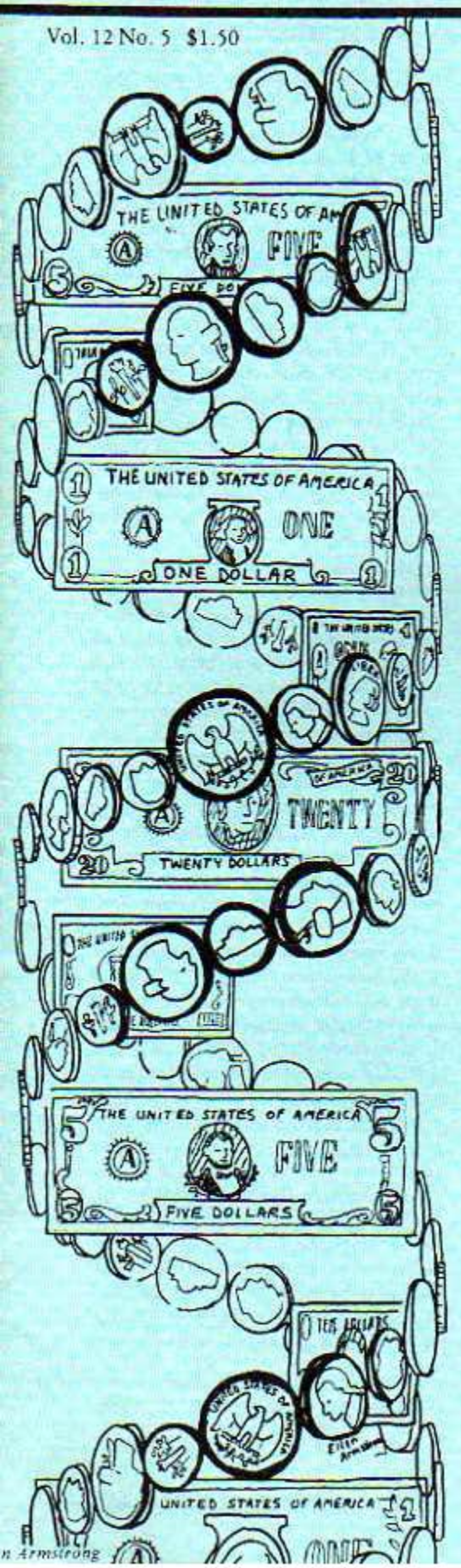
SCIENCE FOR THE PEOPLE

Vol. 12 No. 5 $1.50

September/October 1980



BIOTECHNOLOGY BECOMES BIG BUSINESS

Powerline Assaults the Prairie

Epoxy Boycott in Denmark

Dumping for Dollars

Vietnam War Legacy

letters

Dear SftP:

I found much to agree with in your "Prospects and Problems" (July/Aug.; 1980) article on the antinuclear movement. I share a real concern that the movement I belong to — the pacifist movement — often uses civil disobedience and direct action in a "reflexive" way, that consensus can become antidemocratic, anarchism is often an irresponsible evasion of problems of power, and a big chunk of the no-nukes movement is a middle class white youth group unaware of day to day problems of both white and black workers.

What worries me is that efforts to artificially separate the weapons and power issues (I think Barry Commoner does this, and certainly Nader has done this) reflect corporate decisions. I further suggest there is a lack of reality in separating civil disobedience and elections — it is not "either or" but "now and then" or "both this and also that". The problem with Americans is we aren't a very flexible people, not really nearly as pragmatic as we keep telling ourselves we are. I suggest you need to have some real caution with the direction the Nader/Hayden folks are taking, *not* because it is electoral, but because it is not *toward* serious structural change.

David McReynolds
McReynolds/Drufenbrock
Campaign Committee
339 Lafayette St.
New York, N.Y. 10012

Author's Response:

To some extent, David McReynolds has misread my article. He is worried about efforts to separate artificially the weapons and power issues. Yet on p. 18 I state — "The state has played a major role in the development of nuclear power, because of the close relationship between reactors and nuclear weapons." *Again, on p. 20 — "historically, there has been, and still is, a large pacifist tendency within the movement . . . . This history accounts, to a large extent,* for the continued emphasis on nuclear weapons as well as reactors."

McReynolds suggests there is a lack of reality in separating civil disobedience and elections. If by "lack of reality" he means that this separation is strategically and tactically incorrect, then I certainly agree. If, however, he means that a split does not exist *in the movement between those participating in direct action and those emphasizing "legalistic" activities, then I think he is engaging in fantasy. Certainly there are many groups and individuals, such as McReynolds himself, that are active on both sides. But the Coalition for Direct Action at Seabrook does not have the same position as the Naderites. Furthermore, as the movement has developed, this split has become deeper.*

McReynolds argues for being cautious with the direction taken by the Nader/Hayden forces, not *because it is electoral, but because it is not* towards *serious structural change. First, nowhere do I criticize electoral activity. Second, what does McReynolds mean by "towards serious structural change"? If he means that these forces are not demanding a transition to socialism, then the same criticism could be made of every reform struggle, including the anti-nuclear movement. A main purpose of my article was to give this phrase some content, i.e., to argue "towards serious structural change" meant "raising the class-consciousness of the participants," and to discuss to what extent this was occurring within the anti-nuclear movement. The anti-monopoly movement should be analyzed in the same way.*

Joe Shapiro
New York, N.Y.

Dear SftP:

I am a graduate student in Pharmacology at the College of Medicine and Dentistry of New Jersey in Newark studying the effects of toxic substances on the nervous system. I found your article entitled "The Pesticide Connection" by Paul Barnett (July/August 1980) to be an excellent appraisal of the disturbing tendency of researchers in academic institutions to maintain a close association with industry. I wish to bring to your attention another group of pesticides whose danger is just beginning to be recognized. The studies which I summarize further emphasize and support a number of important points about the danger of these compounds brought out in your article.

It is well known that the effect produced by a toxic chemical depends upon a) the dose, b) the length of exposure, and c) the route of administration of the toxic substance. This is important in view of the fact that the petrochemical industry is getting increasingly involved in studying toxicology. However, their focus is on acute and subacute toxicology. The chronic effects due to long term exposure are more relevant to worker safety and to the public at large, but are rarely investigated by these industries. Chronic exposure to a dose of a chemical which produces no noticeable immediate effects most often produces disturbances which are totally unrelated to the acute effects.

Insecticides are compounds which irreversibly inhibit the functioning of the enzyme, acetylcholinesterase. When a nerve excites a muscle it does so by releasing the chemical acetylcholine which causes the muscle to contract. In order to stop the excitation, the enzyme acetylcholinesterase, which metabolizes acetylcholine to a relatively inactive product, is present at the muscle. If the enzyme is poisoned by an insecticide, acetylcholine will continue to excite the muscle producing a number of acute effects in the organism such as muscle spasms and fasciculations along with sweating and salivation. Immediate death results from respiratory paralysis. If the dose is low enough so that death does not immediately result, the body will synthesize new acetylcholinesterase. It is obvious from this discussion that any long term consequences of repeated exposure to low doses of the insecticides cannot be attributed to acetylcholinesterase inhibition.

The phenylphosphonothioate insecticides have been shown to produce a delayed neurotoxicity in hens (1). One of these compounds, Leptophos, is widely used today. The risk of exposure to people is both dangerous and real. In a factory in which this chemical is manufactured and packaged, workers were

(continued on page 37)

SCIENCE FOR THE PEOPLE

September/October 1980
Vol.12 No.5

FEATURES:

DEPARTMENTS:

Science for the People magazine is published bimonthly by Science Resource Center, Inc., a non-profit corporation. The magazine is edited and produced by the national organization Science for the People. Our address is 897 Main St., Cambridge, MA 02139. Phone (617) 547-0370. We offer a progressive and radical view of science and technology, covering a broad range of issues. We welcome contributions of all kinds: articles, letters, book reviews, artwork, cartoons, news notes. If possible, please type manuscripts (double spaced) and send three copies. Be sure to keep one copy for yourself. Unless otherwise stated, all material in this magazine is copyright Subscription rates (for one year/six issues): $9 (regular), $13 (foreign surface mail; for air mail add $4 to Latin America and Europe, $6 to Asia and Africa), $20 (institutions/libraries), $20 or whatever you can afford (member subscribers). Member subscribers receive the magazine plus our internal newsletter and other internal communications. Bookstores may order on consignment directly from Science for the People. The magazine is available on microfilm from Xerox Microfilms, 300 North Zeeb Rd., Ann Arbor, MI 48109.
Science for the People is indexed in *Alternative Press Index*, P.O. Box 722, Baltimore, MD 21218.

about this issue

Major U.S. corporations are spending billions of dollars on biotechnology: gene splicing and reproductive technologies. On June 6, 1980, the Supreme Court gave these companies the right to patent their products. The court's approval of General Electric's request to patent a strain of oil-eating bacteria will encourage corporate investment in genetic engineering. How corporations use genetic engineering to further their interests will influence the future of all of us.

In this issue of SftP, we have brought together a series of short articles that raise a variety of concerns about biotechnology. We hope they will provoke lengthier discussion.

Kathy Yih's article provides an analysis of some of the economic interests behind genetic engineering. Yih makes important connections between academic research and corporate-government funding. She sets the stage for the other articles.

Cary Fowler presents a case history of what has happened to agriculture in England since seeds became patentable. The variety of available seeds has been significantly reduced; this could erode the genetic variation of food crops threatening food production, availability and price.

One of the first groups to speak out against the Supreme Court's patent decision was the Coalition for Responsible Genetic Research. The group's statement outlines some of the problems and ramifications of the court's action. The statement was issued at a Coalition press conference which Science for the People members helped organize. We support other efforts to raise these critical issues in the mass media.

Sheldon Krimsky's remarks describe the spectre of human genetic engineering. He discusses legal and policy issues that underlie many of the genetic enginneering debates. Engineering of humans is no longer a science fiction fantasy.

Gena Corea's statement about *in vitro* fertilization raises questions about who controls it and how it might contribute to the oppression of women. Her critique of reproductive technology is the necessary beginning of a fuller feminist analysis of biotechnology.

The unleashing of new life forms may one day cause unforeseen environmental and health problems. We are only now, years after it began, aware of the tragedies caused by careless misuse of toxic chemicals. But while chemicals persist in the environment, at least they don't multiply. Containing the proliferation of a dangerous microorganism would probably be impossible. Generations of children will continue to pay a high price for today's mishandling of toxic materials; we must prevent the same abuse of genetic engineering.

Agent Orange is an herbicide; it was used in the Vietman War to defoliate forests. Its health effects are being felt by Vietnamese and American veterans, and their children. Scott Thacher explores the current controversy surrounding the long-term health effects of the chemical. With growing U.S. militarism and the cry for intervention abroad, we must face the possibility of biological or chemical warfare. Recognizing the long term impacts of U.S. war tactics can help mobilize people to actively denounce and reverse the current trends.

Toxic waste dumping in U.S. communities is a major environmental problem. Some companies, faced with mounting resistance to continued dumping here, are looking to the Third World. Christopher McLeod exposes the plans of companies to dispose of hazardous wastes in Africa and Latin America. Imperialism takes on a new dimension as government agencies drag their feet about controlling the dumping abroad.

Janine Morgall describes the attempts by Danish construction workers to boycott the use of potentially carcinogenic epoxy resins. She points out the limitations of merely strengthening regulation of toxic materials. Improvements of hazardous conditions or increased levels of protection don't change who makes the decision about whether chemicals or technologies are safe and whether health and safety of workers takes precedence over efficiency and economy.

The struggle of a group of farmers against the building of a power line on their land is an excellent example of a group of people trying to grapple with a technological, economic, and political situation that is out of their control. Alice Tripp's account of how Central Minnesota farmers became politically active as they faced the "collusion of government and corporations" reveals what community groups and workers are up against and what they can do.

All over the world farmers, industrial workers, tenants, neighborhood groups, and others are opposing technological advances that do not benefit them. They need the support of progressive scientists. In most cases, they do not have the scientific expertise they need to assess health and safety issues and counter the arguments of well-paid corporate scientists.□

Recombinant DNA

BIOTECHNOLOGY BECOMES BIG BUSINESS

by Kathy Yih

With the U.S. Supreme Court's recent decision that new life forms can be patented, concern over recombinant DNA has resurfaced. Critics of genetic engineering are once again being sought by the media. But while a small minority raises important objections, recombinant DNA technology has moved into the marketplace. The potential of genetic engineering to produce highly profitable products has led to a flurry of publicity and investment; four new genetic engineering companies — Biogen, Cetus, Genentech, and Genex — have formed, some with major corporate support. Their combined paper value has risen to over $500 million. The London *Economist* recently observed that "biotechnology is one of the biggest industrial opportunities of the late twentieth century." Development plans include manufacture of enzymes; inexpensive production of dyes, detergents, pesticides, and rubber; and improvement of crop yields by use of bacteria engineered to fix atmospheric nitrogen.

Recombinant DNA, a technique developed over the last 8 years, involves taking genes from plants, animals, or viruses and recombining them with material from other organisms to form an infinite variety of new life forms. Is the incredible amount of activity in the field an example of "pure" science being applied to better the lot of humankind? Not quite. Recent developments in producing interferon provide a good example of the profit motives underlying the research — as does the hype used to justify it.

The Biogen Announcement

In Jan. 1980, Charles Weissman of the scientfic advisory board of the firm Biogen and Dr. Walter Gilbert of Harvard University announced that they had succeeded in producing interferon through recombinant DNA techniques. Interferon is a virus-fighting protein naturally produced in minute amounts by human white blood cells; it may be important in the treatment of virus infections and certain types of cancer. It was discovered in 1957, but its investigation and use have been limited by the high cost of extracting it from human cells. So the possibility of producing more interferon at less cost through recombinant DNA techniques is a major development.

Biogen was incorporated in 1978 in Luxembourg and specializes in the production of vaccines by recombinant DNA methods. The company was set up by the International Nickel Company (Inco) of Toronto, which owns 23% of the company's stock. Schering-Plough, a large pharmaceutical firm, bought a 16% share in 1979, and has been granted an exclusive license from Biogen to market interferon. The interferon announcement was carefully orchestrated for maximum effect. Weissman had barely presented the research formally to scientists at the Massachusetts Institute of Technology before facing the press. The day after the news appeared, the price of a Schering-Plough share climbed 3 5/8 and Inco rose 1 1/2.

But Biogen is not the only firm doing interferon research: others include Burroughs, Wellcome, Cetus, Dupont, Genentech, Hoffman-LaRoche, Eli Lilly, Merck, National Patent Development Corp., Syntex, Upjohn, and Warner-Lambert. As one researcher said, "If you look on the (research) log books of any major pharmaceutical company, you'll probably find interferon there." And, although Biogen has received much of the publicity, they are not the unequivocal leader. Genentech scientists have reported bacterial yields of interferon as high as 100,000 molecules per bacterial cell, more than 50,000 times higher than Biogen's reported yields.

Then why was Biogen the one to make an announcement? "Because," says Backe, an investment service company, "there is no incentive for others to announce their early success. Schering-Plough is facing a patent expiration on Garamycin, an antibiotic responsible for at least 40% of their worldwide earnings. Hence a very positive announcement was needed to counter impending negative news. Other companies with brighter near-term pictures would be imprudent to describe early laboratory success with interferon."

This article is adapted from an article which originally appeared in the Guardian. *Kathy Yih is a graduate student in biology at the University of Michigan. She has been active in Ann Arbor Science for the People and the Farm Labor Organizing Committee for the past several years.*

Ellen Armstrong

Interferon and Curing Cancer

Interferon is a good publicity generator because of its possible use in cancer treatment. But existing evidence indicates that interferon is getting much more credit than it deserves. Although recent studies have shown some regression of certain types of cancer with interferon treatment, the results have been both ambiguous and unimpressive. Not enough of the substance has been available for thorough testing, and, in some cases, no one knows how interferon does what it has been reported to do. Dr. Frank J. Rauscher, vice-president of the American Cancer Society, considers interferon research very important but concedes that none of the results so far have been better than those achieved by conventional treatment. Dr. Arthur S. Levine of the National Cancer Institute (NCI) said of interferon studies in general, "Taken together I think one would have to be circumspect."

Sheldon Krimsky of Tufts University, and the National Institute of Health (NIH) Recombinant DNA Advisory Committee said, "But one thing is clear: interferon will not combat all cancer. Cancer is a complex of different diseases with a multiplicity of causes, requiring different treatments. When discussing cancer, "cure" is not a part of the vocabulary of anyone who knows anything about cancer." However, investment depends on sustaining interest in research, according to a *Wall Street Journal* analysis. This, the *Journal* points out, means keeping the hope of a cancer cure flickering. In a society where cancer is on the rise and fully 80% of cancers are environmentally caused, raising hopes for a chemical cure is a cruel deception.

Who Pays?

The misdirection of attention toward finding a chemical cure is accompanied by the misdirection of millions of dollars in public funds. A vast amount of taxpayers' money goes into research grants, university salaries, and laboratory facilities for cellular-level cancer research, including interferon work. About $10 million of NCI's 1980 budget was for interferon research with more than half of that being earmarked for buying interferon. Five companies have either signed contracts or are in final negotiations for several million dollars in NCI funds for clinical trials. And the American Cancer Society ("Help prevent cancer with a check-up — and a check.") is spending $5.8 million for preliminary interferon studies at 10 US medical centers.

Universities — supported in part by state and federal educational funds, and through National Science Foundation (NSF) and NCI grants — carry a high proportion of the financial load of scientific research. Public money, in the form of university facilities, public salaried university scientists and federal research grants, essentially subsidizes the development of products and techniques which eventually bring profits to private companies. Of course, this is not unique to biotechnology (see, for example, Paul Barnett's article on agricultural research, July/August *SftP*).

The connections between academia and industry are not limited to funding, however. In some cases, the researchers have direct links with private genetic engineering firms. Examples include: Walter Gilbert of Harvard University, chairperson of Biogen's scientific board and partial owner of 15% of the company's stock with the eight other members of the scientific board; David Jackson of the University of Michigan, head of Genex's scientific advisory board and a soon-to-be vice president; and Herbert Boyer of the University of California at San Francisco (UCSF), co-founder of Genentech and its major stockholder.

Safety Issues

In the early 1970's biologists were generally vocal in their criticisms of recombinant DNA research. Some pointed to the need for public input in assessing the hazards, which include the possible release of disease-causing organisms or other genetically-altered organisms that could change the environment in dramatic and unpredictable ways. The public outcry forced the government to adopt NIH guidelines for publicly funded recombinant DNA research, but since then little criticism has appeared in the media. Here also the common interest of scientists and industry have come into play. While the rivalry among the various research groups and companies rages, an increasingly unified public relations stance has developed. The possible benefits to the public of genetic engineering are

trumpeted to the press, and hazards are minimized to keep regulation at bay. Both industry and "independent" researchers want to avoid regulatory intervention as much as possible.

The current NIH guidelines put an upper limit of 10 liters on the volume of recombinant-DNA-containing material that can be used in any single experiment. Several exceptions to this rule have been made, however. In addition, although private industry almost always seems to follow the NIH guidelines, *no* mandatory regulations exist for industry. Congress refrained from legislating private DNA research in 1978. Most recently, the NIH recombinant DNA advisory committee passed a resolution calling for publication in the Federal Register of a statement concerning its role in advising the government on proposals for large-scale industrial production of recombinant DNA products. The resolution stated that the committee's determination of the safety of the genetic material involved was not to be construed as assurance that large-scale production procedures themselves were safe. The resolution represents a ducking of responsibility for the consequences of industrial production. Some members of the committee argue that the panel has insufficient expertise in the area of large-scale production. But meanwhile, industrial research, development, and production proceed unregulated.

Where is the Recombinant DNA Industry Headed?

Initially, Sheldon Krimsky has said, there will be great emphasis placed on developing products with a strong public appeal (such as insulin and interferon). This emphasis will serve to legitimize the field. Later, he thinks, industry will try more dangerous things such as viral pesticides, products with a greater potential for causing disease or ecological disaster.

With recombinant DNA technology in the hands of industry — aided by academic scientists — we can expect continued exposure to biological risks, and continued benefits to private interests at public expense. As David Suzuki, a geneticist, wrote three years ago, "What could be more explosive than the application in human engineering of techniques of molecular genetics . . . in a society in which racism, bigotry, greed, and economic inequities are apparent?"□

Plant Patenting

SOWING THE SEEDS OF DESTRUCTION

by Cary Fowler

American agriculture is imported. All major food crops grown in North America originated elsewhere, in what we call the Third World. For Americans there is really no such thing as the home-grown meal. Wheat, spinach and apples, for example, are from Asia. Soybeans come from China. Corn and tomatoes originated in Central America. Potatoes are from the Andes and sorghum originated in Africa. Only hops, Jerusalem artichokes, sunflowers, a couple of berries and a few other minor foods originated in North America.

Nearly all of our food crops are of ancient origin. Thousands of years ago our Stone Age ancestors began domesticating plants, saving the best seed for replanting the next year. Human efforts and natural selection processes resulted in different varieties of food crops becoming adapted to "different niches in the ecosystem." The result was thousands of varieties of wheat, rice, corn and other crops as genetically distinct as beagles and great danes. In diversity there was strength. As pests and diseases changed or mounted more powerful attacks, plants evolved different or better defenses. These defenses were represented in the genetically diverse varieties of each crop. Modern agriculture is changing this natural system.

With the breeding and marketing of new "improved" varieties, traditional varieties are being replaced. Farmers and gardeners stop growing them. Field after field is planted with one variety. Where thousands of varieties of wheat once grew, only a few can now be seen. When these traditional plant varieties are lost, their unique genetic material is lost forever. If, because of genetic limitations which result from inbreeding, new varieties are no longer resistant to certain insects or diseases (conceivably even insects or diseases never before known to attack wheat), then real catastrophe could strike. Without existing seeds which carry specific genes conferring resistance it may not be possible to breed resistance back into wheat, corn, or any other crop.

How serious is the situation? The National Academy of Sciences warns us that "most crops are impressively uniform genetically and impressively vulnerable." Respected scientists speak of agriculture's questionable future. Others talk of the "collapse of civilizations" that would accompany another major genetic-related crop disaster like the Irish potato famine. These fears are not far-fetched. Perhaps the most endangered of our crops according to the National Academy of Sciences, is wheat, the dietary foundation of millions of people. What will happen when the genetic material needed to confer resistance has vanished with a plant variety now extinct?

Seeds As Big Business

Recently a rush of mergers and corporate takeovers has hit the seed industry, creating much cause for alarm. Old, family-owned seed businesses have been, and are being, bought up by large multinational chemical and drug firms — the same companies that manufacture pesticides and fertilizers. Purex now owns Ferry-Morse, Sandoz (a Swiss chemical and drug conglomerate) owns Northrup-King, and ITT has just purchased Burpee. In addition, Celanese, Ciba-Geigy, Monsanto, Shell, Pfizer, Union Carbide and Upjohn have all recently bought seed companies.

Will these big corporations encourage their new seed company subsidiaries to develop plant varieties that require more or fewer pesticides and fertilizers? The answer seems clear. Already many of the companies listed above have begun to develop and patent processes to coat seeds with herbicides and pesticides, thus using seeds as a delivery system for chemicals into the field. With this development, the link is forged between the marketing of seeds and agricultural chemicals (see box).

As seeds have become big business, pressure has been put on governments around the world to insure high profits for the seed industry. Many governments have passed laws allowing companies to patent new varieties of plants, in effect to patent life.

Plant patenting laws, however, benefit only those companies big enough to hire teams of researchers to de-

This article is reprinted from Coevolution Quarterly, *Winter 1979/1980. Cary Fowler is director of the Resource Center at the National Share Croppers Fund's Frank Porter Graham Center. Since 1937, the National Sharecroppers Fund has worked with and tried to advance the best interests of the nation's sharecroppers.*

velop new varieties. Since the passage of such laws in the United States, the government has granted 73 patents on beans. Over three-quarters of these patents are held by just four corporations: Purex, Sandoz, Union Carbide and Upjohn. Armed with the monopoly provided by patents, these large corporations can confidently jack up prices. Meanwhile, smaller seed companies are forced to specialize in a dwindling number of unpatented varieties.

A Rose Is A Rose Is A Rose?

Plant patenting laws were first instituted in Europe in the early 1960s at the urging of French rose breeders. What is the European experience with these laws? In Europe, enforcement has proven to be a legal jungle. It is almost impossible to prove in court that your "tomato is genetically identical to my patented variety." In order to prevent confusion with patented varieties, the Common Market countries have simply outlawed many unpatented plants. European governments are establishing a "Common Catalog," which lists all varieties that are legal to grow. Each month varieties are deleted from the list. Sometimes over a hundred are scratched out in a single month. These deleted varieties cannot be raised or sold by seed companies. Even backyard gardeners cannot grow the illegal varieties if their gardens are located close to a commercial plot using a patented variety. With such restrictions — and a fine in England of up to £400 for violators — many varieties are quickly falling out of use.

Dr. Erna Bennett of the U.N.'s Food and Agriculture Organization in Rome estimates that *by 1991, fully three-quarters of all the vegetable varieties now grown in Europe will be extinct due to the attempt to enforce patenting laws.*

In England, the Director of the National Vegetable Research Centre has called the laws a "self-inflicted injury." Environmental organizations are asking Canadian groups to take and safeguard seeds of the newly outlawed varieties — ironically just as the Canadian government is attempting to establish its own patenting scheme. And OXFAM, the charity whose projects are generally located in the Third World, is considering the allocation of funds to help preserve Eurpoe's endangered vegetable varieties. Truly, Europe is no longer safe for vegetables.

This could happen in the United States. In 1970 Congress passed a law deceptively entitled, Plant Variety Protection Act, establishing a plant patenting system in the U.S. We have yet to experience the full effect of this legislation. Breeding programs undertaken after 1970 generally have not had time to produce patentable varieties. But bills (H.R. 999 and S. 23) are pending in Congress to amend our plant patenting laws to include six previously exempt vegetables: tomatoes, carrots, cel-

RECENT SEED COMPANY TAKOVERS

New Owner	Seed Company
Anderson Clayton	Paymaster Farms
	Tomco-Genetic Giant
Cargill	Dorman Seeds
	Kroeker Seeds
	PAG
Celanese	Cepril Inc.
	Moran Seeds
	Joseph Harris
Central Soya	O's Gold Seed Co.
Ciba-Geigy	Funk Seeds Int'l.
	Stewart Seeds
	Louisiana Seed Co.
FMC Corp.	Seed Research Assoc.
Garden Products	Gurney Seeds
Hilleshoeg/Cardo	Int'l. Forest Seeds Co.
Int'l. Multifoods	Baird Inc.
	Lynk Bros.
I.T.T.	Burpee Seeds
	O.M. Scott & Sons
Kent Food Co.	L. Teweles Seed Co.
Kleinwanzieberer Swatzucht AG	Coker's Pedigreed Seed Co.
NAPB (Olin & Royal Dutch Shell)	Agripro, Inc.
	Tekseed-Hybrid
Occidental Petroleum	Ring Around Products
Pioneer Hi-bred	Lankhart
	Lockett
	Arnold Thomas Seed Co.
Pfizer	Clemens Seed Farms
	Jordan Wholesale Co.
	Trojan Seed Co.
	Warwick Seeds
Purex	Advanced Seeds
	Ferry-Morse Seeds
	Hulting Hybrids
Rorer-Amchem	Jacques Seed Co.
Sandoz	National-NK
	Northrup-King
	Rogers Brothers
Southwide, Inc.	Delta & Pine Land
	Greenfield Seed
Tate & Lyle	Berger & Plate
Tejon Ranch Co.	Waterman-Loomis Co.
Union Carbide	Keystone Seed Co.
Upjohn	Asgrow Seeds
	Associated Seeds

ery, peppers, cucumbers and okra. The passage of these amendments will pave the way for the U.S. to join the European-dominated international organization that promotes and coordinates plant patenting laws. Most of the nations belonging to this organization have found it necessary to outlaw many vegetable varieties in a desperate attempt to enforce their plant patents. For the privilege of joining this select group, the initial membership fee will cost U.S. taxpayers nearly $100,000.

Seeds of Life

The future of agriculture depends on the genetic diversity in food crops that our ancestors created over the 10,000 year history of agriculture. This future is being threatened by laws that require genetic uniformity and a reduction in the number of varieties allowed to exist. Without genetic diversity, agriculture loses its primary defense against pests and diseases, thus creating absolute dependency on pesticides. Conveniently, the same companies that profit from plant patenting stand by ready to supply the "needed" agricultural chemicals. Agriculture also loses much of its ability to adapt to changing environmental conditions. Meanwhile, human cultures daily lose varieties they have come to value for their taste and nutritional qualities.

If diversity is to be preserved and agriculture's future insured, we must make whatever effort it requires to stop plant patenting laws. We must take steps to establish plant preserves to protect endangered varieties of food crops and their wild relatives. And we must expand seed collection and storage programs.

As we engage in these public activities, we can begin to address the problem in our own backyards. We can grow and help preserve some of the old varieties. We can educate people about their importance.

But in the end, the future of agriculture can be insured only by healthy, vibrant small farms. The old varieties are threatened today, not because they taste bad or are nutritionally deficient, but because they do not suit the requirements of the factory farmers, the food processing industry and the big seed companies. The California plantation owner who grows tomatoes to be shipped all over the country cannot grow the old, tasty varieties. Their skins are not tough enough. Their insides are not hard. If the old varieties are to flourish, they must be, as they always have been, grown by small farmers and sold to a local market. This system of agriculture has provided sustenance to people for many centuries. It is an enduring agriculture that we tamper with only at great risk.

For thousands of years our ancestors toiled to develop the rich diversity that characterizes our agricultural system — the diversity a permanent agriculture requires. The challenge we face is how to preserve this life-giving legacy. □

LEGISLATION

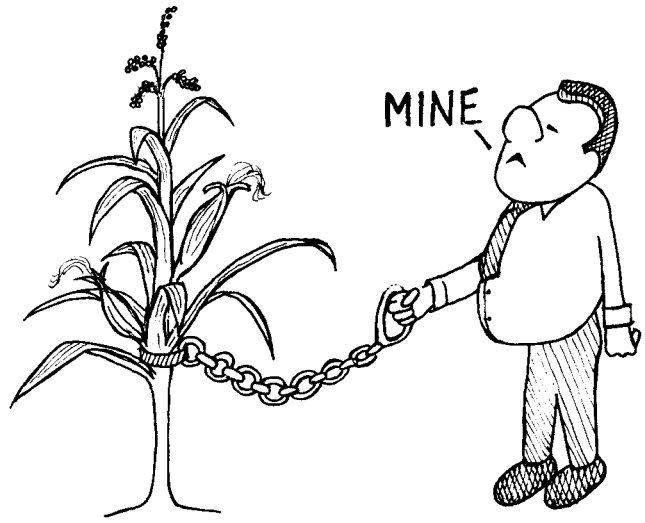
Plant "patenting" has been available in the U.S. since the Plant Patent Act of 1930. The Act is part of Title 35 of the U.S. Code, and is run by the Patent Office. The catch is that patents apply only to asexually produced plants (or to plants that reproduce both sexually — seeds — and asexually — rhizomes, grafting, etc.). You can see examples in any fruit tree catalogue; patented varieties will have their Plant Patent number right below their name.

Protection for sexually produced plants had to await the Plant Variety Protection Act of 1970. This is administered by an office in the U.S. Department of Agriculture, and instead of patents, they issue Certificates of Plant Variety Protection. It's interesting to note that the Agriculture Department opposed this act when it was first proposed during the Johnson administration, but then reversed itself and supported it in 1970. So the Act appears to be another contribution by former Agriculture Secretary Earl Butz to the betterment of corporate America, for it was the protection afforded by this Act which made seed companies become attractive acquisitions for multinational conglomerates, as the preceding chart shows.

When all of this was happening in 1970, Heinz and Campbells, the two big soup producers, argued successfully for the exclusion of six vegetables from the protection of the Act. They were afraid protection would result in higher-priced seeds. Apparently it hasn't, at least for them, for they have since withdrawn their objections.

H.R. 999 and S. 23 amend the 1970 Act to include the six vegetables — tomatoes, carrots, peppers, celery, okra and cucumbers. They also change the length of protection from 17 to 18 years. Both these changes are necessary before the U.S. can join UPOV (Union for the Protection of New Varieties of Plants), the European seed patenting clearinghouse.

—Richard Nilsen
Editor, *Co-Evolution Quarterly*



Ellen Armstrong

PERSPECTIVES ON BIOTECHNOLOGY

The following three commentaries raise a number of issues concerning current developments in biotechnology research and engineering. We hope these pieces will provoke ongoing discussion of how we as progressive people should respond to these events.

COALITION SPEAKS OUT

The Coalition for Responsible Genetic Research is a national organization of scientists, environmentalists and health care professionals concerned about the use of genetic engineering.

On June 16, 1980 the Supreme Court, in a narrow 5-to-4 decision, ruled that genetically modified micro-organisms could be patented under existing U.S. patent law (Dimond vs. Chakrabarty # 79136). In the same week the U.S. House of Representatives subcommittee on agriculture held hearings on an amendment of the little known 1970 Plant Variety Protection Act, which would extend its coverage to a set of vegetables hitherto excluded.

Though written from the limited perspective of Patent Law, the Court decision sets a legal precedent permitting the patenting, and therefore the private ownership, of a strain, line, or species of organisms. Previously one could own an individual corn plant, cow, or cucumber, but not all its descendents. The Court decision moves the right to propagate a strain of organisms into the realm of private property.

The technology for mammalian genetic and reproductive manipulation is rapidly developing; *in vitro* fertilization, transplantation of genes into mammalian cells, cloning of human genes in microorganisms; and very sophisticated forms of genetic screening. These technologies involve the generation of strains of micro-organisms carrying human genes — now patentable — as well as modified human cell lines, also likely to be patentable following the present precedent.

Corporate Ownership of Food Plants

The combination of the Court decision and recent agribusiness legislation will make possible the buying up of the world's food plant resources by a relatively small number of large corporations, mostly pharmaceutical and agrichemical multinationals, who will almost certainly follow their current policy of discouraging the planting and maintenance of non-patented and wild varieties, thus decreasing the overall genetic variation in surviving food plant varieties. This constitutes a serious long term danger to the security of the world's food supplies.

In recent years agrichemical and pharmaceutical multinationals have been buying up small seed companies both in the U.S. and Europe. Since the Patent Laws previously excluded plants, they have lobbied for special interest legislation to permit private ownership of plant varieties. For example four companies, Sandoz, Ciba-Geigy, Pioneer and DeKalb control two-thirds of the maize varieties in the U.S. The existence of a vast variety of wild and unpatented varieties makes it difficult for them to sufficiently control the market. In Europe the large seed companies have therefore pushed programs to suppress the growth of wild and unregistered varieties. The resulting genetic uniformity is useful from their point of view, rationalizing sales of pesticides, fertilizers, and farm machinery, and increasing total market penetration and therefore selling prices.

However, from an agricultural point of view, increased genetic uniformity is a disaster, since the genes needed for the next generation of plant strains, for resistance to new pests, survival in altered environments, or new food needs, disappear from the earth.

Private Patents and Biomedical Research

The extraordinary advances in biomedical knowledge that underlies the new biotechnologies came almost entirely from publicly funded scientists working in university, medical school, and government laboratories. A cornerstone of the productivity of American biomedical scientists has been the free exchange of scientific materials and information, based upon participating in the shared endeavour of increasing public knowledge of life processes. Private patenting interferes with this free exchange. Once organisms are in the public sector they cannot easily be patented. An individual planning to apply for patents is unlikely to freely distribute the material, or information about it, until the patent has been granted.

Private Appropriation of Public Resources

As noted above,modern biotechnology was developed from the billions of taxpayers' dollars invested in biological and biomedical research, starting with the Public Health Services Act of 1944, and later with the formation of the National Science Foundation and the National Institutes of Health. The final applications of the technology to construct a patentable organism, though perhaps performed in a corporate laboratory, represent the last links of a very long chain, none of which was privately financed.

The Court decision creates a situation where the public will have to buy back the very products it has financed over the past 35 years.

If patents are granted the NSF and NIH should insist that its grantees assign patents back to the government, and not to private corporations or individuals.

Control of Hazards

In rendering genetically modified microorganisms private property the Court has made it even more difficult to regulate and oversee the potential health hazards associated with genetically modified microorganisms. Many of these micro-organisms, designed for specific commercial processes, may have deleterious consequences for the health of workers, individuals in the community, or for other organisms in the ecosystem. Though this is true of many byproducts of industrial processes, organisms that have been genetically modified constitute a new form of pollution — self-reproducing. The regulation and control of these agents will require much greater scrutiny and social input than that required for the regulation of self limiting agents. What is profitable for the pharmaceutical industry may be hazardous to the children of pharmaceutical workers.

Lack of Government Regulation

The Court decision gives the green light to the commercial exploitation of genetic manipulation technology. Unfortunately Congress has passed no laws to regulate this emerging industry, and no government agency has explicit responsibility for it. The National Recombinant DNA Advisory Committee has recently announced that regulating commercial production processes are outside its jurisdiction.

Human Genetic Engineering

The technology now exists to introduce foreign DNA into human cells, including germ line cells which are passed on to the next generation. Many laboratories are working on medical applications to human genetic diseases. New reproductive technologies, such as *in vitro* fertilization, make available to medical researchers human sperm, ova, and the early stages of the embryo outside the womb, plus the technology to transplant the embryo back into the womb.

Preparation for attempts to transplant human DNA into human cells often involves cloning of the DNA in micro-organisms or viruses. The Court decision does not exclude these organisms from the patentable group. Similarly specially modified cells, including sperm and egg cells, might be patentable under the decision.

We believe that the Court decision is not in the public interest:

- Plant, animal, and microbial life forms, and their inter-relationships provide the foundations for human life. They are too important to human survival, health and prosperity, to permit them to be owned by individuals or corporations.
- Neither humans, nor their cells or tissues, nor their genes nor any segment of their genes, should be allowed to be owned by an individual or a corporation. To the extent that materials such as human cell lines or strains of micro-organisms carrying segments of the human genome, become available for research, or even in production of pharmaceuticals they should remain a public trust.
- Congress should pass explicit legislation removing life forms from the realms of private ownership and private patents. □

REPRODUCTIVE TECHNOLOGY AND WOMEN

Gena Corea is the author of The Hidden Malpractice: How American Medicine Mistreats Women.

The men who brought us the Pill, the IUD and diethylstilbestrol (DES) are now presenting us with *in vitro* fertilization (IVF). It is, they tell us, the savior of infertile women. So too did they herald DES as a savior of motherhood through its alleged, though unproven, ability to prevent miscarriages. In a similar manner, they proclaimed the Pill as the sexual liberator of women.

We are still reeling from the effects of that earlier experimentation on our bodies.

In the decades to come, we may learn whether the women under the care of IVF pioneer Patrick Steptoe suffered ill effects from the administration of human menopausal gonadotropin, human chorionic gonadotropin, clomidphene, indomethacin, morethindrone, and 17-hydroxyprogesterone. Perhaps we will find out whether the trauma inflicted on their ovaries by needle punctures to suck out ripe eggs had any deleterious effects. Maybe we will find out whether the surgical manipulation of the ovary adversely affected that organ's secretion of hormones and all the bodily processes influenced by those hormones.

(Then again, we may never find out. Ill effects on experimental subjects tend not to be found when no one looks for them. Moreover, Steptoe's patients may be among the many women who, during the course of "prophylactic" hysterectomies recommended to them in their middle years, have their ovaries excised along with their uteri.)

The infertile women among us who want to bear children face a problem which should command the most serious attention and concern. How, we might first ask, did we become infertile? Through infection caused by an IUD or an unnecessary caesarean section? As a result of a shock to the hypothalmus dealt by the injectable contraceptive Depo-Provera? Due to Pill ingestion? As a result of DES-induced uterine abnormalities? Through our exposure to pesticides like DBCP? In consequence of the pandemic spread of sexually transmitted diseases which this country makes only a token effort to prevent?

And are the physicians and researchers who, in many cases, caused our infertility the most appropriate persons to whom we should appeal for our cure?

During the past decades, as these physicians and researchers devised the contraceptives which have proven so devastating to our bodies, they have also been quietly working on IVF and other forms of reproductive technology. The motive behind their work, I would argue, is not a desire to help infertile women.

When these new technologies come into widespread use, they will increase male control over woman's procreative power and over who will exist on our planet. Through the medicalization of birth control, abortion and childbirth — formerly household matters — men already exercise great control over that procreative function.

Now, by defining infertility as a medical matter and by claiming the authority to manage it through IVF, embryo transplants, and the artificial insemination of a surrogate mother (or, as one medical publication referred to the woman, a "surrogate uterus"), that control is increasing.

At the same time, "genetic counseling centers" are sprouting up throughout the land, temples for the fetishization of the gene. As the centers "educate" the public to the necessity of hunting down bad genes, male institutional control over procreation will further solidify.

And how will men use their control over procreation? This is one of the visions — a nightmare of selective breeding through the combination of population control programs and reproductive technology:

Technicians will harvest and freeze our eggs. Then they will sterilize us. (Or perhaps they will line some of us up and inject long-acting and hazardous contraceptives like Depo-Provera into us.) An elite committee of white men will survey the harvest of eggs and sperm and then decide who will be brought to life, who may exist.*

Not so far-fetched. The capacity for "quality control" in the production of human beings increases yearly. In 1978, *The New York Times* reported that Steptoe and his colleague, R.E. Edwards, had proposed freezing human embryos for later implantation. This procedure, the *Times* noted, would provide enough time before implantation to screen the embryo for "genetic defects" and to determine the sex of the embryo, the latter feat already accomplished in cattle, sheep and rabbits.

"Only embryos of the desired sex would be implanted," the *Times* reported, a fact somewhat chilling to we of the undesired sex.

This, too, lends credence to the nightmare: Pill pioneer Dr. Carl Djerassi observed in his 1980 book, *The Politics of Contraception*, that IVF might make women more willing to undergo sterilization.

"If this currently controversial procedure ever becomes a routine, widely used method of conception," he wrote, "it could have a major impact on the acceptability of sterilization among women." □

*Becky Logan of Cornell University discussed this nightmare at the 1979 conference Ethical Issues in Reproductive Technology: Analysis by Women (EIRTAW). The two books coming out of that conference will be available this fall from Humana Press, Crescent Manor, P.O. Box 2148, Clifton, N.J. 07015. Ask for: H.B. Holmes; B.B. Hoskins; and M. Gross (Eds.), *Birth Control and Controlling Birth* and *The Custom-Made Child: Women's Perspectives.*

PATENTING LIFE: SOCIAL AND ETHICAL ISSUES

Sheldon Krimsky is a Professor of Urban Environmental Policy at Tufts and a member of the NIH Recombinant DNA Advisory Committee.

Recently, when I appeared on a Boston radio program to address the patenting decision on microorganisms, a caller asked whether a human clone could be patented. Recalling the Supreme Court's decision in *Diamond* v. *Chakrabarty*, the first idea that flashed through my mind was: Is it manufactured? But obviously if the product is a person he/she cannot be patented on constitutional grounds. Persons have rights; they cannot be owned or enslaved (at least in modern enlightened societies). However, for any life form that does not possess personhood, and which came into being through a process conforming to the Court's conception of manufacture, the question of patentability remains open.

The caller's question first seemed far-fetched and irrelevant. But upon further consideration I began to recognize that questions of this nature are now meaningful and fall within the boundaries of legal and moral discourse. The *Chakrabarty* decision opens up many new problems in patent law and social ethics. I shall address some of these in five areas: (i)

the relevance of life to a product of manufacture, (ii) patenting and the regulatory void, (iii) patenting human genes, (iv) patentability of higher forms of life, (v) patenting and the social good.

The Relevance of Life

In *Diamond* v. *Chakrabarty* the fundamental distinction between living organisms and inert matter was ruled irrelevant by the Supreme Court as far as patenting is concerned. The Court held that the rearrangement of living matter in novel structures or combinations is no less a product of manufacture than analagous human arrangements of inert substances such as minerals. "Congress thus recognized that the relevant distinction was not between living and inanimate things, but between products of nature, whether living or not, and human made inventions." Some may interpret the Court's action as incorporating a metaphysical bias that advocates a chemical reductionist view of life processes. Indeed, the majority argued that the "manufacture" or "composition of matter" should apply no less to life forms than to machine parts or chemical products. There are two relevant questions here. First, is life more than the sum of its chemical parts? Second, if there are any unique characteristics (emergent properties, elan vitale), do they have any relevance to the question of whether life forms may be termed a product of manufacture?

Because there are unavoidable and irreducible differences between inert substances and life forms (this is true whether we adopt a vitalist or a reductionist metaphysics) the decision to patent microorganisms will introduce formidable problems in patent law. These issues will either find their resolution through a broad policy on the part of Congress or will be left to a case by case analysis in the courts. I shall cite one such problem. Do patent rights for an engineered microbe extend to its progeny? Since microorganisms reproduce themselves, we could easily have a situation whereby a patented bacterium escapes into the environment and multiplies. Except for the initial handiwork involved in the genetic alteration of the organism, human intervention plays no role in the propagation of the bacterium. Should each of the daughter cells be considered a product of manufacture, no less than the parent cells? If not, then the patenting decision may be a moot point. However, if patent rights are found to cover all progeny of the life forms in question, then we are introducing a radically new notion of manufacture into our ordinary discourse. Our language will have to tolerate statements such as: "A manufactured object can mutate and thus spontaneously revert back to a non-manufactured object." "A manufactured object can reproduce itself." "A manufactured object can evolve."

How are we to determine that a given genetically manipulated organism is novel, i.e., has not occurred or does not occur in nature? Will it be sufficient to show that it had never been isolated under natural conditions? Or will verification that it is unstable in the wild suffice? And what if there is evidence that it could have existed during some past age when conditions were different than they are today? There is no precedent in patent law to answer these queries. Therefore, the courts will have to create policy or the Congress will have to establish new rules for patenting life forms *per se*.

Patenting and the Regulatory Void

By now it is generally known that a substantial regulatory apparatus has been put into place for NIH funded recombinant DNA work. It mostly affects academic research. Industrial DNA activities are covered by a voluntary compliance program that is being administered by the NIH. What relation, if any, does patenting have to the issue of regulation?

The reason one would want regulation of industrial practices in genetic engineering (not only recombinant DNA but other processes that produce new or modified life forms) is that one takes seriously the prospects that:

1. Recombinant DNA research is a radically transforming technology;

2. Synthetic biology, like synthetic chemistry, is not going to be a free lunch, from the point of view of health and the environment.

It is reasonable to anticipate that the Supreme Court's decision in *Chakrabarty* will provide greater economic incentives to firms for investing in genetic engineering research and development. (Ultimately this is an empirical question, since the effect could be negligible.) If the industrial activity develops more rapidly as a result of investment confidence spurred on by the extension of patent rights to microorganisms *per se*, then those apprehensive about the present laissez-faire attitude toward the biotechnology industry should be more concerned after the decision. Taken simply as a symbolic action, at the very least, the Court's patenting decision acts as a stimulant for commercial gene-splicing activities at a time when there is still concern about the large scale production and distribution of modified life forms.

Patenting Human Genes

While humans are not patentable entities, the Supreme Court has left open the possibility of patenting human genes. Bacteria that possess the genes for human insulin or interferon are already in advanced stages of development. Beyond the issue of the patentability of a bacterium with a single gene insert, let me pose the question: Can we patent Shockley's genes? Patentability is not excluded because matter is living, nor, apparently, because the entity consists of a system of cells. But of course, Shockley's germ plasm is not patentable on the grounds that it is a product of nature. However, suppose his genes are engineered to some degree. Then his germ plasm might indeed qualify as a product of manufacture. Who would want to patent Shockley's genes, or anyone else's for that matter? And what could possibly be done to change them to qualify as a "product of manufacture?" With the growth of human reproductive technologies, commercial sperm depositories have been established to exploit the demand for artificial insemination and *in vitro* fertilization. A recent *New York Times* report cites seventeen sperm banks in the U.S. (1) If there are profits to be made in huckstering human germ plasm, patenting may be sought as a means of protecting one's investment.

I can foresee another circumstance where patent requests for human genes may generate interest. And this is where we begin to see how frivolous and exploitative recombinant DNA research and industrial cloning can become. Consider a new line of cosmetic creams with oils or hormones produced from the genes of a glamorous star. Is my imagination playing tricks on me or could this form of genetic peddling have an appeal to Madison Avenue? "Cosmetics with the Hormones of Your Favorite Personality." It hardly matters if the personality-proteins are not the slightest bit different from those of us common folk.

In both the examples I cited, there is an unsettling aspect to the patenting of human genes. Perhaps it is because it fosters a genetic aristocracy. Who you are as a person will become secondary to your genetic blueprint. Or perhaps there is something venal about the private appropriation of human genetic resources.

To return to an ancillary question, what modifications could be made in human germ plasm to qualify it as a product of manufacture? Perhaps someone will discover a sequence that enhances the biochemical activity associated with certain desirable traits, or that gives people an advantage over viral disease or cancer, or that allegedly promotes longevity.

Eleven years ago an eminent biologist Salvadore Luria alerted us that his field was developing the instruments for shaping human evolution.

> We should not ignore the possibility that genetic means of controlling human heredity will be put to massive uses of human degradation even outside the military context. Huxley's nightmarish society might be achieved by genetic surgery

> rather than by conditioning, and in an even more terrifying way since the process would be hereditary and irreversible.(2)

We are all vulnerable to fantasies of archetypal offspring. By extending the rights of patenting to human genes through modified germ plasm, we have a tacit approval to unleash the terrifying power that Luria describes.

Patenting Higher Organisms

If we genetically modify the germ plasm of a bull to qualify as a product of manufacture, can we patent the germ plasm? Does the patent extend to all the progeny? Presently, a single bull can provide the sperm for hundreds (perhaps thousands) of offspring. Someone can own the bull, and sell the sperm, but there is no entitlement to ownership of all the progeny.

Let us suppose that in addition to genetically modifying the bull's germ plasm (where progeny cows provide a higher yield of milk), we learn how to duplicate, in unlimited quantity, our product of manufacture. The patenting of this product could be tantamount to owning the genetic strain of a species. Moreover, we might be able to achieve mono-herds, the livestock counterpart to monocultures. But by narrowing the genetic variation of livestock to improve upon certain qualities and promote uniformity, we could be duplicating the hazards faced worldwide in agriculture where the variety of crops has been dramatically reduced. Genetic homogeneity, whether in crops or animals, is vulnerable to a single catastrophic event that a variegated genetic pool could overcome.

It is notable that some countries which permit patenting of microorganisms do not grant similar patent rights to higher life forms. Under the European Patent Convention and under the German Patent Act, plant and animal varieties and biological processes for their production are excluded from patent protection.(3)

From the *Chakrabarty* decision the Court drew no lines on patenting life forms. The brief filed for General Electric argued that each case should be decided on its own merit by the courts, even those cases involving human genetic engineering. I cite a remarkable passage from their brief.

> As to humans, constitutional problems would seem to afflict a patent granting someone the right to exclude others from reproducing a human being. A more precise consideration is appropriately postponed until a case or controversy makes a decision necessary.

In his majority opinion Justice Warren Burger made it very explicit that the Court was quite restricted in rendering its decision. "Our task, rather, is the narrow one of determining what Congress meant by the words it used in the statute; once that is done our powers are exhausted. Congress is free to amend para. 101 so as to exclude from patent protection organisms produced by genetic engineering."(5)

As I have shown, there are more issues involved in the patenting decision than legal semantics. The question is: Do we leave these issues to be resolved in the courts on a case by case approach or do we need a broad national policy? I propose that we start by convening a commission with the explicit mandate to consider the social and ethical issues of patenting life forms of all varieties. With the commission's recommendations Congress should accept the tacit invitation of the Supreme Court and develop a policy that is comprehensive and that can serve as a guide for future court cases and as a safeguard for future generations.

Patenting and the Social Good

Few would deny that the rights to patent inventions and novel products of manufacture have been a great incentive for the industrial development of technology. The patenting of *processes* that utilize life forms is well established. In the case of Chakrabarty's oil digesting microbe, patents were filed for the process of manufacture, the method of dispersal, and the product *per se*. Some human genes are clearly desirable to clone in large quantities. Perhaps firms would not develop interferon or insulin if they could not obtain a secure rate of return through the assurance that they could capture a predictable portion of the market. A company that takes risks to commercially develop a product has the right to recoup its expenses and profit from its risks.

In this argument I want to address the issue of whether patenting is always in the public interest. The distinction of patenting of process and patenting of product is not relevant in this line of reasoning. My point is a simple one. While patenting as an incentive for development of new technologies and industrial innovation may operate as a general rule, there are specific instances where the public good is not achieved through private patents.

Let me use the case of a bacteria with a human interferon-producing gene. One recent estimate of interferon's world wide market potential has been placed at $3 billion.(6) Where is all this money going to come from? — research centers, government research grants, the consumer of health care either directly or through third party payments. Hardly a person would classify an interferon-producing bacteria as frivolous. But what would the patentability of the microbe do to its cost? Interferon is a product that has been widely acclaimed for its potential clinical benefits in the treatment of viral diseases and cancer. Its availability and price should not be determined by what are tantamount to monopoly conditions. What are the choices before us? Can we assume that through the patenting process we will achieve:

(a) The only or most efficient development of interferon;

(b) The greatest availability of interferon for research and clinical application;

(c) The best cost for the product so its full potential can be investigated as per (b)?

During periods of war, patent decisions do not dictate the price and production levels of tanks. We are presently engaged in a war against cancer in which our society has already invested billions of dollars. The weapons to fight this war must serve the public's interest first and foremost. Congress has acted in the past to exclude certain innovative technologies from patentability. The production of fissionable materials and the military utilization of atomic energy were among the technologies excluded. The question remains whether special areas of innovation with gene-splicing and the manufacture of novel life forms should also be excluded from private control because of an overriding national interest. It is an issue that should be considered by our legislative branch of government and not left by default to the judiciary.□

REFERENCES

1. Fleming, Anne, "New Frontiers in Conception," *New York Times Magazine*, July 20, 1980.

2. Luria, S.E., "Modern Biology: A Terrifying Power," *The Nation*, pp. 405-409, October 20, 1969.

3. Lederer, Franz, "A Perspective in Patenting Microorganisms Under European Convention: Prospects and Considerations," *American Patent Law Association Quarterly*, Vol. 7, No. 3&4, p. 296, 1979.

4. *Diamond v. Chakrabary*, No. 79-136, a brief for the Supreme Court for the respondent, October term, 1979, p.37.

5. "Diamond v. Chakrabary", *The U.S. Law Week*, 48, June 17, 1980.

6. *European Chemical News*, Vol. 34, April 14, 1980.

For more information: Linda Havarfield, CRGR, 530 7th Street, S.E., Washington, D.C., telephone 202-543-4312. Terri Goldberg, CRGR, 897 Main St., Cambridge, MA 02139, 617-547-0370. Francine Robinson, CRGR, Suite 213, 502 Northwest 75th, Gainesville, FL., 904-375-4140.

Farmers Topple Towers

POWERLINE ASSAULTS THE PRAIRIE

by Alice Tripp

Introduction

As technology advances and expands, the people who live with it have a right to require that new techniques be proven safe and beneficial. The disruptive results of a general disregard for the average person, who lives in the shadow of an atomic plant or under the legs of a giant transmission tower, are common. Techniques inadequately tested and politically railroaded should not withstand the protests of the ordinary person who refuses to accept them. Protesting citizens may be afraid of technological uncertainties or may be simply defending their workplace and home against the encroachment of the advancing technological business world.

Who is right, the scientist, financed by corporations, or the person in the street? Einstein said that these decisions must be made in the village square. Why do we accept Einstein's formulas and reject his philosophy?

History

In West Central Minnesota, local farmers have been opposing an electrical transmission line for over four years. The resistance dates back to the very first information meeting staged by the utilities. The public relations person for the utility company said at the meeting, "You should be proud to have the biggest powerline in the world in your country." but the farmers felt differently. They did not want the world's biggest powerline running over their carefully tended fields. As they began to oppose the line, they discovered unanswered questions about the health effects of high voltage transmission lines, and they ran into the stone-wall of government-corporate collusion. They also discovered resistance to powerlines all across the country and around the world. They began to form alliances and develop a new political sensitivity and awareness.

Together with other local people, the farmers have tried to use every ligitimate legal and political channel to make known to the utility company, the government and the public their determination to save the land and to maintain safety in their workplaces. The farmers and their urban supporters have been met with indifference and arrogance by both the utility and the government. Turned away at the state capitol, they have taken their case to the courts again and again, only to be rebuffed. The courts have admitted that the state agencies have not abided by the law, but in each case the courts have ruled against the farmers.

Alice Tripp

Now the line is completed but the farmers still oppose it. Indeed, after a brief electrical testing period dur-

Alice Tripp is a farmer and protester from Central Minnesota. She and her husband John, farm 200 acres in Stearns County. They have been active in the protest against the CU powerline for several years. They have been arrested, gone to jail, and have entered electoral politics. Ms. Tripp and Mike Casper, Physics Professor from Carleton College, ran in the democratic primary in 1978 and got 20% of the vote against the populist governor, Rudie Perpich. They are still fighting the powerline and the powers that continue to try to ignore and divide people. They are active in alliances with groups across the country trying to run their own lives.

ing which the farmers could hear and feel the intensity of the electric fields on their bodies as well as on their telephones and TV sets, the resistance stiffened. People who were stationed under the line reported that they felt sensations like cobwebs on their skin, or tingling, Reports also circulated that nosebleeds and rashes were common under the line. Six miles of underground telephone company connections were completely disrupted by the testing. Farmers have made it clear that they do not want to live with these hazards.

Who can blame farmers for shooting out insulators on towers which have been erected in their fields against their will? When government officials from the governor and his appointees to the elected legislators say to the citizens, "There's nothing I can do," the law-abiding, hard-working people lose respect for government and the courts.

The Utility Company

Thirty-four small rural electrical co-ops (R.E.C.) form two utility conglomerates, United Power Association (U.P.A.) and Cooperative Power Association (C.P.A.). The powerline is a project of these co-ops.

Most of the protesting farmers are members of the rural electrical co-ops. They realized, however, that as co-op members, they were only invited to an annual meeting where they received free lunches and door prizes. The members never knew that the powerline was being planned until equipment and supplies had been purchased. These "sunken costs" were so great that the government and courts were convinced that the process should not be stopped or reversed.

The powerline is under the jurisdiction of the Rural Electrification Administration (R.E.A.) which is part of the Federal Department of Agriculture. The R.E.A. is entering into partnerships with private utilities. This means that the electric utilities can get Federally guaranteed funds without responsibility. This kind of collusion promotes mismanagement, which in the present case, has raised the cost of the project from the original $536 million to $1.2 billion, according to a study done by Barry Associates.*

C.P.A. and U.P.A. have two large law firms working for them who provide highly paid and skilled lobbyists. Utility lobbyists write the laws; and according to one of them, they sit on the governor's desk. The needs of the citizens are secondary when weighed against the demands of economic growth, more accurately called profit growth.

The Powerline

The generating plant in North Dakota, using lignite for fuel, is scheduled to generate 1000 Megawatts. The powerline is designed to transmit electricity as dir-

Alice Tripp

ect current (dc) from Underwood, North Dakota to Delano, Minnesota. In North Dakota, alternating current (ac) will be generated. Expensive Swedish converters transform the power to dc and back to ac at Delano Minnesota where it will be distributed to Minnesota customers and the Mid-continent Area Power pool (M.A.P.P.) power grid.

The towers supporting the 1 1/2 -inch diameter conductor lines are 150-180 feet high and are placed approximately every 1/4 mile. Towers are set in the middle of fields, sometimes as close to homes as 300 feet and even closer to farm buildings.

The line has been routed often diagonally, across prime farmland, and routed away from lower-grade farmland where corporate farms have installed dozens of irrigation systems, and routed away from wildlife areas and state lands.

References to the possible dangers of high voltage transmission lines occur in many articles on energy. The few studies which have been made, such as those by Dr. Marino from Syracuse, show damage to the central nervous system and changes in blood chemistry from exposure to electrical fields like those produced by high voltage lines.

Minneapolis Tribune, March 6, 1979, p. 1.

The Government

The state government could not answer the farmers when they protested against the line, the secretive process, and the route of the line. When the farmers went to the state capitol in caravans of busses and cars, they were met only with shoulder-shrugging "nothing-I-can-do" attitudes. The process had been pushed through, and a new power plant siting act had been written and manipulated. A certificate of need for the powerline was granted before the farmers knew what was happening.

Minnesota Governor Rudie Perpich became involved after all the state regulatory processes were completed but before construction of the line had begun. In response to the active, well-publicized protest, he did go out to the farmers' homes and talked to them. His only solution was to propose a "science court" He brought a New Yorker to Minnesota from the American Arbitration Association to describe to the farmers the science court. The court would discuss health and safety issues but would not have any legal power. Construction would continue, and by the time the court had come up with its findings, the line would be up. The farmers would be required to stop their protesting while the court was conducting its findings. Though no concessions were promised by the government, the farmers agreed to a science court if a moratorium on construction was implemented. The farmers wanted an inquiry into many aspects of the powerline. The utility company, however, did not agree to the moratorium and the court was never convened.

The "Science Court"

In August 1978, the American Bar Association invited representatives from the Governor's Office and Alice Tripp, a protesting farmer to address their technology section on the science court. Most of the participants in the discussion were scientists. There was general agreement that the court does not provide for sufficient input from the people. It was the consensus of this group that the science court, as conceived, would not work because it was imposed on people by the authorities. Also, scientific conclusions are not arrived at easily; they require discourse. When that discourse involves lay people and becomes a subject of discussion in the streets and fields, it becomes as Professor Earl Callen of American University said, "the beautiful music of democracy," not the babble of ignorance. Participants in the meeting largely agreed that people should have more voice in decisions that affect their lives.

The Protests of the Farmers

The farmers continued their protests as construction of the line proceeded. They hindered the work of the surveyors. They drove tractors in front of transits and barricaded vehicles. The farmers gathered daily to discuss new ideas such as digging up a township road so workers and the sheriff could not get to the site. They shot off insulators and toppled towers and the utilities became concerned that they would never be able to energize the lines. As the utility replaced one fallen tower, another came down. Thirteen towers have been taken down. The utilities have hired a security company to locate the so-called "vandals". The reward for information has been increased to $100,000, but there have been no takers. Some county officials and townships cooperated with the protesting farmers. In all their actions they never hurt anyone.

Governor Perpich resorted to force to guarantee the completion of the project. He sent out 150 highway patrolmen. These state troopers, acting as company police force, made 100 arrests in the winter of 1978 on charges of "obstructing legal process". After the line was completed, all the charges were dropped with a few exceptions.

(continued on p. 33)

Fight for Safe Workplace

EPOXY BOYCOTT IN DENMARK

by Janine Morgall

In June 1978 at a meeting of Byggefagenes Samvirke (BS), a federation of construction workers' unions, the results of a research project from The Royal Danish School of Pharmacy were made public (Andersen, et al. 1978). The report concluded that aromatic epoxy resins (used extensively in the building and ship building industry) correlate highly with carcinomas. Experience at the workplace also identified epoxy as the cause of eczema and allergies.

On the basis of this report BS advised its members to boycott on the job all products containing epoxy resins. Workers went out on strike. The Minister of Labor was asked to take epoxy products off the market, and there was a call for a registration and screening system for all new chemicals coming out on the market.

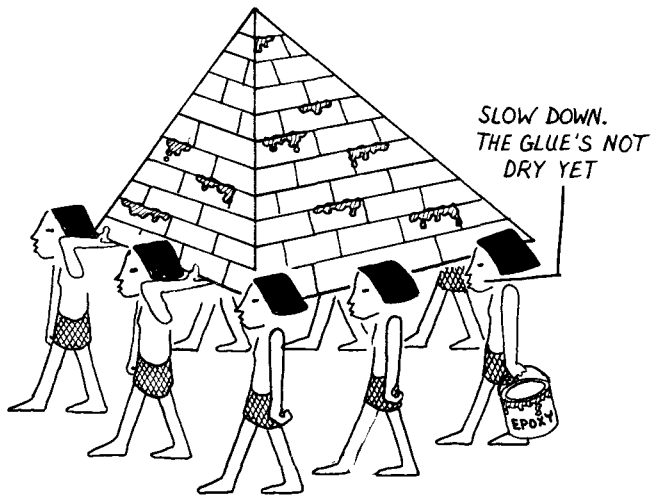
The boycott received support from the local unions but not from the national union, which felt that the government regulations were sufficient. It considered the boycott too militant and felt the problems should be resolved in a more cooperative manner. Nonetheless, for over a year workers at a county-owned sewage treatment plant (which was under construction) successfully boycotted epoxy products. During the last three months a physical blockade was formed. The blockade was eventually removed by police force.

Although the Danish Labour Inspection Service set up government regulations limiting the use of epoxy, over 30 dispensations were granted to industry (mainly on economic grounds). As a result workers who refuse to work with epoxy products have breached their collective bargaining contract and are subject to a fine by the industrial tribune.

Janine Morgall is a member of Aktionsgruppen Arbejdene Akademikene (Action Group: Works-Academics) in Copenhagen, Denmark. The group was active in the epoxy boycott and continues to be active in health and safety problems in the work environment.

Epoxy: Help or Hazard

Epoxy resins were first synthesized in the 1930s and are the most important of the epoxy compounds. Epoxy consists of two parts — a resin and a hardener — which are mixed together shortly before use. Epoxy resins have many uses and functions: as surface coatings and adhesives, especially for metals, and as a component of paints, lacquers, and glues. They are used in more than 16 thousand different products. Used extensively since the mid-1950s as surface coatings, they have been acclaimed because of their ability to produce a smooth and resistant surface. Dissolved in paints, they are used to seal off and smooth out cement surfaces in buildings. They are used to repair cracks in cement, to prevent corrosion of metal and the cement surrounding it, and in the production of many of the products we buy for our homes. In Denmark they are used primarily in the building industry, including ship building.



Ellen Armstrong

Besides being so versatile, epoxy resins are very effective. Some people claim that there are no adequate substitutes for them. They have a low degree of shrinkage, are highly adhesive and have an almost unlimited shelf-life. Epoxy was used in Egypt to glue the pyramids together when they were moved.

The economic advantages of epoxy resins are illustrated by the following two examples. The foreman of the Master Builder's Association in Denmark told a news reporter that if he had to put 100,000 square meters of tile and he could not use any epoxy products, it would cost approximately 30-40 million kroner (about 6-7 million dollars) in repairs because the tiles would keep falling down. Similarly, the maintenance of a water tank protected by epoxy need only be done every 15 years, whereas a water tank not protected by epoxy requires maintenance once every three years. Versatility, effectiveness, and good economics — three good reasons for using epoxy. There seems to be only one reason to support the boycott of these products — they are a health hazard.

> Unfortunately, the resins are extremely irritating, and contact with fumes of the epoxy resins has caused dermatitis of the face, eyelids, and neck. Inhalation of vapors or aerosols can lead to acute pulmonary edema, or fluid in the lungs. The reported incidence of dermatitis among those having prolonged or unusual contact runs from 10 to 60 percent. Sensitization is not uncommon and may run as high as 2 percent of the exposed population. (Page and O'Brien, 1973)

Then there is the research done at the Royal Danish School of Pharmacy which used the "Ames Test" (see box) and concludes:

> To prevent cancer and genetic damage in humans it is necessary to minimize the exposure to substances such as aromatic epoxy resins which have been shown to be mutagenic in bacteria, and thus must be considered as potential mutagens and carcinogens in human beings. (Andersen, et al. 1978)

These results were supported, almost two years later, by a study that appeared in *Cancer Research* (Holland, et al. 1979) which concluded that epoxy resins were carcinogenic in mice skin.

The Unions Respond

In recent years labor unions have become more and more interested in problems in the work environment. In Denmark unions have initiated research into social and medical problems related to work. Their goal has been to make the workplace safe for their members and to track down work-related health hazards and illness. There are over 10,000 uncontrolled chemical products on the Danish market. Epoxy has been singled out as one of these chemicals which is known to cause health problems and which now is suspected of being carcinogenic.

Besides wanting epoxy products banned in Denmark the epoxy campaign had other goals. One was to develop a system independent of the employer and the manufacturer whereby all chemicals would be tested and approved before they came out on the market. A long-range goal was to demonstrate the need for changing the law regarding toxic substances to insure an effective screening of *all* chemicals before they come out on the market. Another concern of the unions was the laws forbidding persons with tendencies toward eczema and allergies from working with epoxy products. Intended to *protect* the workers, in fact these regulations cut 10-15 percent of them off from their profession. This sorts out the work force rather than the chemicals. It also gives employers grounds for firing anyone with tendencies towards eczema or asthma. The result is two labor markets, one for the healthy and one for the unhealthy. Lastly the unions questioned a system which makes workers choose between consideration for their health and consideration for their employment! Should the ability to compete on the labor market be based on more or less unhealthy working conditions?

THE AMES TEST

The Ames Test, developed by Professor Bruce Ames and his colleagues at the University of California, Berkeley, is a fast inexpensive way to screen for potentially carcinogenic (cancer-causing) chemicals. The test does not directly examine the ability of chemicals to cause cancer in animals, but rather it examines the ability of chemicals to mutate (cause change in) the DNA of bacteria. The test has demonstrated that 90% of the chemicals known to be carcinogenic in animals are also mutagenic in bacteria, suggesting that any chemical which is positive in the Ames Test is possibly a carcinogen.

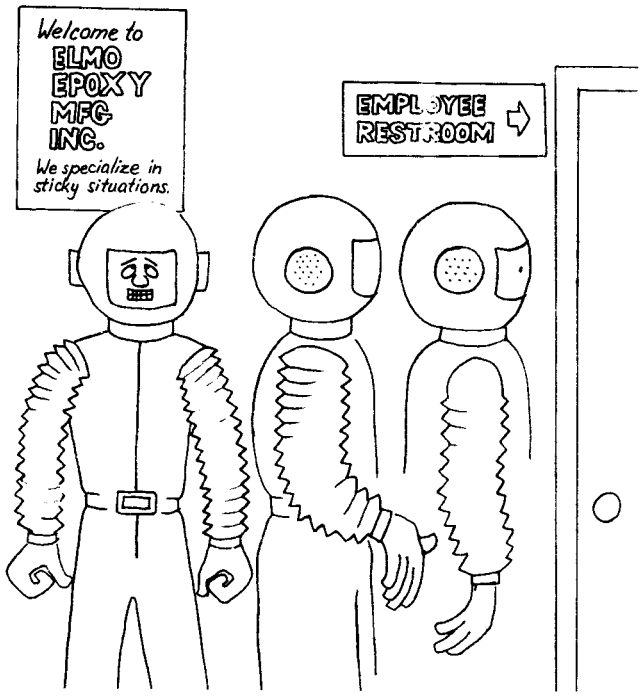
The test uses strains of bacteria which are unable to grow unless they are supplied with the amino acid histidine. When the chemical being studied and the bacteria are placed together on solid growth medium without histidine, none of the bacteria can grow unless the chemical is a mutagen. If it is, a few bacteria will mutate so that they will be able to make their own histidine, and grow on the plate.

The World Health Organization estimates that environmental factors, including chemicals, are responsible for 75-85% of all cancers. A thorough animal test of a single chemical costs over $100,000 and takes 1-3 years. Not enough scientists and facilities exist to perform animal tests on the over 60,000 chemicals now in use, much less the almost 100 new ones introduced each year. Moreover, the few chemicals that are carcinogenic are usually not discovered until many people have been exposed to them. The Ames Test takes only a few days and costs less than $1000 per chemical, which makes it possible to test more chemicals in less time, and screen chemicals before they are introduced.

The Workers

It is estimated by the National Trades Unions Organization (LO) and the Employer's Confederation (Dansk Arbejdsgiverforening) that 15,000 Danish workers come into daily contact with epoxy and that due to the versatility and effectiveness of epoxy resins that number is rising every day.

In their statements to the media, workers have been clear that they want dangerous and harmful chemicals banned. They do not agree that it is just a question of more and more protection. Some substances are so harmful (epoxy is one of them) that they are forced to wear what resembles a "space suit" in order to be properly protected. These suits are uncomfortable and cut down the worker's productivity. Several studies have shown that these suits still do not protect them from dangerous vapors. Workers who must wear special suits are tired of the creams, gloves and masks they are forced to wear. They want to be able to dress like normal construction workers, in normal work clothes.



Ellen Armstrong

The Employers

Many employers expressed bewilderment over the epoxy boycott. One told the newspapers that epoxy products had been used for years and that it was only recently that this claim about epoxy being carcinogenic had come up and that he simply did not know what to do about the situation.

An engineer at Lynetten, a county-owned sewage treatment plant, says that officially they must hold themselves to what the Ministry of Labour says but that in reality they can't force the workers to work with epoxy. When all is said and done, the problem will be left with the entrepreneurs, many of whom work exclusively with epoxy products.

There is of course a very real economic threat. Many claim that there are no substitutes for epoxy when it comes to efficiency and economy. If Denmark were to ban epoxy products it would be the only country in the world to do so; this means that Danish companies could not, quality-wise or economically, compete on the world market. Some claim that were there restrictions against epoxy products it would cause big economic problems and most likely add to the already high rate of unemployment.

The Danish Labour Inspection Services (Arbejdstilsynet)

When the campaign to boycott epoxy began, the Danish Labor Inspection Services told newspapers that they did not doubt that the Ames test was positive for the three epoxy resins tested. They also agreed that the Ames test was the best short-term test available for the screening of possible carcinogens. However, they did not agree with the interpretation of the results by the research group from the Royal Danish School of Pharmacy, and they did not ban epoxy from the market. A representative is quoted in a report from the School of Pharmacy as saying:

> Epoxy is a dangerous substance which should be treated with respect, but there are no reasonable grounds to introduce a general ban of epoxy products due to the results of this report. (authors translation)

The Danish Labour Inspection Service issued a pamphlet containing guidelines, agreed to by the National Labour Organization and the Danish Employer's Confederation, for protecting workers when they work with epoxy products. In October 1978 they also issued government regulations with rules for limiting the use of epoxy. The government regulations did not ban epoxy; instead they contained stricter rules which can be outlined as follows:

(1) Epoxy suppliers must be registered with the Labour Inspection Service who will then give their approval that the material may be used and that the ingredients and instructions are acceptable. The Labour Inspection Service's approval is based *solely* on information from the supplier.

(2) Epoxy may be used only if another, less dangerous, product has been tested and gives unsatisfactory results. It is the employer who decides to what extent another material is unsatisfactory.

(3) Spraying epoxy outside of closed system, i.e. cabin or box used for spraying, is forbidden.

(4) Workers must wear protective clothing, gloves, etc. to avoid epoxy contacting the skin.

(5) Workers with allergies or very sweaty hands are forbidden to work with epoxy.

(6) Workers who work with epoxy must complete a special course on precautionary measures for working with epoxy.

(7) The workplace must have adequate washing facilities. These facilities must be placed so that other workers do not come in contact with epoxy.

(Iversen, 1980)

The Danish Labour Inspections Service, the National Labour Organization and the Employer's Confederation have agreed that the health and safety of workers using epoxy are not in danger so long as the government regulations are observed. Legally this means that a worker cannot refuse to work with epoxy by claiming that it is a threat to "life, honor and welfare." It is a breach of collective bargaining for a worker to refuse to work with epoxy if an employer follows the government regulations.

This situation raises many questions: Do the government regulations protect workers against allergies and the risk of cancer? How can we be sure? Are there any guarantees that nothing will happen?

Despite the government regulations, B.S. continued its boycott of epoxy. It argued that in practice skin contact cannot be avoided when working with epoxy. Furthermore, B.S. maintained it was degrading and stressfull for its members to work with material that require them to be dressed like astronauts in order to be safe. At Lynnetten workers hindered the use of epoxy for over a year. B.S. held a large solidarity march outside the workplace in which 5,000 construction workers participated. In the last two to three months of the boycott, trade union leaders and union members formed a physical blockade to keep out the boycott-breakers. The blockade was eventually removed by the use of police force, and the boycott was called off.

The Government Regulations — One Year Later

The government regulations have been in force for over a year. What are the effects?

First of all, no studies have been done to determine the extent to which the regulations have protected the workers in practice or even how many employers actually followed the regulations. More than 2,000 epoxy products have been reported to the Danish Labour Inspection Service, and 600 have been approved.

With regard to the rule forbidding spraying of epoxy outside of a closed system — 30 dispensations have been granted. The entire ship building industry has been given dispensation. To get dispensation a firm approaches the Danish Labor Inspection Service (Arbejdstilsynet) which then consults the National Trades Unions Organization (L.O.) and the Employer's Confederation (Dansk Arbejdsgiverforening). If there is agreement between these two, dispensation is granted. It is the impression of the workers that L.O. has consistantly prioritized the workplace higher than the working environment.

There are still no standards to define what appropriate protective equipment *is* nor has there been any systematic checks on work sites to determine whether the protective equipment being used is sufficient.

No action has been taken to help workers who are allergic to epoxy (and are "protected" by the regulations) to find other work. There is now a special course on precautionary measures for working with epoxy, which consists of 16 hours of instruction in the use of epoxy. The course is based on the assumption that if used properly epoxy is not at all dangerous. Many feel that the course is run like a "sales promotion" and ignores the basic and fundamental danger of this product.

AKTIONSGRUPPEN ARBEJDERE AKADEMIKENE

The goal of Aktionsgruppen Arbejdere Akademikere (Action Group: Workers-Academics) is to support trade union and workplace activities that deal with health and safety problems in the work environment. This is achieved by disseminating knowledge and establishing contacts among workers, safety representatives and trade unionists, as well as by developing advice and counseling services. A basic principle of Aktionsgruppen is that the workers decide how these resources are used.

Aktionsgruppen issues pamphlets on different topics relevant to the work environment such as Danish laws on the work environment, industrial health services and workers compensation. These pamphlets are meant as discussion papers and aides to debate. They are therefore written in a form which makes them adaptable as background material for courses, professional conferences, study groups and meetings. Members of Aktionsgruppen include: workers, safety representatives, trade unionists, doctors, engineers, nurses, sociologists, social workers, physical therapists, occupational therapists, and pharmacists. There are also 20 trade unions and 20 clubs that have joined.

Aktionsgruppen was active in the epoxy boycott and continues to be involved in health and safety problems in the work environment. Anyone interested in working in agreement with Aktionsgruppen's goals can become a member.

Contact Address: Benny Christensen
Arnesvej 44
2700 Bronoshoj
DENMARK

Conclusion

Epoxy products have not been banned from the Danish market. In response to the government regulations issued in 1978 restricting the use of epoxy products, many firms have applied for and received dispensations. This means that workers who refuse to work with epoxy products can be brought before the industrial tribune. There have been cases of this and workers have been fined as a result.

Despite the fact that B.S. was forced to call off its boycott, due to intervention by the Danish police, the action has had far-reaching consequences. It has shown the various methods which are necessary in order for workers to protect their own health. It has made the public aware of the danger of chemicals at the workplace. It has proved that the Danish Labour Inspection Service does not protect the health interests of the workers when it really counts. And finally it has started people thinking: When do considerations of efficiency and economy take precedence over health hazards? Who should decide? □

REFERENCES

Andersen, Kiel, Larsen, Larsen and Jette, "Mutagenic Action of Aromatic Epoxy Resins, *Nature*, vol. 276, Nov. 23, 1978, pp. 391-392.

Berlingske Tidende, July 1 and 9, Aug. 5, 7 and 8, 1978, Jan. 8, 1979.

B.T., June 9, 1978.

The Economist, Nov. 25, 1978.

Holland, Gosiee and Williams, *Cancer Research*, no. 39, March 1979, pp. 1718-1725.

Lars Iversen, *Argument*, vol. 1, March 1980.

Patrick Kinnersly, *The Hazards of Work: How to Fight Them*, London: Pluto Press, 1973.

Page and Mary-Winn, *Bitter Wages: Ralph Nader's Study Group on Disease and Injury on the Job*, New York: Grossman Publishers, 1973.

Politiken, June 6, 9, 22, 25, and 29, 1978 March 27, 1979.

Solidaritet (Tillaeg Til V.S. Bulletin 188), Special Number: Epoxy Boykotten (The Epoxy Boycott, November 1978).

Weekendavisen, June 30, 1978.

ENERGY

WHAT IS TO BE DONE?

CALL FOR CONTRIBUTIONS

We are planning a weekend conference on energy-related issues to be held in New York City early in 1981. Prospective participants wishing to share research results, work in progress or to report on contemporary struggles involving the political economy of energy are encouraged to submit presentation outlines (one or two typed pages) by September 1, 1980.

The left has offered many critiques of mainstream energy economics and policy and has occasionally offered alternatives. This, however, has seldom been tried in the context of a coherent attempt to combine a firm theoretical understanding of the issues with the experience of political activists working on policy-oriented questions. We hope that the conference outlined below will be an opportunity for debate covering a gamut of questions from the purely theoretical to the immediately practical. Historical presentations and reports on organizing experience in any of the areas below are particularly appropriate.

Topical Areas

A. Energy and the labor theory of value: Is existing Marxist theory adequate for understanding the value of energy?

B. Political economy of world energy flows and theories of imperialism: OPEC, multinationals and technology transfer.

C. Toward a Marxist analysis of energy development: Explaining and planning technology development under capitalism and socialism.

D. Towards a Marxist analysis of energy policies: The jobs issue, equity issues, energy and the infrastructure, ecological and occupational health issues and critiques of current energy programs.

E. Relating participation in reform struggles to the development of class consciousness: The anti-nuclear movement, rate withholding campaigns, municipalization, nationalization and socialization of energy industries.

Conference organizers:
—Union for Radical Political Economics
—New York Marxist School
—New York City Science for the People

To request more information and to submit outlines or suggestions, contact:
Maarten deKadt
310 West 94th Street
New York, NY 10025

Exporting Toxic Wastes

DUMPING FOR DOLLARS

by Christopher McLeod

With stiff new federal regulations on the domestic disposal of hazardous wastes scheduled to go into effect this November, an unusual breed of American entrepreneur has begun making the rounds of Third World nations from Africa to the South Pacific.

The business is neither selling nor buying anything. It is finding new dump sites for part of more than 100 billion pounds of toxic chemicals and nuclear wastes discarded annually in the U.S.

The prospect that these materials may wind up abroad has federal officials worried that our toxic wastes will poison U.S. foreign relations along with the environments of developing countries around the globe. But government efforts to prevent their export are being hampered by a rift between the State Department and the Environmental Protection Agency (EPA) over the way the matter should be handled.

In the last year, American waste disposal companies have approached 11 countries in Africa and Latin America. Philadelphia landfill operator David Ehrlich of the Gloucester Environmental Management Services, says he has only "to work out some technical details" before he will begin shipping chemical wastes from the East Coast of the United States, as well as Europe, to a West African nation which he refuses to name.

But ever since last December, when Washington was notified that chemical industry representatives were offering multi-million dollar deals to Third World leaders in exchange for guaranteed dumping sites, an ad hoc committee of representatives from the State Department, the EPA, and the Council on Environmental Quality has been moving to stop such exports.

A classified State Department cable to Sierra Leone warned that this new export would lead Africans to "condemn the United States for dumping its wastes in the black man's backyard." The cable was prompted by a proposal from Nedlog Technology Group of Arcada Co., to ship 1 million tons of toxic chemical wastes to Sierra Leone per year.

When the cable was leaked to the press, the President of Liberia, which borders Sierra Leone, flew to the capital city of Freetown to urge President Shiaka Stevens to reject the American offer, and student demonstrations were organized at Njala University in Freetown, and at the Sierra Leone Embassy in Washington. Eventually, Stevens went on national TV to deny that his government had entered into any agreement to import toxic wastes, but he did not rule out such an agreement in the future.

Dumping for Dollars

Nedlog vice-president James Wolfe, who had tried to set up the waste site in Sierra Leone, predicts that the new EPA regulations on chemical waste disposal will increase the cost of waste disposal, creating a mountain of paperwork and "an incredible logjam" of dangerous chemicals awaiting disposal. "That's why we were looking overseas to find countries that need foreign exchange and jobs, and have plant sites," says Wolfe, who has dropped the plan because of the adverse publicity. But, he says, "We're being a little paternalistic in telling the Africans what they can and can't do. If I was Sierra Leone I'd be pissed as hell."

Meanwhile, David Ehrlich is going ahead with plans for a treatment plant and landfill in another west African nation. Though Ehrlich doesn't know exactly what chemicals he will ship, he says, "There is so much waste out there that I have people coming to me constantly. They'll be standing in line. We have insufficient waste facilities here, and this stuff has to go somewhere."

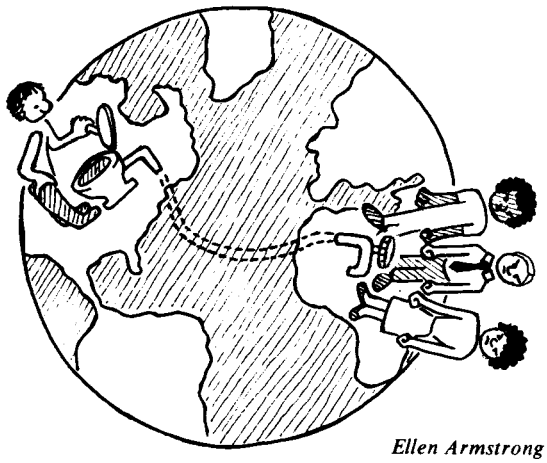
Ehrilich says the wastes will be disposed of in "an environmentally sound manner," using state-of-the-art technology. "The people I'm dealing with are university-trained. It's not one of your more backward coun-

---

Christopher McLeod is a correspondent for Pacific News Service. He has written on the chemical industry for Mother Jones *magazine and other national periodicals.*

tries. Technically they know what they're doing. They have pride in their environment. Maybe even more than we do."

But a look at the chemical dumping record in the United States casts serious doubt on industry assurances. According to the EPA, 90% of this country's hazardous chemical wastes have been disposed of in an "environmentally unsound manner." The EPA has identified 2,000 waste sites in the U.S. which may "pose imminent hazard" to public health and the environment. This year, 100 billion pounds of toxic chemical waste will be generated by American industry, and according to Senator Carl Levin's Subcommittee on Oversight of Government Management, a full 65 percent of it will go unregulated under the new regulations.



Ellen Armstrong

The EPA and the State Department Disagree

On the issue of exporting the toxic wastes, the split between the EPA and the State Department reflects EPA's primary concern with the U.S. environment and the State Department's concern with U.S. foreign relations. Under the terms of the new Resource Conservation and Recovery Act, the EPA simply requires the exporter to notify it four weeks prior to shipment of the hazardous waste, so that the EPA can inform the receiving country of the shipment and later verify its arrival. But actually, says an EPA official who asked not to be named, "The EPA's attitude is one of indifference. They'd like to see the waste go overseas. They're not going to go very far out of their way to worry about it."

Back at the State Department, however, policymakers have decided that the notification requirement is inadequate. According to Dr. Jack Blanchard, of the State Department Office of Environment and Health, the State Department will move soon, with the support of the Commerce Department and the Department of Justice, to place any EPA-designated "hazardous chemical waste" onto the "Commodity Control List," which under the Export Administration Act, gives the executive branch the power to require licensing of exports which might adversely affect U.S. foreign policy. Such licensing will serve to discourage dumping by requiring public hearings on proposed exports, as well as a written State Department opinion on the potential impact on U.S. foreign policy. Says Blanchard, "We anticipate that the situation will come up again in the future, and we want to have a mechanism in place ready to deal with it."

It's Getting Worse

It will come up again, and soon. David Ehrlich says he plans to start shipping toxic wastes within the next six months, and if the U.S. government moves to stop him he says he will ship wastes from Europe to the west African dumping site. Meanwhile in New Jersey, the Newark *Star Ledger* has reported a "still confidential plan" by local interests to establish a hazardous waste dumping site on the western shore of Haiti. And EPA documents reveal that in the last six months, three Texas companies — Diamond Shamrock, Quanex, and the Arbuckle Electrical Machinery Co. — have exported shipments of PCBs (a well-known carcinogen) for disposal in Mexico, South Africa, and the Dominican Republic.

Voices of Protest

The voice of protest from Third World nations is growing. Angry Mexican officials requested a closed door session with U.S. governors at the first international conference of border states in Ciudad Juarez, Mexico, this month to discuss dumping. And the UN environmental program adopted a resolution at its annual meeting in Nairobi calling on government to control the international transfer of toxic chemicals and insure adequate measures for handling and disposing of such wastes.

All of this may be simply a prelude to a much bigger controversy over the possible export of nuclear waste materials. Boeing has contracted International Energy Assoc. Ltd. (IEAL) — a Washington, D.C. consultant firm — to do "a very large and elaborate study" entitled "The Pacific Basin Storage Study," which, according to Daniel Lipman of IEAL, will assess "the potential market" for Boeing to construct facilities for the "storage of spent nuclear fuel in the Pacific region — not just from the United States, but also from Japan, Taiwan, South Korea, and the Philippines." The rationale for storage in the Pacific, says Lipman, is primarily to prevent reprocessing and creation of weapons grade plutonium, and secondly to give Asia's nuclear reactors an outlet for an ever-growing quantity of spent fuel rods. Potential sites considered in recent years include northern Indonesia, Malasia, Australia, the Marshall Islands, the Caroline Islands, Wake Island, Palymyra, Guam, and possible seabed disposal in the Mariana trench and the Philippines trench.□

Birth Defects and Illness

VIETNAM WAR LEGACY

by Scott Thacher

A herbicide, Agent Orange, was spread over almost one tenth of the area of South Vietnam by the American military during the peak of the Vietnam War to defoliate forests and destroy cropland. Today, exposure to Agent Orange threatens not only the health of American and Vietnamese veterans, but it is possibly the cause of birth defects in their children. Much less is known about the long-term effects of the spraying on the ecology of South Vietnam and its people.

According to the Veteran's Administration, the effects of Agent Orange have been greatly exaggerated. They have grudgingly begun to investigate its effect on veterans. By March 1980, two vets had received compensation for exposure, in each case because a prior skin condition had been aggravated. Two years ago, when the effects of Agent Orange exposure were beginning to receive widespread publicity, 450 veterans had submitted claims. The number will surely continue to grow. In response to these claims of exposure, the VA promises no action, only medical examinations. The Government Accounting Office and veterans groups are not convinced that even these small efforts are being carried out properly by the VA. (1) Is the VA trying to cover up the long-lasting effects of chemical warfare?

What is Agent Orange and What Are Its Health Effects?

The active components of Agent Orange are a pair of similar chemicals, 2,4,5-T and 2,4-D. During the chemical synthesis of 2,4,5-T, and to a lesser extent of 2,4-D, a contaminant is formed called dioxin. There are many varieties of dioxin which are related in their chemical structure. The form of dioxin in 2,4,5-T is the most toxic one known; it is called 2,3,7,8-tetrachlorodibenzodioxin (TCDD). It is one of the most toxic chemicals ever synthesized. Material sprayed in Vietnam had anywhere from 1 to 25 parts per million TCDD. Agent Orange now used in this country as a defoliant contains 25 parts per billion or less.(2)

Vietnam vets, and workers who were exposed to Agent Orange during its production since the 1930's, have most commonly suffered from chloracne. This ailment is similar to acne but more persistent and intense. Blackheads appear initially on the face, and later on the back, shoulders and groin. If chloracne is severe enough, there will be disfigurement. Tests on rabbit ears, in the 1950's, showed that TCDD in Agent Orange caused chloracne. Some other chlorine-containing compounds can also cause chloracne.

Chloracne and other symptoms of dioxin poisoning do not always appear immediately and may not be seen until days or even years later. They can appear and disappear over time. This may explain why veterans have not recognized symptoms of Agent Orange exposure until recent years. Weakness, radical mood changes, numbness, tingling in the extremities and liver dysfunction are some of the reported ills. Any of these can be extremely aggravating and even debilitating. Despite the fact that dioxin's effect had been known for the workplace, Agent Orange was described as "relatively nontoxic to man or animals" in U.S. Army manuals. The manuals did suggest the use of protective clothing during its use, but protection against breathing Agent Orange mist was not required.(3)

American soldiers were exposed to Agent Orange during routine preparations for spraying missions but exposure at other times may have been more serious. One vet reported that he and many others developed fevers and severe blackheads soon after an incident in 1969 near an ammunition depot near DaNang where Agent Orange was stored. The men were sent to rescue some nearby children after explosions at the depot released clouds of material, including the Agent Orange.

Scott Thacher is a member of Science for the People Boston Disarmament/Energy Group. He is a biochemist doing research related to toxicology.

Laura Reeves

When the soldiers complained of sickness following the explosion the military doctors told them it was combat fatigue or some kind of jungle sickness.(4)

Little is known about how dioxin poisons. One measure of its extraordinary if almost mysterious effects is that a guinea pig can die within days or weeks of exposure to a dose of dioxin one-billionth of its body weight. Toxicity varies greatly among animal species: dogs are 1,000 times less sensitive than guinea pigs, for example. Some animals die with severe liver damage, while others exhibit little damage to their livers upon death. Dioxin has also been shown to cause cancer in mice.

One important case of widespread dioxin poisoning of animals was the outbreak of so-called "chick edema disease" in Georgia during 1957. The chickens were fed fat obtained as a by-product from the leather-tanning industry. During the tanning process, chlorophenols are heated and produce dioxin. This contaminant is picked up in the fat that is extracted from the hides.(5)

Dioxin persists in the environment, and possibly in the human body. It cannot be easily flushed out of the soil or the body because it is insoluble in water. It is very difficult to remove. In a few cases, workers, upon returning to clean up industrial plants years after major dioxin accidents, received serious exposure to residues of the chemical. One chemical plant was cast in concrete and dumped into the sea because of this problem.(6)

No information is available on the residues remaining all over South Vietnam. Fish caught during the war were reported to contain one part per billion of dioxin by weight.(7) Since some cropland was sprayed, in addition to enormous areas of forest, the inhabitants of Vietnam may be continuing to ingest the poison. Many experimental studies show that dioxin concentrates in the food chain. The half-time for dioxin persistence in the soil has been estimated to be from three months to a year, and apparently it is decomposed by sunlight. No studies have been done to show if this has led to the disappearance of dioxin from Vietnam.

Since humans and animals do not break down dioxin, it may become stored in their bodies for years. A fifth of the workers exposed during an industrial accident involving dioxin had skin problems thirteen years later. American veterans are now complaining of problems from exposures they experienced a decade ago. The spraying was most intense during the years from 1967 to 1969, and was officially cancelled in December, 1970.

Medical researchers have not been able to develop sensitive methods to measure the presence of dioxin in human body fat. If they could, it would help greatly in understanding the relation of dioxin poisoning to some of its unusual symptoms. Veterans groups are undertaking extensive surveys to obtain a clearer understanding of symptoms which may be related to Agent Orange exposure (see box). The National Institute of Occupational Safety and Health is maintaining a registry of those who worked in industries where Agent Orange and similar compounds were manufactured.

Dioxin — A Cause of Birth Defects?

The effects of Agent Orange linger on, painfully. Evidence from both American and Vietnamese veterans suggests that an increased number of birth defects among their children has occurred. A recent study by Dr. Ton That Tung, a Vietnamese surgeon, contrasted Vietnamese veterans who had fought in the South, where Agent Orange was used most heavily, with those who remained at home or fought in the North. He found that the veterans who had fought in the South were more likely to have children with birth defects than the other two groups of men. He writes that his results "suggest damage to the first generation through the

father." His studies were conducted initially by interviews with parents of all children with birth defects born from 1975 to 1978 in Yen Bai, a city of 10,000. Seven hundred soldiers had returned there from the South after the war and married women from the North. Half (15/30) of the children with birth defects in the city belonged to these veterans. Six were anencephalic — lacking in development of their brain. The malformation quickly results in death. The condition usually occurs in one out of every thousand babies born to other parents in the survey of Yen Bai. The study concluded that overall, abnormal births were about 4% (averaged from a number of cities) for fathers returned from the South or about twice as high as expected from a normal population. Dr. Tung interviewed a small number of soldiers who did not go South. They had fewer abnormal births than expected. Dr. Tung did not report whether the fathers of children with birth defects showed symptoms of dioxin poisoning.(8)

Dioxin has long been suspected of causing birth defects in women exposed to it during pregnancy. In animal experiments, dioxin was shown to be one of the most potent teratogens (agents causing birth defects) ever analyzed. It is by far more potent than thalidomide. When female mice were given a concentration of dioxin, one to ten parts per billion of their body weight, their litters had birth defects while they exhibited few if any symptoms of toxicity.(9)

Spraying of herbicides was halted in Vietnam partly because of a study by the American Association for the Advancement of Science. It correlated a two-fold increase in stillbirths in a Saigon hospital with the onset of spraying. They also found an increase in two birth abnormalities, cleft palate and spina bifida.(10) Recently, doctors at the Gynecological Hospital in Ho Chi Minh City (Saigon) contend their own statistics show an unusually large number of miscarriages and stillbirths, as well as anencephalia, because of the spraying during the war.(11)

Spraying of 2,4,5-T in the U.S. was restricted to areas far away from human populations in March, 1979 because of an increase in the number of miscarriages in areas of Oregon which appeared to correlate with spraying.

Dr. Tung, who visited the U.S. in May, 1979, says that he decided to undertake his studies because many American veterans suspect that Agent Orange was responsible for abnormalities in their children. VA medical records of approximately 120 U.S. Vietnam veterans, who claimed to have been exposed, were examined by the General Accounting Office. These records showed that 13% had reported birth defects in their children.(12) Dr. Gilbert Bogen, formerly a doctor at the VA, said he independently interviewed 78 Vietnam veterans who said they were exposed to Agent Orange, one fifth of them had children with birth defects.(13) In comparison, two percent of newborns in the U.S. have birth defects. These surveys could have been biased because they were not controlled. More studies need to be conducted, and soon.

A recent study by the National Toxicological Program (NTP) showed that male mice receiving dioxin or Agent Orange do not have an increase in defective offspring when mated weeks after exposure.(14) This study received widespread publicity, but it may be only slightly relevant to humans. The widely varying effects of dioxin exposure on different animal species was not emphasized. The study is hardly definitive because other animal studies have shown that dioxin can cause chromosomal changes.(15)

VETERAN'S GROUPS

Two non-governmental groups are seeking medical histories of Vietnam veterans, particularly those who believe they were exposed to Agent Orange. Both groups will send questionnaires on request. Citizen Soldier wants to identify and assist veterans who may have been harmed by Agent Orange. The National Veterans Information Clearinghouse is undertaking a survey of veteran's health problems for research purposes. Information about individuals will be kept confidential.

All veterans, are encouraged to participate.

Citizen Soldier
175 Fifth Avenue, Suite 1010
New York, N.Y. 10010

National Veterans Information Clearinghouse on Agent Orange
c/o Veterans Education Project
1346 Connecticut Avenue N.W.
Washington, D.C. 20036

For current news on the medical effects of Agent Orange, as well as actions of the government:

Agent Orange Newsletter
Agent Orange Veterans Advisory Committee
944 Market St., Suite 500
San Francisco, California 94102

The "Toxic Cocktail"

American veterans were exposed to many other chemicals including various insecticides and an antimalarial drug now thought to be toxic. Some scientists have suggested that this "toxic cocktail" will make it impossible to evaluate the effect of dioxin alone. A synergy between the toxic effects of many compounds may be responsible for the veterans' symptoms, but dioxin stands out as the most toxic and long-lasting one. The Defense Department suggests that the inhabitants of Seveso, Italy, where a cloud of dioxin was emitted from a chemical plant in 1976 (see *SftP* Nov./Dec. 1977), could

Steve Karian

be studied to understand the problems of dioxin exposure.(16) This may or may not be helpful for the veterans whose exposures were more sustained and possibly more severe.

The military is interested in downplaying the effects of Agent Orange. A scientific panel appointed by the government recently recommended that the overall war experience be considered a cause of maladies among the vets, including, presumably, symptoms of Agent Orange exposure.(17) These suggestions do not take into account how limited the efforts have been to understand and describe, much less explain, the continuing sickness of veterans which resembles dioxin poisoning. The Federal government may be hesitant because of the lawsuits brought by veterans against them and the chemical manufacturers of Agent Orange.

New Threats of Chemical Warfare

The legacy of the veterans is a reminder of the horrors of the chemical warfare used by American forces — as if the death and destruction in Vietnam is not enough.(18) The spraying of herbicides violated the spirit of treaties outlawing chemical warfare. Technological blindness and cynicism promoted a method of war which was not only destructive, but accomplished little militarily. There is proposed legislation in the U.S. Congress to build a new variety of nerve gas projectile, the so-called binary shell. This is a mindless response to the highly exaggerated reports of Russian stockpiling of chemical weapons. If we forget the destruction of past wars and allow our government to ignore their serious after effects, the current efforts to prepare for just another "cold war" will go forward unquestioned.□

REFERENCES

1. "Health Effects of Exposure to Herbicide Orange in South Vietnam Should be Resolved," *Report of the General Accounting Office*, April 6, 1979.

2. "Some Fumigants, the Herbicides 2,4-D and 2,4,5-T, Chlorinated Dibenzodioxins and Miscellaneous Industrial Chemicals," International Agency for Research on Cancer (IARC), *Monographs on Carcinogenic Risk*, Vol. 15, August, 1977.

3. "U.S. Ground Troops in South Vietnam Were in Areas Sprayed with Herbicide Orange," *Report of the General Accounting Office*, November 16, 1979.

4. "8 Who Lived With Agent Orange," *Boston Globe*, January 21, 1980.

5. Kimbrough, Renate, "The Toxicity of Polychlorinated Polycyclic Compounds and Related Chemicals," *Critical Reviews in Toxicology*, Vol. 2, No. 4, pp. 445-498, 1974.

6. Hay, Alistair, "Toxic Cloud Over Seveso," *Nature*, Vol. 262, pp. 636-638, 1976.

7. *International Agency for Research on Cancer, Monograph on Carcinogenic Risk*, Vol. 15, 1977.

8. Weisburd, Abe and Deborah Weisburd, Description of Dr. Tung's Study, Liberation News Service, July 11, 1980. A preliminary copy of the study is available from the Agent Orange Veterans Advisory Committee, 944 Market St. Suite 500, San Francisco, CA. 94102.

9. IARC, *Monograph on Carcinogenic Risk*, Vol. 15, 1977.

10. Ibid.

11. Weisburd, Abe and Deborah Weisburd, Liberation News Service, July 11, 1980.

12. *Report of the General Accounting Office*, April 6, 1979.

13. "Symptoms in Vietnam Veterans Exposed to Agent Orange," *Journal of the American Medical Association*, Nov. 30, 1979.

14. "Agent Orange Test Results," *Boston Globe*, August 2, 1980.

15. IARC, *Monograph on Carcinogenic Risk*, Vol. 15, 1977.

16. *Report of the General Accounting Office*, April 6, 1979.

17. *Boston Globe*, April 2, 1980.

18. Lewallen, John, *Ecology of Devastation: Indochina*, Penguin Books, 1971; and Nielands, J.B., et. al., *Harvests of Death. Chemical Warfare in Vietnam and Cambodia*, The Free Press, 1972.

POWERLINE

(continued from p. 21)

Technology and the Land

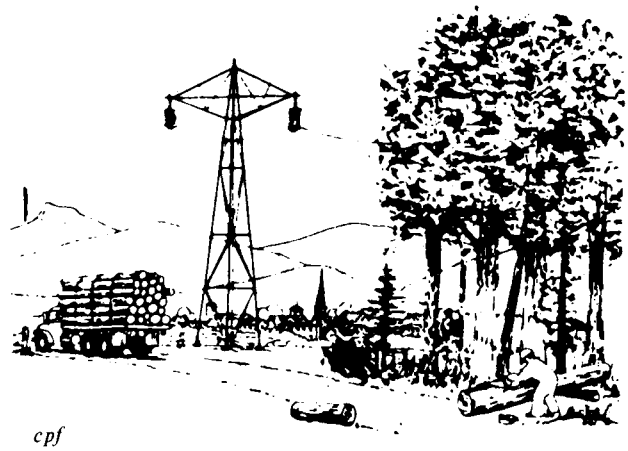
The technology of the powerline is new and the dangers are unknown. Some of these probably dangers arise from electric fields, ions and noise produced by the high voltage lines. One is told that all metal buildings and fences near the line must be grounded. School buses should not discharge passengers under high voltage lines. One should not refuel equipment under the powerlines. The state health department issued a report which could not assure the safety of the line: it said that too little is known about the hazards to stop construction. However, Dr. Petersen, a representative on an inspection tour, admitted that something is wrong; and further investigation is planned. Farmers will demand that this promise be fulfilled.

In addition to health and safety hazards, large towers in fields are a hindrance to farming. Though utilities have not used defoliants in Minnesota as they have in New York, they have destroyed the tillability of the earth under the lines. This easement may become a road, dividing up the fields. Large towers, forty feet on a side, obstruct farm machinery. Center pivot irrigation is impeded. The line produces noise which is foreign to the countryside.

To people who love and care for the land, a transmission line of this size is a desecration. People who once felt they lived in a democratic society feel they have been betrayed and no longer control their own lives. They have been left out of decisions affecting them. They known the need for this line was never proven, and they know there are alternatives which could be safer for everyone.

People can no longer accept technology that is based on the "GNP syndrome", pushing always for bigger and bigger. Technology based on profit cannot ride over people in the name of expansion. For example, the solutions to the energy problems do not lie in more and bigger generators and transmission lines. Solar energy in all its forms is at our doorstep. As Ann Fuchs, farmer from Minnesota said, "If we can go to the moon, surely we can find ways to produce energy without destroying the land."

Land is our most precious resource, next to people. Technology can be used to save the land and enhance living on it, rather than turning our fields into industrial pathways. Native Americans believe wisely that the earth is our mother. She must be saved and protected, not just for ourselves, but for those who are yet to come. Technology should be directed towards saving the earth not destroying it. □



cpf

UPDATE

The farmers are still meeting and protesting the powerline even though it is in operation. The state is conducting a survey on powerline health and safety, which is one of the major concerns of the farmers. For more information contact: General Assembly to Stop the Powerline, Lowry Minnesota, 56349. #(612) 283-5439.

news notes

BIOLOGICAL EVOLUTION VS. CREATIONISM IN SCHOOLS

Teaching theories of evolution is still thought by many to be controversial. The Institute for Creation Research (part of the Christian Heritage College of San Diego) feel the Bible alone provides factual basis for curriculum development when it comes to the origin of matter and energy. Since laws concerning *Biblical* creationism has been repeatedly overturned in court, these people call their doctrine *Scientific* Creationism and under this guise they are demanding that schools and textbooks present two "equal and alternative" models of human origin: biological evolution and scientific creationism.

H.B. 690 is a bill introduced into the Georgia legislature demanding that teaching any theory of evolution be "balanced" by "scientific creationism — the belief, based upon scientific principles, that there was a time in the past when all matter, energy, and life, and their processes and relationships were created ex nihilo and fixed by creative and intelligent design." It is believed that other states may look forward to introduction of similar bills (From NABT News and Views, February 1980) (National Association of Biology Teachers, 11230 Roger Bacon Drive, Reston, VA 22090).

Interestingly, the Indiana courts defeated a bill (S.B. 177) which provided guidelines for the State Textbook Committee which would require (among other things) that adopted textbooks "... not ridicule or present in a degrading manner the religious or ethical beliefs of others."

BREEDING A NEW CHINA

Peking, July 20 — Arguments have begun to surface in the official Communist Party newspaper, the People's Daily, that propose controlled breeding of the Chinese people through laws prohibiting persons with genetic defects from marrying or having children.

On June 8, the newspaper published an article by a chief medical officer in Liaoning Province which said, "We have done a lot ... in controlling the population" but "very little to improve the quality of the population." The official further stated, "It is necessary to promulgate the necessary laws and eliminate factors that endanger the quality of the population ... Those who are suffering from congenital diseases must be dissuaded from getting married and giving birth to children." He said it was necessary to "take elimination measures when abnormal babies are discovered."

Another People's Daily article suggested that the right to have children be denied to "imbeciles, lunatics, hemophiliacs and those who are color blind or carry hereditary diseases."

The suggestions lack the authority of government edicts and are expected to incite resistance and debate, but they indicate the extremes to which many Chinese are willing to go to reduce a population nearing the billion mark. Provincial authorities threaten severe economic penalties for young couples who produce more than one child. Prospective parents have confessed to fears that the single offspring allowed them may have some defect. To many Chinese determined to continue the family name, this defect may include simply being female.

—*Information from* The Washington Post *July 21, 1980.*

JOBS WITH PEACE UPDATE

The Jobs with Peace(JWP) campaign is continuing to pick up momentum nationally (see *SftP* magazine, July and August for detailed description).

Oakland's Jobs with Peace initiative is on the November ballot. The Oakland city council called a special election to coincide with the presidential election and (on July 19) by a vote of 6-1 placed JWP on the ballot. This followed months of vigorous petitioning, lobbying, radio interviews, a press conference, and was capped off with appearances and speech-making at the council by members of the clergy (Catholic archdiocese), numerous local Trade Union leaders (e.g. ILWU, Teamsters, molders, etc.), minority and community representatives, and many others. And in a trend that has been repeated in previous JWP campaigns, there was no organized opposition present at the council.

Add Santa Clara County, Fresno, CA and Ann Arbor, MI to the list of cities where people are working to put JWP Initiatives on their ballots. At a successful meeting called by San Jose Women's Int'l League for Peace and Freedom the text for Santa Clara JWP Initiative was drafted and plans were made, which are now in progress, to lobby county supervisors to place the initiative on the November ballot. The text reads: "Shall the people of the county of Santa Clara oppose the institution of the peace-time registration and the peacetime draft, and shall the county of S. Clara petition the Federal Government to significantly reduce wasteful military spending and use the money saved to develop jobs and needed services?" As Santa Clara has one of the heaviest concentrations of military and related industries in the world, the JWP campaign, whether on the November ballot or after, will be viewed from many corners of the country.

The Fresno campaign, initiated by a local radio commentator and active member of the Citizens Party, plans to lobby their city council for JWP in November. If this fails they will work to place it on their ballot in March, 1980. Similar actions are to take place in Ann Arbor. People in Seattle, Stockton, CA and many other cities are looking towards the next ballot after November for a JWP Initiative.

The Boston Chapter of Science for the People has been actively involved in the Massachusetts JWP campaign. The campaign has succeeded in getting the JWP public policy question (see *SftP* magazine July/August for full details) on the November ballot in four Massachusetts Districts. The campaign spent 2 months collecting 10,000 signatures on

their referendum petitions. They needed 1200 signatures in each district in order to get it on the November ballot. Organizers of the campaign plan to mount a concerted outreach effort to labor and community groups and solicit media attention between now and November.

For further information on JWP campaigns contact, The Committee to Implement the Jobs with Peace Initiative, 2990 22nd St. San Francisco, CA 94110, (415) 821-1064; or Science for the People, 897 Main St., Boston, MA 02139, (617) 547-0370.

HUMAN TRIALS OF RECOMBINANT DNA PRODUCED INSULIN

Human trials using a recombinant DNA-produced insulin have recently begun in England. Eli Lilly & Co. announced that a selected group of "healthy" volunteers are being administered the biosynthetic insulin, produced by Lily in conjunction with Genetech of California.

The American Diabetes Association says that the incidence of diabetes is increasing by 6% a year. Roughly 25% of the 6 million people diagnosed as diabetic require daily insulin injections. Insulin has until now been extracted from slaughtered animals, usually pigs. Two reasons given for producing insulin biosynthetically are negative reactions of some diabetics to animal-derived insulin, and fear of a future insulin shortage.

Recombinant DNA biotechnology involves the insertion of a human gene, in this case the one responsible for insulin production, into a bacterium. The bacterium usually used is *E. coli*, normally found in the human intestine. Under suitable conditions the genetically altered bacterium will produce molecules of the substance designated by the recombined DNA. The new life form can also reproduce itself.

During the past decade of recombinant DNA experimentation, the prospect of accidental creation of a new, untreatable epidemic disease has engendered fear and controversy among scientists and people living near research centers. One cause for fear of recombinant DNA mishap is the ready accessibility of *E. coli* to the human body. Another cause for concern is the increase in chance of bacterial escape when recombinant DNA is produced in large quantities.

Biosynthetic insulin is expected soon to become the first publicly available recombinant DNA-produced pharmaceutical. Techniques for its commercial production will be similar to those presently used to make antibiotics: fermentation in large tanks requiring careful control of temperature, nutrients, and other factors.

Eli Lilly board chairman Robert D. Wood announced, "With the potential availability of Lilly biosynthetic insulin, we can now see the promise of a time when supplies of insulin will always be adequate to meet public needs." The recent Supreme Court decision allowing a patent for new life forms (such as insulin producing bacterium) gives drug companies a powerful means of protecting their inventions and investments in recombinant DNA biotechnology. Lilly is spending $40 million to establish facilities in the U.S. and England for manufacture of biosynthetic insulin.

—Information from the Boston Globe *July 22, 1980.*

OOPS! CLONED THE WRONG VIRUS

A University of California, San Diego researcher, Dr. Samuel I. Kennedy, is reported to have mistakenly cloned the wrong virus — the first reported violation of federal regulations.

Dr. Kennedy was trying to clone sindbis virus when he accidentally cloned virus in a more dangerous class, the semliki virus. Sindbis, which can cause skin rash and fever, is listed by the Center for Disease Control in Atlanta as a Class 2 agent, along with rubella and polio viruses. Semliki causes fever and headaches, and is classified with yellow fever and smallpox as a more dangerous class 3 agent.

A week after the reported cloning mistake, a 32 ounce bottle of rabies vaccine virus was stolen from Dr. Kennedy's lab. As a result, the locks have been changed and Dr. Kennedy has been suspended.

If such mistakes are made in high security, publically funded laboratories, imagine what could happen in a privately funded, unregulated sitution?

—information from the Boston Globe *(Associated Press).*

A "DECADE OF GENETIC STRUGGLES"

Anthony Mazzochi, Director of the Health and Safety Department of the Oil, Chemical and Atomic Workers Union (OCAW) predicts that the eighties will be a "decade of genetic struggles."

In his speech at "Working for your Life," a St. Louis, Missouri trade union conference on occupational safety and health, Mr. Mazzochi said that we are seeing the beginning of "corporate genetics." Large corporations are screening the chromosomes of job applicants for such "traits" as sickle cell anemia, which tend to be ethnically or racially linked, even though these have nothing to do with the job or work environment. The institutionalization of such screening may, he warned, lead to genetically determined occupations.

Another feature of corporate genetics is the push into recombinant DNA technology, which Mr. Mazzochi called "the biggest danger facing humankind." While not all the dangers associated with recombinant DNA are as dramatic as the possibility of the escape of a "supergerm," in the long run they may be just as deadly. Much of the public praise of recombinant DNA is for the hope it offers of a cancer cure, even though "more than fifty percent of cancer is work induced. We should be looking at ways to prevent cancer rather than for a miracle drug to cure it," Mazzochi concluded.

The same sort of thinking which focuses on curing individual cancer cases and does not address the necessity of removing causes of cancer is used in support of other corporate interests as well. Mr. Mazzochi reported that some DNA researchers have said that "instead of correcting pollution at the workplace we can create a pollution-free worker." The future of recombinant DNA may tend towards a regimented society. In addition, DNA technology itself may be used to perpetuate pollution by, for example, creating varieties of food plants that require pesticides in order to grow.

These dangers are great, but the possibility of a catastrophic accident should not be easily dismissed. The corporate record on safety and health is notorious.

(continued on p. 37)

OUR ISSUES NEVER GROW OLD

Science for the People is more than a bimonthly magazine. It is a growing reserve of useful material documenting our struggle to make science truly serve the people, and thus of permanent value. Order your back issues now! You can use the form below.

JULY/AUGUST 1980 VOL. 12 No. 4
Your Body or Your Job
The Pesticide Connection
Organizing for Job Safety
The Anti Nuclear Movement
From Eugenics to Population Control

MAY/JUNE 1980 VOL. 12 NO. 3
SPECIAL ISSUE ON CANCER
Cancer: Some Notes for Activists
The Risk of Cost/Benefit Analysis
Coke Oven Cancer
The Politics of Cancer Research
Why There is No Cancer Prevention

MARCH/APRIL 1980 VOL. 12 NO. 2
SPECIAL ISSUE ON OCCUPATIONAL SAFETY AND HEALTH
Danger: Women's Work
Dying For a Job
Mass Psychogenic Illness
Molly Coye, Health Activist for OCAW
Black Workers and Occupational Hazards
Nonionizing Radiation

JAN/FEB 1980 VOL. 12 NO. 1
Reclaiming Reproductive Control
Is There a Gay Gene?
Textbook Sexism
Nukes in the Philippines
Mailing Lists and Technophobia

NOV/DEC 1980 VOL. 11 NO. 6
SPECIAL ISSUE ON SCIENCE AND EDUCATION
Education and Capitalism
Testing: The Competency Controversy
An Analysis of Reading Management Systems
Sharing Science in the Classroom
How to Challenge the School System
Discovering History of Women in Science

SEPT/OCT 1979 VOL. 11 NO. 5
Political Gynecology
Doing Science for the People
Factory Workers of ZhuZhou
Changing the Face of Health Care in Mozambique
Organizing Miners in Mexico

JULY/AUGUST 1979 VOL. 11 NO. 4
Love Canal: Chemical Wastes Back Up
Three Mile Island and Nuclear Power
Scientific Research and Education in Vietnam
Food and Agriculture in China

MAY/JUNE 1979 VOL. 11 NO. 3
SPECIAL ISSUE ON FOOD, AGRICULTURE AND AGRIBUSINESS
Migrant Workers, Farmers and Mechanization of Agriculture
Food as a Weapon
Food Producers Speak
Del Monte — Move Over
Food and Agriculture in China

MARCH/APRIL 1979 VOL. 11 NO. 2
Here Comes the Sun
Society May Be Dangerous to Your Health
Sociobiology

JAN/FEB 1979 VOL. 11 NO. 1
SftP—A Ten Year Retrospective
AAAS Deceived by Argentine Junta
Changing US Contraceptive Policy
SftP China Trip: An Itinerary Report

NOV/DEC 1978 VOL. 10 No. 6
SPECIAL ISSUE ON HEALTH CARE
Worcester Ward: Violence Against Women
Medical Care and Socialism in Tanzania
A Marxist View of Medical Care

SEPT/OCT 1978 VOL. 10 No. 5
SPECIAL ANTI-NUKE ISSUE
Anti-Nuke Movement in Europe
Twilight of Nukes in Japan
Dollars and Cents of Nuclear Power
Farmers vs. Tokyo International Airport

JULY/AUGUST 1978 VOL. 10 NO. 4
How Scholars Play With the Poor: Agricultural Research in Colombia
New McCarthyism in England
Professionalism in Nursing, Part II

MAY/JUNE 1978 VOL. 10 NO. 3
The False Promise: Professionalism in Nursing, Part I
Issues in Lesbian Health Care, plus a review of the literature
Summer at Seabrook with the Clamshell Alliance
Science Teaching Conference

MARCH/APRIL 1978 VOL. 10 NO. 2
Women and Agribusiness
The Myth of Intelligence
Dream Machines/Computer Lib
Zimbabwe Medical Drive
Sociobiology on the Run: AAAS

NOV/DEC 1977 VOL. 9 NO. 6
Seveso: Environmental Disaster in Italy
Protecting Women Out of their Jobs
The Myths of Hunger
Laboratory! (A SftP Play)

SEPT/OCT 1977 VOL. 9 NO. 5
Carter's Energy Plan: Our Cloudy Future
The Great DNA Debate
Controlling Hyperactive Kids

JULY/AUGUST 1977 VOL. 9 NO. 4
Are Sex Roles Biologically Determined?
Infant Malnutrition in Third World
Repression of Scientists in Argentina
Fighting Nukes at Seabrook

MAY/JUNE 1977 VOL. 9 NO. 3
Brown Lung Blues
Abortion Clinic Strike
Sack Saccharin, Ban Delaney
Recombinant DNA: Does the Fault Lie Within Our Genes?
Sociobiology: A Sexist Synthesis
Nukes in New York City

QUANTITY:

_____VOL. 12 NO. 4
_____VOL. 12 NO. 3
_____VOL. 12 NO. 2
_____VOL. 12 NO. 1
_____VOL. 11 NO. 6
_____VOL. 11 NO. 5
_____VOL. 11 NO. 4
_____VOL. 11 NO. 3
_____VOL. 11 NO. 2
_____VOL. 11 NO. 1
_____VOL. 10 NO. 6
_____VOL. 10 NO. 5
_____VOL. 10 NO. 4
_____VOL. 10 NO. 3
_____VOL. 10 NO. 2
_____VOL. 9 NO. 6
_____VOL. 9 NO. 5
_____VOL. 9 NO. 4
_____VOL. 9 NO. 3

Magazines cost $1.00 a piece. Please add postage of 60¢ total on orders of 1 to 4 copies. Please send postage of 10¢ per copy on orders of more than 4 copies.

Total # of magazines ordered:_____
Price of magazines:_____
Postage:_____
Total payment enclosed:_____

NAME_____

ADDRESS:_____

_____

_____

Make your check or money order payable to Science for the People and send to 897 Main St., Cambridge, MA 02139.

NEWS NOTES

(continued from page 35)

The continued leaks and accidents at nuclear power plants, the everyday discoveries of hazardous chemical leakage and illegal waste dumps demonstrates how the record has not improved much since Hooker Chemical buried its wastes in Love Canal.

If industry is to be allowed to proceed with recombinant DNA technology, it must be rigorously controlled, not just by scientists but by workers. Mr. Mazzochi pointed out, "scientists know nothing about the conditions that exist at the point of production, conditions which will continue to be unsafe as long as recombinant DNA is pursued solely for profit."

Mazzochi added that recombinant DNA has a political function. It is part of the business counterattack against the growing movements for occupational and community health and safety. Today that counterattack emphasizes lifestyle causes of disease and a supposed necessity for increasing worker productivity. The counterattack is growing and we must work energetically to defeat it.

CORRECTIONS

The article by Dan Berman, "Organizing for Job Safety," in the July/August SftP originally appeared in *C/O: Journal of Alternative Human Services. C/O* can be obtained by writing Community Congress of San Diego, 1172 Morena Blvd. San Diego, CA 92110.

In the July/August SftP on page 18, Pacific Power and Gas should be Pittsburgh Plate Glass.

LETTERS

(continued from page 2)

poisoned and some developed paralysis (2). A factory manufacturing a similar chemical exploded in Chicago in August of 1978, exposing workers and the community to this poison.

Exposure to these phenylphosphonothioate pesticides over a subchronic fects. However, after a prolonged period of exposure, a neurotoxicity results (about 4 month) period via oral administration will produce little or no acute ef- which has been called a "delayed neurotoxicity" (1). At very low doses in hens (0.5 mg/kg) this is reversible. But at higher doses (20 mg/kg) the hens displayed ataxia and paralysis which progressed to death. Doses between these two extremes can produce an irreversible loss of nerve function. There is degeneration of the peripheral nerves, spinal cord and medulla (1). It is interesting to note that in humans these symptoms will resemble multiple sclerosis. In fact, the misdiagnosis of workers has occurred (2). Leptophos has a half-life of 11.5 days and thus its persistence in the environment and in the tissues of exposed animals is the basis for its great health hazard to humans in producing this delayed neurotoxicity(1). The photo-degeneration product of Leptophos, desbromoleptophos, also causes delayed neurotoxicity(3).

It is known that topical application of this class of pesticides is more efficacious in producing the delayed neurotoxicity than oral administration. DEF (S,S,S,-tributylphosphorotrithioate) has been shown to be broken down in the gastrointestinal tract to n-butylmercaptan (nBM). nBM produces another series of effects, termed "late acute effects" (4), independent of the inhibition of acetylcholinesterase or the development of the delayed neurotoxicity. Due to the metabolism of some of the DEF to nBM, less DEF will enter the blood and thus the propensity for producing the delayed neurotoxicity by DEF will be less upon oral administration (4). However, the occurrence of the late acute effects of the toxin will not be correlated with acetylcholinesterase inhibition in the blood.

These studies demonstrate the complexity of the field of toxicology and point to the need for more studies on chronic exposure to these and other toxins. Furthermore, the need for objective research cannot be overemphasized. Bias on the part of the researcher is always a problem. When the issues have social, political and/or economic ramifications total objectivity is impossible. In order to insure scientific credibility, scientists must maintain their independence from those segments of society with which their work may bring them into conflict. Only in this way could the public interest be considered.

Bruce Gold
Montclair, N.J.

1. Abou-Donia, M.B. and D.G. Graham, "Delayed Neurotoxicity of Subchronic Oral Administration of Leptophos to Hens: Recovery During Four Months After Exposure", *Journal of Toxicology and Environmental Health*, Vol. 8, 1979, p. 1133.

2. "The Environmental Protection Agency and the Regulation of Pesticides," Staff Report to the Subcommittee on Administrative Practices and Procedures of the Committee on the Judiciary of the United States Senate, U.S. Government Printing Office, Washington, D.C., 1976, pp. 32-34.

3. Sanborn, J.R., R.L. Metcalf, and L.G. Hansen. "The Neurotoxicity of (2,5,-dichlorophenyl) 0- methyl phenylphosphonothioate, an Impurity and Photoproduct of Leptophos (Phosvel) Insecticide," Pesticide Biochemical Physiology, Vol. 7, 1977, pp. 142-245.

4. Abou-Donia, M.B., K.M. Abdo, and A.A. Romeil. "Delayed Neurotoxic, Late Acute and Cholinergic Effect of S,S,S,-Tributylphosphorotrithioate (DEF): Subchronic (90 days) Administration in Hens," Toxicology, Vol. 14, 1979, pp. 229.

Dear SftP:

I enjoy the magazine. It contains information necessary to serious political struggle. The research/factual information provided is first rate; the political analyses are generally weak. There can be no compromise between bourgeois science and science under socialism . . . lets see more of the relevant analysis. Thanks for a good magazine.

Val Woodward
St. Paul, MN

Dear SftP:

Something continues to be wrong — the magazine is too predictable, too . . . ? Perhaps more book reviews to tie in a bit with mainstream culture. I don't really know. The hard edge of purpose seems missing. Reinstitute meeting disruptions? It just seems too safe, almost conservative in its critique. A small safe area has been won, where are the fresh new pushes against social structure?

Joseph Schwartz
London, England

resources

HISTORY, TECHNOLOGY AND BLACKS

The Other Slaves: Mechanics, Artisans and Craftsmen, James E. Newton and Ronald L. Lewis, Eds., G.K. Hall & Company (70 Lincoln Street; Boston, MA 02111), 1979, $20.00 (hardback), 245 pp., a collection of nineteen essays. "Although slavery perpetrated all of the vileness attributed to it, the existence of the institution per se does not justify or explain the post-emancipation denial of equal access in the job market. Slavery is a convenient scapegoat, for it focuses blame on the past while ignoring the present reality of individual and institutional racial discrimination. The burden of employment marginality which saddles the black community must be hitched to modern society, not the bygone era of slavery. Whatever the burdens inflicted by that institution, it did not universally prevent blacks from acquiring the technical and craft skills which, in a purely rational economy, would have made them a potent force at all levels in the labor market."

*****

SCIENCE AND HISPANIC MINORITIES

El Camino Real (GSA Building 41; P.O. Box 25426-C; Denver Federal Building; Denver, Colorado 80225) is a minority-owned distributor of Chicano and Mexican-American materials. We list here a sampling of titles that may be of interest to *SftP* readers:

- *Viva: A Salute to Hispanic Americans in Science and Engineering*
- *Health in the Mexican American Culture*
- *El Tecato: Cultural and Sociological Factors Affecting Drug Use Among Chicanos*
- *Que Paso?: An English-Spanish Guide for Medical Personnel*
- *Spanish for Doctors and Nurses*

Please write to them for their catalog.

*****

WOMEN AND SCIENCE

Fair Science: Women in the Scentific Community, Jonathan R. Cole, Free Press (866 Third Avenue, New York, NY 10022), 1979, $17.95 (hardback), 336 pp., extensive bibliography, name index, subject index. This is a pro-woman analysis of women's place in the contemporary scientific community and of the social, historical and legal forces that have created that position.

The Death of Nature: Women, Ecology, and the Scientific Revolution, Carolyn Merchant, Harper & Row, 1980, $12.95 (hardback), 320 pp. "Exploring the historical connections between women's issues and ecology, Merchant concludes, paradoxically, that the advancement of science set back the cause of women. According to Merchant, a feminist historian of science, the Scientific Revolution of the 16th and 17th centuries had at heart a philosophy of domination over nature and woman."

*****

MATHEMATICS EDUCATION

Socialist Mathematic Education, Frank J. Swetz, Ed., Burgundy Press (P.O. Box 313; Southampton, PA 18966), 1979, $12.50 (paperback), 421 pp. Probably the best way to describe this collection of essays is to list the chapter headings: (1) Education, Mathematics and Socialist Society. (2) Educational Reform and Mathematics in the Soviet Union. (3) The German Democratic Republic. (4) People's Republic of China: Mathematics for the Proletariat. (5) Mathematics Education in Yugoslavia: Unity in Diversity. (6) Sweden: Mathematics in an Undifferentiated School System. (7) The Evolution of Modern Mathematics Education in Hungary. (8) The United Republic of Tanzania: Mathematics for Social Transformation. (9) An Examination of Selected Practices in Mathematics Education. (10) Socialist Mathematics Education: A Panoramic View.

*****

ISLAM AND SCIENCE

Science, Technology and Development in the Muslin World, Ziauddin Sardar, Humanities Press (Atlantic Highlands, NJ 07116), 1977, $16.00 (hardback) 215 pp., bibliography. Chapter headings are as follows: (1) What Forms the Muslim World? (2) A Muslim View of Science. (3) Science Policy and Development. (4) Cultural and Ethnic Dimensions of Development. (5) The Social Side of Development. (6) Aid, Trade and the New Economic Order. (7) A Question of Priorities: Agriculture or Industry? (8) Imported Know-How or Technological Self-Reliance? (9) R&D: Basic or Applied? (10) Paths of Academia. (11) The Future. This book examines how the Muslim World as and should respond to the particular problems of science, technology and development. It argues cultural independence and self-determination while also showing how the Muslim and non-Muslim worlds can collaborate productively in many spheres.

*****

MEDICINE AND POLITICS

Deviance and Medicalization: From Badness to Sickness, Peter Conrad and Joseph W. Schneider, The C.V. Mosby Company (11830 Westline Industrial Drive, St. Louis, MO 63141), 1980, $10.95 (paperback), 311pp. This book presents a sociological and historical analysis of the origins and consequences of the medicalization of deviance in American society.

*****

SCIENCE AND THE INTERNATIONAL LANGUAGE

Many progressive people have heard about the international language Esperanto, but not so many people are aware of the fact that several science oriented periodicals are being published in that language.

Scienca Revuo (Science Review) is the official organ of the Internacia Scienda Asocio Esperantista (P.O. Box 663; Houston, Texas 77001). **Homo Kaj Kosmo** (Man and Cosmos) is a popular review of astronomy. **Scienca Mondo** is the Esperanto edition of *Science World.* **Medicina Internacia Revuo** and **Sano** (Health) relate to the medical sciences. **El Popola Cinio** (From People's China) is a general issues monthly that includes articles about the sciences.

All of these, and others, are available from the Esperanto Language Services Company (452 Aldine, Apt 501; Chicago, Illinois 60657). Another group to contact is the Esperanto League of North America (P.O. Box 1129; El Cerrito, California 94530).

CHAPTERS AND CONTACTS

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

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.

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. **San Francisco Chapter:** Matt Larsen, 3675 19th St., San Francisco, CA 94110. (415) 824-4337. **Irvine Chapter:** SftP, P. O. Box 4792, Irvine, CA 92716. Allan Stewart-Oaten, Biology Dept., USCB, Santa Barbara, CA 93110. (805) 961-3696. Dave Offen, 262 O'Connor St., Menlo Park, CA 94025. (415) 323-5452.

COLORADO: Greeley Chapter: Anne Woolley, Dept. of Antrhopology, University of Northern Colorado, Greeley, CO 80369. Ted Scheffler, 1217 26th Ave., Apt. 103, Greeley, CO 80631. (303) 351-0835.

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

DISTRICT OF COLUMBIA: Walda Katz Fishman, 6617 Millwood Rd., Bethesda, MD 22034 (301) 320-4034.

FLORIDA: Gainesville Research Collective, 630 NW 34th Place, Gainesville, FL 32601. **Tallahasse 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 Illini Union, Urbana, IL 61801 (217) 333-7076.

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

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, Universtiy 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.

MINNESOTA: Mickey Lauria, 1410 E. 22nd St., Minneapolis, MN 55404. (612) 871-8874. (612) 323-4581.

MISSOURI: St Louis Chapter: Science for the People, Box 1126, Washington University, St. Louis, MO 63130. (314) 533-1936.

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.

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

OHIO: Jenny Thie, 2147 Fulton Ave., Cincinatti, OH 45206. (513) 281-6149. Nici Ihnacik, 116 Central Ave., Athens, OH 45701.

OREGON: Portland Chapter: c/o Jacqueline Germain, 6916 NE Mallory St., Portland, OR 97211.

PENNSYLVANIA: Ruth Weinstein, 2116 Walnut St., Apt. 2R, Philadelphia, PA 19103. (215) 561-4323. Miriam Struck, Scott Schneider, 5646 Munhall Rd. #10, Pittsburgh, PA 15217. (412) 521-0678.

RHODE ISLAND: Carolyn Accola, 245 President Ave., Providence, RI 02906. (401) 272-6959.

TEXAS: Austin Chapter: c/o Ed Cervenka, 911 Blanco St., No. 104, Austin, TX 78703. (512) 477-3203. Ann M. Baker, 738 Garden Acres, Bryan, TX 77801. (713) 846-3824.

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

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

WISCONSIN: Rick Cote, 1525 Linden Drive, Madison, WI 53706. (608) 262-4581. (608) 257-2747.

CHAPTERS and CONTACTS 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.

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

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 Mlk 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 & Jorgen Bansler, Stigardsvej 2, DK-2000, Copenhagen, Denmark 01-629945.

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

INDIA: M.P. Parameswaran, Chintha Publishers, Trivandrum 6950001, India.

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

JAPAN: Gendai Gijutsu-Shi Kenkyu-Kai, 2-26 Kand-Jinbo Cho, Chiyoda-Ku, Tokyo 101, Japan.

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

WEST GERMANY: Paul Otto-Schmidt, Forum fur Medizin, Kaiserdamm 26, 1000 Berlin 30, West Germany. Wechsel Wirkung, Gneisenaustr, D-1000 Berlin 61, West Germany.

Science for the People
897 MAIN STREET
CAMBRIDGE, MA 02139

Non-Profit Organization
U.S. Postage
PAID
Boston, MA
Permit No. 52696

CHARLES SCHWARTZ 1/82I
PHYSICS DEPT.
UNIV. OF CALIF.
BERKELEY, CALIF. 94720

The Second National
SCIENCE FOR THE PEOPLE CONFERENCE

Due to overwhelming interest, the Berkeley Science for the People Chapter is proceeding with plans for a second National Conference. It will be held December 19-22. The purpose of the conference will be to discuss chapter activities and debate proposals on fundraising activities, magazine production and distribution, decision-making structure, etc. The conference will also be a good opportunity to assess the results of the first national conference.

Activists from all regions are encouraged to attend the conference. If you are interested in attending or want more information contact the Berkeley Planning Committee, Science for the People, P.O. Box 4161, Berkeley, CA 94704; or Science for the People, 897 Main Street, Cambridge, MA 02139, (617) 547-0370.

Subscribe to *Science for the People!*

☐ **Regular Subscription (US)**
Enclosed is $9 for a one-year subscription (six issues).

☐ **Foreign Subscription**
Enclosed is $13 for a one-year foreign subscription. For airmail delivery (except to Canada and Mexico) add $4 to Latin America and Europe or $6 to Asia and Africa.

☐ **Gift Subscription**
Enclosed is $9 for a gift subscription to be sent to the name and address filled in on the margin or on a separate sheet.

☐ **Member Subscription**
Enclosed is $20 or whatever I can afford ($_____) for membership in SftP organization. This supports the organization and includes a one-year subscription to the magazine, to the Internal Discussion Bulletin, and to other internal communication that may be put out by the organization or local chapters.

☐ **Institutional Subscription**
Enclosed is $20 for a one-year institutional or library subscription.

☐ **Sustaining Subscription**
Enclosed is $50_____, $100_____, $500_____, or more _____ for a one-year sustaining subscription. Sustainers will receive a gift copy of the latest Science for the People book, *Science and Liberation*.

Name _____
(Please print)
Address _____
_____ Zip _____

You may want to fill out some or all of the following:

Telephone: ( )

Occupation:

Interests:

Local chapter in which I'm active:

☐ I would like to be contacted by other people who are active or want to be active in SftP

☐ I'd like to start a chapter or be a contact person for my area

☐ I'd like to help distribute the magazine

☐ Names and addresses of friends who might like receiving a sample copy of the magazine (on separate sheet).

Make checks out to Science for the People and send to: 897 Main St., Cambridge, MA 02139