypocrisy. Fraser should mend his racist ways closer to home. The continuing struggle of Australian Aborigines for their very existence is drawing support around the world.

—*Australian Support Network,*
San Francisco

ABORTION FACES TERROR IN SPAIN

In Spain, a law passed under the Franco regime prohibited advertising, sale, and distribution of contraceptives. It was revoked in 1978, but family planning, especially in the provinces, remains essentially unknown. Los Naranjos, a collectively-run center offering counseling on contraception and unwanted pregnancies, opened a year ago in Seville to provide information on sexuality, contraception, and abortion — subjects still taboo in post-Franco Spain.

On October 21, 1980, the police in this southern Spanish city unexpectedly raided and closed Los Naranjos. Twenty-four women were taken into custody. Fifteen of them, who had been participating in a group discussion at the time of the raid, were forced to sign a statement declaring that they had sought out the center because they planned to have abortions. They were then released. A list of the names and addresses of over 400 women were also seized. Their families are being questioned by the police as possible witnesses in a trial. The other nine were held incommunicado for four days until finally released on bail. Two of the women reported being beaten by the police. All of the nine, though ostensibly free, are still under the threat of violence — right-wing vigilantes are known to collaborate with the police.

The nine will be charged with conducting abortions. Abortion in Spain is strictly forbidden even where the mother's life is in danger. Thousands — the lucky ones — travel abroad each year. Others have illegal abortions; Supreme Court figures indicate that 300,000 abortions were performed in 1979, with 3,000 women dying of the abortions or complications.

Protesting such grim results of the abortion laws in December 1979, over 30,000 women signed a letter saying that they had had abortions, and asking for abortion on demand for all Spanish women. The raids and arrests by the police are uncovering wide solidarity with the cause of the accused. The feminist groups Organization for Women's Liberation and Independent Women were joined in protesting the arrests by many leftist parties and trade unions.

—*Newsfront International*

breakthroughs

COMPUTERS AGAINST THE PEOPLE

Anyone who has spent a quarter to play one of the new video games must be impressed with recent developments in computer graphics. Video displays of anything from space ships to "star castles" reveal a remarkable flexibility for computer-assisted representation of visual data. One of the more spectacular techniques involves representing a solid object from a variety of perspectives. Thus, a graphical model of a chemical molecule, for example, can be viewed from the right, from the left, from a little more to the left, etc.

The general computer technology that goes into such video display is, in principle, quite simple and has been available for quite some time. It is not surprising that it should now be applied by the army.

For years, field commanders had only their own vision and traditional topographic maps as sources of information about the terrain on which the battle was being fought. Position of enemy troops, possible lines of fire, travel time of support troops, and a variety of other information had to be interpreted in the light of the "flat" information provided on the topographic map. And with modern weaponry operating at blinding speeds, the time it takes to translate the flat topographic data to a mental image and then translate that image into various perspectives (north approach, south approach, etc.) becomes a serious problem for the battlefield commander.

A new computer system has been developed by the U.S. Army Engineer Topographic Laboratories, called "Field Exploitation of Elevation Data" (FEED). The system consists of a mini-computer with a video display and sophisticated data storage devices, mounted in a mobile van. The system enables a field commander to view a three-dimensional model of the terrain of the battlefield from whatever perspective he wishes on his TV screen, all in the comfort of his mobile van.

According to Captain Thomas Tindal, research and development coordinator at the U.S. Army Engineer Topographic Laboratories, the development of FEED

has been possible because of three recent developments: First, "... the widespread availability of digital elevation data". Second, "the recently developed militarized minicomputers and associated computer peripherals [that made] its possible to assemble a sophisticated and rugged system... These minicomputers are designed for mobile operation under a variety of conditions. They are suited for the battlefield environment". Third, "Software... developed which would in effect compact the elevation data to a manageable size and also increase graphics processing efficiency."

Certainly this is not the only military application of computer technology. Rather it is just part of a growing trend towards the computerization of the battlefield. The much touted failure of the Tactical Operations Systems (TOS) was only a temporary setback for the military. Various systems are being developed under such names as Management Information Systems (MIS), all for the purpose of computerizing the already highly technological battlefield. A complete analysis of this trend (from a progressive perspective) is urgently needed so that progressive forces in the world can respond effectively.

Information from: Army Research, Development, and Acquisition Magazine, Sept.-Oct. 1980: 34-35; Military Review, May 1980: 60-63; Military Review, March 1980: 41-47.

OVER-THE-COUNTER ANTIHISTAMINE REPRESENTS A NEW FORM OF CARCINOGEN

Methapyrilene hydrochloride is a common component of over-the-counter sleep aids in the U.S. In 1977 it was discovered that this chemical, when given to rats in combination with nitrite caused liver cancer while control rats fed only nitrite did not develop liver tumors. Unfortunately no control group was fed methapyrilene alone. A recent more extensive study of this chemical shows that methapyrilene by itself is a potent carcinogen.

Scientists at the Frederick Cancer Research Center fed 100 rats a combination of methapyrilene and nitrite and another 100 rats methapyrilene alone. In both cases 96% of the animals developed liver tumors (the normal rate of tumor formation in their lab was 2.4%). Methapyrilene itself, not just in combination with nitrite, is a potent carcinogen.

These findings have caused the manufacturer of methapyrilene voluntarily to withdraw the chemical from the market (this year), but not before probably several million people had ingested it. Furthermore, other compounds of similar chemical structure remain on the market.

The chemical structure of methapyrilene is quite different from any other known class of carcinogens. It apparently represents a whole new family of potentially carcinogenic agents. Furthermore, it does not react as a carcinogen in the popular Ames test, even though it causes tumors in rats.

—Information from: Science, Vol. 209, pp. 817-819, 1980.

EXCESS CARBON DIOXIDE NOT ELIMINATED BY PLANT MATTER

When a dead animal or plant decays, the carbon of which it is made is released into the atmosphere as carbon dioxide. If that dead animal or plant is very old, it is called a fossil, and if that fossil is burnt (rapidly decayed), it too gives off carbon dioxide. Since carbon dioxide is the principle source of carbon for living things, its presence in the atmosphere should be desirable.

But, as always, historical context is very important. The world in which we currently live has had a relatively constant amount of carbon dioxide in the atmosphere for quite some time now. In fact, the natural processes upon which our lives depend seem to be in a delicate balance corresponding to exactly that amount. It is for this reason that so much concern has been recently voiced over the rising amount of carbon dioxide being emitted into the environment. These emissions are thought to imperil our lives in a variety of ways.

The negative possibilities of increased carbon dioxide were partially neutralized by suggestions that the process of photosynthesis (the chemical process in which carbon dioxide is converted, by plants, to biological material) could not only utilize the excess carbon dioxide for more biological productivity, but might even "keep up" with the industrial increases, by acting as a sort of sink to take up the excess CO₂.

A recent report by Duke University botanist Paul J. Kramer casts serious doubt on these suggestions. Kramer notes that the studies upon which the suggestions were based were all short-term studies. While plants may respond to increased carbon dioxide concentration by increasing their rate of carbon dioxide absorption in the short run, long-term effects are frequently quite different. It is not at all clear that the ultimate abilities of vegetation to absorb excess carbon dioxide would correspond to what was suggested by the short-term experiments.

Furthermore, most plants are not currently limited in their growth potential by the availability of carbon dioxide. Other nutrients and light are frequently more important factors. If the growth of a plant is limited by the concentration of nitrogen in the soil, it will not do much good to offer more carbon dioxide.

The excess generation of carbon dioxide by industrial processes remains an important consideration for all societies, developed and developing, capitalist and socialist. Studies such as these reinforce the notion that rational planning and management at a regional level are necessities that become more important every day. Excess carbon dioxide from an unplanned industrial development is not likely to be guided by some invisible hand into a sink of vegetation.

—*Information from: Bioscience, Jan. 1981: 29-33.*

KILLER CELLS

Immunologists have begun to re-examine the role of natural killer (NK) cells in the body's systems of defense against cancer and virus infections. NK cells are a type of cell which has the spontaneous ability of killing tumor cells as well as those cells which are infected by viruses.

A major focus of current research is the role of NK cells in the action of interferon, a natural agent which has potent

anti-cancer and anti-viral activity. The exact relationship between NK cells and interferon is not well understood, especially in humans (the vast majority of the research thus far has studied mice) — although it has been shown recently that interferon increases the action of NK cells.

The role that the interferon-NK cell system plays in the defense against persistent viral infections, which have been related to such human diseases as multiple sclerosis and lupus erythematosus, has also been examined. Though NK cells were discovered about six years ago, it is still not known exactly what type of cell they are. Also, little is known about how they find and destroy their targets. It is likely that with the increased availability of interferon from recombinant DNA techniques, research will increase in the area of interferon and NK cells and their role in the body's natural defense system.

—*Information from: Science, Vol. 210, pp. 624-626, Nov. 7, 1980.*

TANNING BOOTHS MAY CAUSE MORE GENETIC DAMAGE THAN SUN

It may be argued that the psychological need to mobilize the melanin in one's skin (get a suntan), is symptomatic of deeper psychic dangers that perhaps should be analyzed and even eliminated. But regardless of these possible personality-trait problems it seems that a more physical problem may be involved with those who satisfy their suntanning needs in one of the growing number of "tanning booths" that appears in the non-tropical world.

Some NASA workers have recently suggested that there are several fundamental differences between the effects of exposure to natural sunlight and those associated with tanning booths. They observed a high level of variance in the radiation field produced inside the booths. This effect was attributed to the lack of ultraviolet (UV) reflectivity of the inner wall covering and the lack of uniformity among the individual tanning lamps within the booth. It is of note that both these effects are not observable without relatively sensitive UV radiation meters, not the sort of equipment your friendly neighborhood tanning booth is likely to have on hand. This large fluctuation in UV radiation could con-

ceivably lead to serious sunburn in those areas which receive the highest level of exposure, to say nothing of an uneven tan.

If there is a direct correlation between skin-cancer induction and DNA damage, a widely held assumption, a significantly increased risk of skin cancer is to be expected from UV radiation from sunlamps. Sunlamp-generated UV radiation (at a distance of 33 cm, which is the minimum lamp-to-subject distance recommended by the manufacturer) was found to generate 26 times more DNA damage than natural sunlight. Taking into account the absorption of some UV radiation by the outer skin layers, they still note almost eight times more DNA-damaging UV radiation from sunlamps per unit time than from a typical Florida sun.

To reduce these effects the NASA group suggests the use of special filters which block the shorter wavelength radiation associated with DNA damage. They note, however, that these filters are subject to rapid breakdown which would require frequent replacement, and booths using such filters would still cause more DNA damage than the sun.

If you're cursed with that anemic whitey look, and looking for the perfect tan, stay away from the booths — follow the sun.

—*Information from: Science, Vol. 211, pp. 405-407, Jan. 23, 1981.*

RECOMBINANT DNA AND BIOLOGICAL WARFARE

Army Medical Research is asking for people to send in research proposals on recombinant DNA methods of splicing human genes for acetylcholinesterase into bacteria. "The purpose of the research is to obtain a microorganism which synthesizes the human enzyme so that it can be isolated for biochemical, neurochemical, and pharmacological studies." Acetylcholinesterase is half of the chemical system for transmitting nerve impulses for a great part of the body's nervous system; agents which interfere with the acetylcholine/acetylcholinesterase system are highly toxic, and are sometimes used as nerve gases.

The proposals are to be submitted to Fort Detrick. Fort Detrick has been the Army center for research on chemical and biological warfare.

—*Information from: Science, Vol. 209, 1980.*

resources

ELECTRONICS

Delicate Bonds: The Global Semiconductor Industry, Global Electronics Information Project, Pacific Studies Center (867 West Dana Street, #204; Mountain View, CA 94041), 1981, 29 pp., \$1.50. This is a special issue of *Pacific Research* (Vol. XI, #1).

They also publish the monthly **Global Electronics Information Newsletter**, a brief summary of current events in the global semiconductor industry. With this newsletter they hope to create a network of researchers, activists, and groups interested in the evolution of the solid-state electronics industry. \$5.00/year.

OCCUPATIONAL HEALTH

The Case Of The Workplace Killers: A Manual For Cancer Detection On The Job, United Auto Workers, UAW Purchase & Supply Department (8000 East Jefferson; Detroit, MI 48214), 1980, 40 pp., teaches workers how to do their own epidemiology of cancer in the workplace.

Noise Control, Matt Witt of the American Labor Education Center, OSHA (200 Constitution Avenue, N.W.; Washington, D.C. 20001), Free. A manual for workers, that explains how noise is created and how it can be controlled.

BAD CHEMISTRY

Laying Waste: The Poisoning of America By Toxic Chemicals, Michael Brown, Pantheon Books (201 East 50th Street; New York, NY 10022), 1980, 351 pp., \$11.95. "As the story unfolds, the real poison at Love Canal becomes increasingly apparent: a toxic combination of greed, detachment and scientific arrogance."

A Nation Of Guinea Pigs: The Unknown Risks Of Chemical Technology, Marshall S. Shapo, Free Press/Macmillan (866 Third Avenue; New York, NY 10022), 1979, \$12.95.

WOMEN & SCIENCE

Women Look At Biology Looking At Women, edited by Ruth Hubbard, Mary Sue Henefin, and Barbara Fried, Schenkman Publishing Co. (Mt. Auburn Place; Cambridge, MA 02138), 1979, 268 pp., \$8.95. Included is a 55 page bibliography on Women, Science and Health. Feminists have long been challengers of the myth of scientific objectivity in anthropology, psychology and the social sciences. This book continues the critique with an examination of the natural sciences.

BIOLOGICAL WARFARE

"Japan's Germ Warfare: The U.S. Cover-up of a War Crime", John W. Powell. This is the feature article of the Oct./Dec. 1980 (Vol. 12, #4) issue of the *Bulletin of Concerned Asian Scholars* (P.O. Box W; Charlemont, MA 01339). Quarterly, \$4.00/issue, \$14.00/year. An important case study of biological warfare.

TECHNOCRATS

"Limiting Democracy: Technocrats and the Liberal State", David Dickson, **Democracy: A Journal Of Political Renewal And Radical Change** (Jan. 1981), \$4.00/issue, \$15.00/year, quarterly. **Democracy** (43 West 61st Street; New York, NY 10023).

APPROPRIATE TECHNOLOGY

Tranet, a quarterly, \$15.00/year. A newsletter-directory of, by and for those individuals and groups around the world who are actively developing *Appropriate/Alternative Technologies*. **Tranet** (P.O. Box 567; Rangeley, ME 04970).

Rain: Journal Of Appropriate Technology, (2270 N.W. Irving; Portland, OR 97210), \$15.00/year, monthly. **RAIN** is a national information access journal. It is getting better, and more political.

MARXISM & SCIENCE

Working Papers On Marxism And Science, Science Task Force, New York Committee for Education (P.O. Box 419, Village Station; New York, NY 10014), published three times a year, \$11.00/year, \$4.00/copy. It emphasizes dialectical materialism and the natural sciences and the role of scientists in the class struggle.

ENERGY AND POLITICS

Labor Outreach Guide For Anti-Nuclear Activists, by the Abalone Alliance Labor Task Force, Abalone Alliance (944 Market Street, Rm 307; San Francisco, CA 94102), \$2.00/each.

Critical Mass Energy Journal, (P.O. Box 1538; Washington, DC 20013), monthly, \$7.50/year. The energy publication of Ralph Nader's Public Citizen, Inc. Without a doubt, this is the very best ongoing source of positive information about the anti-nuclear movement.

Energy-Scan: The Directory of Energy Industries' & Environmental Frequencies!, Tom Kneitel, CRB Research (P.O. Box 56; Commack, NY 11725), 1980, \$5.95. A listing of over 20,000 frequencies that enables scanner owners to listen in on the energy industries. Includes listing for environmental agencies, nuclear power plants, petroleum industry, utilities, etc.

Small Farm Energy Project's Final Report, Small Farm Energy Project, Center for Rural Affairs (P.O. Box 736; Hartington, NE 68739), 1980, \$5.00.

Big Business And Renewable Energy Sources: An Analysis Of The Corporate Connection, Citizens' Energy Project (1110 6th Street N.W.; Washington, DC 20001), 1980, \$1.50.

The Atom Besieged: Nuclear Dissent In France And Germany, Dorothy Nelkin and Michael Pollack, MIT Press (28 Carelton Street; Cambridge, MA 02142), 1980, 352 pp., \$17.50.

CORRECTIONS

The pictures that appeared on pages 24 and 25 of *SftP* Vol. 13 No. 2 (March/April, 1981) were taken by J. Bandyopadhyay.

On page 33 of *SftP* Vol. 13 No. 2 (March/April, 1981), in the second paragraph the sentence which begins, "My view, which was supported...." should read, "One view, which was supported...."

CHAPTERS AND CONTACTS

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NATIONAL OFFICE: Science for the People, 897 Main St., Cambridge, MA 02139. (617)547-0370.

MIDWEST OFFICE: 4104 Michigan Union, Ann Arbor, MI 48109. (313)971-1165.

ALABAMA: Bryson Breslin, 2349 Center Ways, Birmingham, AL 35206. (205)323-1274.

ARIZONA: Sedley Josserand, 2925 E. Adams, Tuscon, AZ 85716. (602)323-0792.

ARKANSAS: Dotty Oliver, P.O. Box 2641, Little Rock, AR 72203.

CALIFORNIA: East Bay Chapter: Science for the People, P.O. Box 4161, Berkeley, CA 94704. **Irvine Chapter:** SftP, P.O. Box 4792, Irvine, CA 93110. Allan Stewart-Oaten, Biology Dept., USCB, Santa Barbara, CA 93110. (805)961-3696. Dave Offen, 2808 Greer Rd., Palo Alto, CA 94303. (415)858-1591.

COLORADO: Greeley Chapter: Ann Woolley, Dept. of Anthropology, University of Northern Colorado, Greeley, CO 80369.

CONNECTICUT: David Adams, Psych. Lab., Wesleyan Univ., Middletown, CT 06457. (203)347-9411 x286.

DISTRICT OF COLUMBIA: Walda Katz Fishman, 6617 Millwood Rd., Bethesda, MD 20034. (301)320-4034. Miriam Struck and Scott Schneider, 1851 Columbia Rd. N.W. #109, Washington, D.C. 20009. (202) 387-0173.

FLORIDA: Gainesville Research Collective, 630 NW 34th Place, Gainesville, FL 32601. **Tallahassee Chapter:** c/o Progressive Technology, P.O. Box 20049, Tallahassee, FL 32304.

ILLINOIS: Chicago Chapter: c/o Ivan Handler, 2531 N. Washtenaw, Chicago, IL 60647. (312)342-6975. **Urbana-Champaign Chapter:** 284 Illinois Union, Urbana, IL 61801. (217)333-7076.

IOWA: Paul C. Nelson, 604 Hodge Ames, IA 50010. (515)232-2527.

LOUISIANA: Marie Ho, 4671 Venos St., New Orleans, LA 70122. (504)283-8413.

MARYLAND: Baltimore Chapter: c/o Alternative Press Center, 2958 Greenmount Ave. Baltimore, MD 21218. Frank Teuton, 7923 24th Ave., Adelphi, MD 20783.

MASSACHUSETTS: Amherst Chapter: Marvin Kalkstein, University Without Walls, Wysocki House, University of Massachusetts, Amherst, MA 01002. **Boston Chapter:** Science for the People, 897 Main St., Cambridge, MA 02139. (617)547-0370.

MICHIGAN: Ann Arbor Chapter: 4104 Michigan Union, Ann Arbor, MI 48109. (313)971-1165. **Lansing Chapter:** Eileen Van Tassell, 2901 Lovejoy Rd., Perry, MI 48872. (517)625-7656.

MISSOURI: St. Louis Chapter: Science for the People, c/o Peter Downs, 4328 DeTonty, St. Louis, MO 63110.

NEW HAMPSHIRE: Val Dusek, Box 133, Durham, NH 03824. (603)868-5153.

NEW YORK: New York City Chapter: c/o Red Schiller, 233 E. 21st St., Apt. 18, New York, NY 10010. (212)254-1365. **Stony Brook Chapter:** P.O. Box 435, E. Setauket, NY 11733. (516)246-5053. Steve Risch and JoAnn Jaffe, 909 N. Tioga St., Ithaca, NY 14850. (607)277-4097.

NORTH CAROLINA: Marc Miller, 51 Davie Circle, Chapel Hill, NC 27514. (919)929-9332; (919)688-8167.

OHIO: Jenny Thie, 2147 Fulton Ave., Cincinnati, OH 45206. (513)281-6149. Nici Ihnacik, Hayes Dairy Farm, Guysville, OH 45735.

PENNSYLVANIA: Ruth Weinstein, 2116 Walnut St., Apt. 2R, Philadelphia, PA 19103. (215)561-4323.

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TEXAS: Austin Chapter: c/o Ed Cervenka, 911 Blanco St., No. 104, Austin, TX 78703. (512)477-3203.

VERMONT: Steve Cavrak, Academic Computing Center, University of Vermont, Burlington, VT 05405. (802)658-2387; (802)656-3190.

WASHINGTON: Phil Bereano, 316 Guggengeim, FS-15, Univ. of Washington, Seattle, WA 98195. (206)543-9037.

WISCONSIN: Rick Cote, 1525 Linden Drive, Madison, WI 53706. (608)262-4581.

OUTSIDE U.S.

AUSTRALIA: Lesley Rogers, Pharmacology Dept., Monash University, Clayton, Victoria 3168, Australia. Janna Thompson, Philosophy Dept., La Trobe University, Bundoora, Victoria, Australia. Brian Martin, Applied Mathematics, Faculty of Science, ANU, P.O. Box 4, Canberra, ACT 2600, Australia. Tony Dolk, 17 Hampden St., Ashfield, NSW, Australia.

BELGIUM: Gerard Valenduc, Centre Galilee, B.P. Galilee 160, B-1348, Louvain-la-Neuve, Belgium, (10)10-41-49-97.

BELICE: Ing. Wilfredo Guerrero, Ministry of Public Works, Belmopan, Belice Central America.

CANADA: Manitoba: Charles Polayn, c/o Argyle High, 30 Argyle St., Winnipeg, Manitoba, Canada. **Ontario:** Science for the People, P.O. Box 25, Station "A", Scarborough, Ontario, Canada M1K 5B9. **Quebec:** Doug Boucher, Dept. of Biology, McGill University, Montreal, Quebec. (514)392-5906. Bob Cedegren, Dept. of Biochemistry, Univ. of Montreal, Montreal 101, Quebec, Canada. **British Columbia:** Jim Fraser, 848 East 11th Ave., Vancouver, British Columbia V5T 236, Canada.

DENMARK: Susse Georg and Jorgen Bansler, Stigardsvej 2, DK-2000, Copenhagen, Denmark 01-629945.

EL SALVADOR: Ricardo A. Navarro, Centro Salvadoreno de Tecnologia Apropriada, Apdo 1892, San Salvador, El Salvador, Central America.

ENGLAND: Society for Social Responsibility in Science, 9 Poland St., London, W1V3DG, England. 01-437-2728.

INDIA: M.P. Parameswaran, Parishad Bhavan, Trivandrum 695-001 Kerala, India.

IRELAND: Hugh Dobbs, 28 Viewmont Park, Waterford, Eire. 051-75757.

JAPAN: Genda Gijutsu-Shi Kenkyo-Kai, 2-26 Kand-Jinbo Cho, Chiyoda-Ky, Tokyo 101, Japan.

MEXICO: Salvador Jara-Guerro, Privada Tepeyac-120-INT, Col. Ventura Puente, Morelia, Mexico.

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WEST GERMANY: Paul Otto-Schmidt, Forum fur Medizin, Und Gesundheitspolitik Gneisenouster, 2 (Mehnhof), 1000 Berlin 61, West Germany. *Wechsel Wirkung*, Gneisenaustr, D-1000 Berlin 61, West Germany.



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