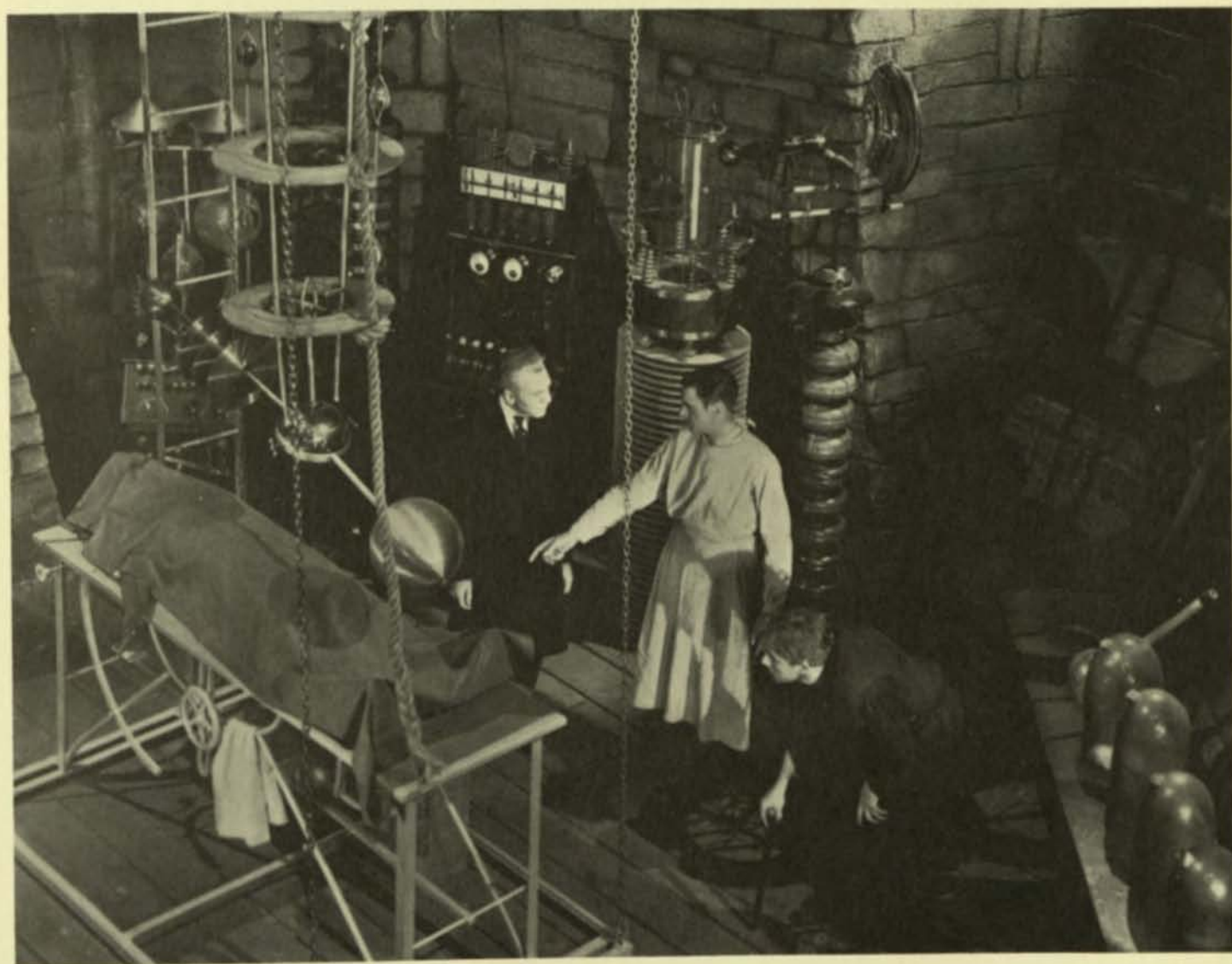


THE JOURNAL OF COMMUNITY COMMUNICATIONS



Making Decisions on Technology

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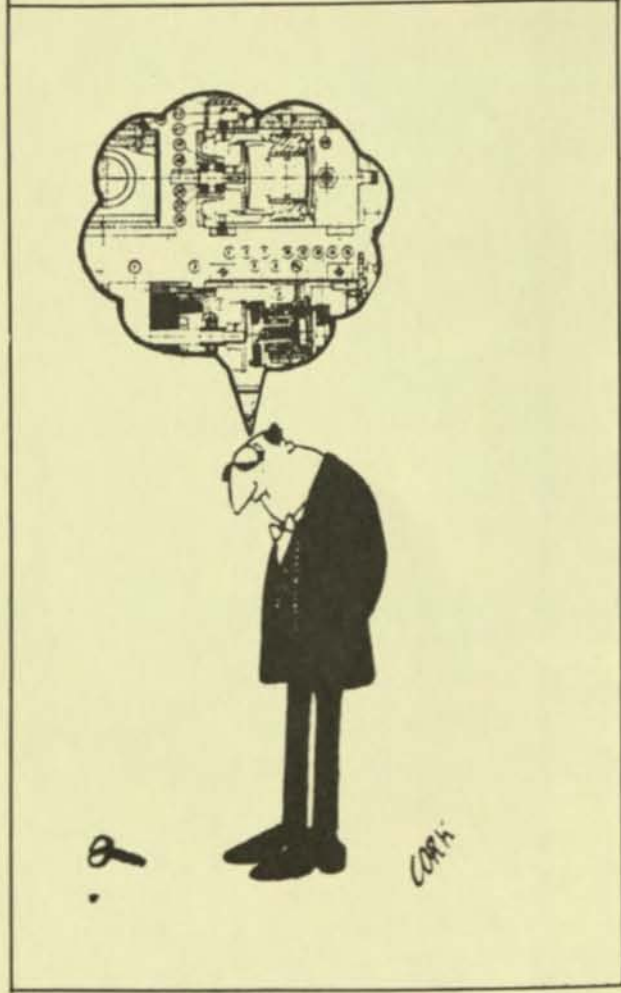
Tom Athanasiou
Editors -- Sandy Emerson and Marcy Darnovsky

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Technological Decision-Making

"Close up, [the city] is a fairly legible printed circuit, a transistorized labyrinth of beastly tracks, a data bank for asthmatic voice-prints. Only some of its citizens have the right to be amplified and become audible."

(Susan Sontag, "Debriefing," *I, etcetera*, 1978.)

What's keeping us from being heard isn't a lack of hardware -- there are lots of printed circuits, printing presses and communications channels around. There are technologies that can tell us everything from what Jimmy Carter ate for breakfast to who Aunt Bea called on the phone at 11 a.m. three years ago on the day before Christmas.

The problem is more correctly defined as a selective lack of access to communications technologies and a selective lack of control over their use and deployment. In this set-up, there is seldom the need for anything as nasty as censorship: it is the *structure* of our society and how communications are sold within it and for it that ensure our voicelessness.

Indeed, the state of our mass media indicates that only *meaningless* communications are marketable. A few dissenting voices manage, for moments at a time, to manipulate the media more than they are manipulated, but in general what is "not marketable" is functionally equivalent to "not there." Noam Chomsky estimates in *The Political Economy of Human Rights* that *all* of what can be construed as "alternative media" reaches only about one percent of Americans.

There are two ways to enforce this meaninglessness: to put out empty messages or to make the receivers incapable of understanding anything meaningful. Conveniently, mass communications do both. A Purdue University study of regular television watchers illustrates the "dysfunctional receptor" problem. When quizzed on 30 second segments of entertainment shows, news programs and commercials, 90% of the subjects misunderstood up to one third of what they had seen -- and they understood the commercials better than the other programs.

At this stage in the Age of Electronics we might find that many of the citizens, were they given open access to amplifiers, would have nothing to say. On the other hand, there are an increasing number of people all around the world who are trying to defend themselves against certain objectionable technologies while taking control of others, particularly communications technologies.

In this issue, retired Australian trade unionist John Baker gives a first-hand account of the strategies by which Australian workers are trying to take control of technological decision-making. Ron Rothbart reviews case studies on some attempts by American workers to protect themselves from technologies that atomize, routinize and replace their jobs.

Another view of self-defense against harmful technologies is provided by Peter Hayes, who reports on transnational networks against nuclear power and mercury pollution. In "Kentucky Fried Farming" we report on some preliminary efforts by alternative technology activists and small farmers to foil a large corporation's plans to become the world's agricultural information broker.

In our next issue we plan, among other things, to begin a discussion of the breakdown in communications among those who are supposed to run them. Even on their own terms, the decision-makers are having a hard time gathering high quality information and transferring it effectively to those who "need to know." Is bumbling bureaucracy the problem? Over complexity? Neurotic attachment to outdated paradigms and self-serving ideologies? We invite you to participate in this exchange. Tentatively, our next copy deadline is September 1, 1980.

-- Marcy Darnovsky



CIS Report, The New Technology

High Tech Politics

by Thomas Athanasiou

"Would the coming of solar energy bring, as some have suggested, fundamental changes to American society? Technological change always does imply some social change, and that would surely be the case with solar energy. But the 'revolutionary' impact of solar has been exaggerated."

(Modesto A. Maidique, the Harvard Energy Project, 1979.)

Technology is a highly charged political issue and will remain so indefinitely because its deployment raises inescapable social and economic questions. Employment and unemployment, environmental quality, health care, health hazards and the health of the economy all immediately tie into decisions about new technology.

Not so strangely, then, technology has been taken as a focus by forces all over the political spectrum. Captains of industry trapped by rising costs and declining markets see it as their

best hope for streamlining operations and reducing labor costs. At the same time, alternative technologists are convinced that its proper use could radically alter the distribution of power by, for example, democratizing the flow of information or removing the monopoly over energy supplies from large corporations.

Those of us who are trying to take advantage of the opening created by the technological turmoil should bear in mind the extent to which what David Dickson has called the "ideology of industrialism" can still be used to

diffuse the impact of any social movement that takes hardware as its focus.

Regardless of how much we may believe, for example, that solar development or workplace conversion or the development of a community access information system is a piece in the puzzle of liberation, we can never allow ourselves to represent our technology as an answer to the human predicament. It must be taken as a tool, sans metaphysical significance. Otherwise it just feeds the mystification.

The mystification itself needs little introduction. The recent paeans to solar energy and decentralism are only the latest verses in a song that was already ringing in the ears of our grandparents. You know the tune -- the problems of society are only technical problems and they are amenable to technical solutions. Solar energy will lead to the end of domination because it will allow local autonomy (the eco-freaks); socialist revolution will free science from the distorting tendencies of the capitalist market and release it to glorify the powers of socialized humanity (orthodox Marxists); modern information technology and information "management" will enable us to put the knowledge of the whole civilization at the fingertips of every individual (some enlightened technocrats.) No doubt there will soon be a pharmacological cure for alienation.

That said, let us quickly admit the truth of the flip side. There is something in technology that is truly liberatory because its power is our power and with increased power comes an increase in the range of our choices. The history of Man the Toolmaker is a story bounded by the power of his tools, or rather by the productivity of the whole social labor process.

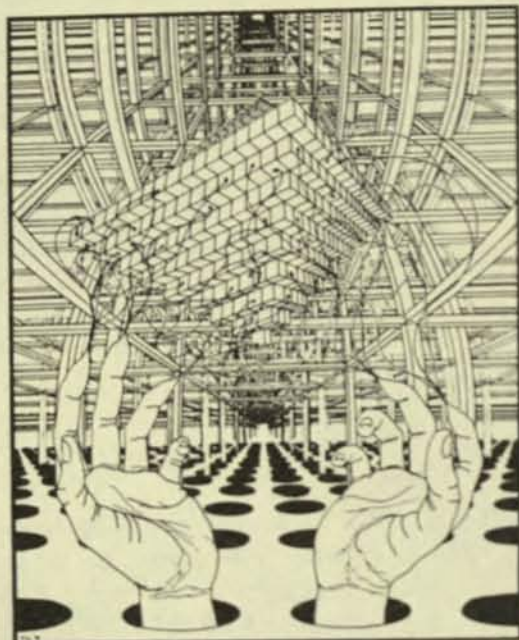
Ironically, the politics of technology have come to the center stage of the social conflict just when the Enlightenment mythos of scientific progress has begun to fade. We have lost that particular faith and our idols stand exposed. Now we can see technology for what it is -- not quite universal, but ubiquitous; not quite central to the social process, but involved in and conditioning all human interaction. This makes the politics of technology exciting but not yet dangerous to the existing order. As long as our problems are approached in the terms of rationality and control, and the one big machine made of all our lives is not the focus of the attack, then all else is acceptable.

Those who see technology as our last hope for salvation co-exist with many who see it as the root of every problem. In an era when the technology of nuclear weaponry threatens to obliterate us, and increasing alienation and bureaucratization threaten to suffocate us, there are many who find it hopelessly utopian to speak of the liberatory possibilities in modern technology. We must modulate our optimism, but it is nothing short of self-defeating to deny the liberatory *potential* of advanced technology, just as it is self-defeating to approach politics in general with an attitude so common sensical and "realistic" as to trivialize the crucial role that a vision of transformation must play.

*"The control of the economic system by the market is of overwhelming consequence to the whole organization of society: it means no less than the running of society as an adjunct to the market. . . . Once the economic system is organized in separate institutions, based upon specific motives and conferring special status, society must be shaped in such a manner as to allow that system to function according to its own laws." (Karl Polanyi, *The Great Transformation*, 1944.)*

Today the principle of the market has become so universal as to seem natural and inevitable. The forms of social organization that preceded it have been almost completely integrated into the metabolism of capital and the sectors of the planet that have attempted to separate themselves, however tenuously, from its global network are rapidly surrounded and reincorporated. In any case, neither the archaic forms of economic life based upon barter nor the state-dominated and bureaucratic regimes of the eastern bloc can in any way be seen as feasible or desirable alternatives to the capitalist market.

As the economy grinds into the next depression, one may wonder how the image makers intend to save the "free" market this time around. Things are getting tough, fast and dangerous, and you don't have to be a long time watcher of the ruling class to hear the note of self-doubt that has begun to penetrate their private studies and even their public pronouncements. Optimism, these days, comes in measured gradations.



The boys at the Harvard Energy Project, quoted at the beginning of this article, are one amusing example. They think they know what to do about the energy crisis (low tech solar and conservation) but bemoan the "vested interests" and "institutional barriers" that prohibit a rational and coordinated response to the situation.

The extent to which the daily "business as usual" of market society endangers the prospects of a future and degrades the life of the present is visible everywhere -- from the "administrative" torture routinely practiced by the governments of U.S. client states to the routinized misery of work and leisure in the advanced industrial world. Only if humanity's new tools are used to create the basis for a new social order is the prospect of developing them exciting.

The potential power of computer technology is particularly striking. It promises us the unlimited ability to manipulate information, either to preserve it for the use of a select group or to allow non-degraded communications among any community of shared interest. But the most basic societal dialogue and the one most in need of redesign is the global dialogue by which production is organized and coordinated.

If, for example, a high tech communications system could be built that would support the global distribution of the planning process, as the "free" market was supposed to do, then we might begin to see the outlines of a future society in which money had been abandoned as destructive and obsolete, and where the ancient conflict between the individual and society was one step closer to resolution. In this light we can see that some applications of computer technology could be early steps towards the "self-planning" society of the future.

One technological challenge, then, is how to abolish the mechanism of the market and replace it with something better. This would involve the design of a system that could:

- 1) Facilitate the overall systemic planning of social production, including a modeling function that would allow the interactive and dynamic exploration of various options prior to implementation.
- 2) Allow decisions about resource allocation and the coordination of production to seek appropriate social contexts.

Milk production may be a "local" decision, but ocean farming certainly isn't. Workers' self-management and the maximization of autonomy are the point of the story, but they are only realistic goals if they can be integrated into a global planning process and if that global process can be made the result of the aggregate of local forces.

The world market overcame the feudal world because it was more powerful and dynamic. The point now is to create the tools which could replace the obsolete allocative and planning mechanisms of the market with others as far superior to those which characterize the existing economic world as capitalism was more powerful than the societies that preceded it.

Understand that I am not suggesting a "techno-fix" for humanity's problems, as if such a thing were possible. I am simply pointing to the possibility of a cybernetic tool that would allow diverse human societies to control their own economies without relying on the fundamentally oppressive logic of the market. The real question isn't technological development at all. It's not a lack of technological sophistication that has brought us to this miserable juncture -- and it won't be hardware and gadgets that get us out.

Report from Down Under:

Australian Trade Unions and Technology

An Interview with John Baker

"The main question remains, who owns and who controls? The most dangerous thing in the capitalist world is workers designing and controlling their own circuitry."

Introduction

John Baker is a retired Australian trade unionist who maintains a keen interest in the ongoing battles between Australian workers and their employers over the deployment and use of technology. The fields of contention have ranged from uranium mining to the destruction of residential neighborhoods to the introduction of microprocessors into telecommunications -- as Mr. Baker puts it, from macro-technology to micro-technology.

In September of 1979 the Australian Trade Union Congress adopted a decision to place a five-year national moratorium on technological development. This resolution (the "Black Ban") is part of an attempt to subject the introduction of new technology to intensive debate by both the workers affected and the public.

The success of this "Black Ban" will depend on the enthusiasm with which it is enforced in each workplace and industry. In the face of the global economic crisis, the pressure is on management to increase mechanization and workplace rationalization, thus increasing labor productivity and boosting profits. Even in the Australian economy, where the manufacturing industry plays only a minor role in the economy, compared, for example, to the U.S., an effort to open a widespread social discussion on the control of technological development -- particularly one focusing on the impacts of microelectronics -- must directly confront management's whole gamut of mechanisms designed to ensure profits.

Still, the Black Ban is not just a bluff. As John Baker describes below, the environmentally oriented "Green Bans" adopted by the



The Job Killers

trade unions have been an extremely powerful force. The uranium industry, for example, has been so crippled by the refusal of the transportation union to transport uranium that only a few mines are still operating.

The battle over the control of technology as it has developed over the last ten to fifteen years has too often been seen as disconnected from the older traditions of social struggle. It is sometimes considered entirely a counter-cultural development or a product of some "new age." The "environmental" and "ecology" movements are seen as separate from, if not hostile to, the concerns of workers and the labor movement.

In Australia, where a strong and relatively independent trade union movement has continued to exist, much of the politicization of technological development has taken place within the trade union framework. The "Bans," first Green and now Black, are in line with a long history of workplace conflict that dates back to the "dark Satanic mills" of the early days of industrialization.

The watershed dispute in Australia occurred in June of 1977 when the technicians' union within the Australian telecommunications monopoly, Telecom, launched a campaign against the new telephone exchanges that Telecom had decided to introduce. This new technology, called ARE-II, would have centralized and automated the private telephone

exchanges. More importantly, it would have provided the technological basis -- vastly expanded data communications facilities -- for the automation of the rest of the Australian economy.

The Telecom dispute was eventually settled when "an agreement was reached to test different ways of applying the new telephone exchange technology in practice. . . and to force Telecom into fuller consultation with the unions. But the basic issues were not resolved." (1)

This is no great surprise since the "basic issues" are nothing less than the control of technological development. No solution short of the achievement of popular control over the allocation of the social wealth could really resolve this. Still, the dispute was highly significant for several reasons. It heralded the emergence of workplace conflict in a highly technological sector in which events propelled workers "toward full control of the telecommunications network." (2) It also instigated a drastic increase in public awareness of the potentialities and dangers of the new microelectronic technologies.

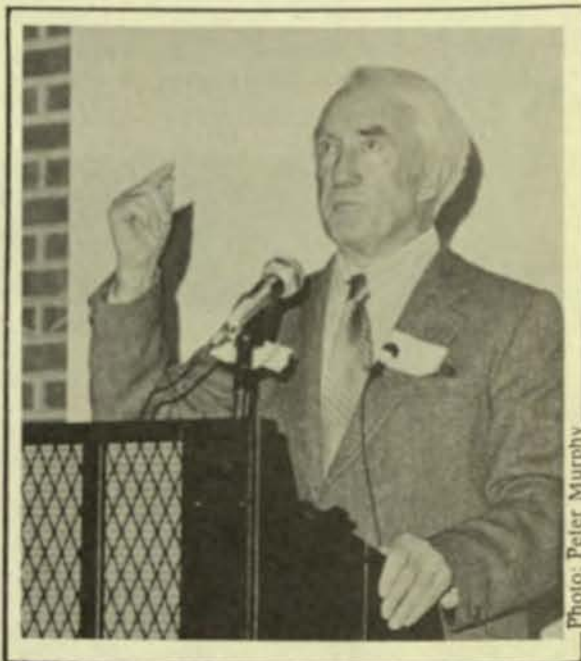
What follows are excerpts taped, during John Baker's December, 1979 visit to The Community Memory Project in Berkeley, California.

-- Tom Athanasiou

Some Australian History

The origins of the Green Bans and Black Bans go back to the Bans in the mid-1950's on the automated telegraph system. The telegraph operators had got a lot out of that battle and had carried the doctrine into the rest of the labor movement, particularly the white collar sectors. By 1961 some of the students and others who weren't getting the jobs they needed were going into the building workers' unions, where they instigated struggles over internal democratic control.

Some of them were ecologically conscious and a movement started in which environmental protectionists would approach the Building Laborers' Union and say, 'Look, that shouldn't be done, that building shouldn't be demolished.'



John Baker.

The Journal of Community Communications - Summer, 1980

It's not difficult to understand why the Green Bans people would say that some of the old areas of Sydney or Melbourne should be saved. Workers would decide, 'We want our pub saved,' and stake out claims against the city developers. Then they'd carry them through. The Building Laborers got together with the environmentalists to confer about a whole area of Sydney that was to be redeveloped as a huge highrise. It was a lovely place by the Sydney Bridge right on the edge of the harbor. It was all to go . . . but it hasn't gone.

The Green Ban sentiment spread to a movement that sprung up when the Queensland government contracted with American and Japanese firms to drill for oil on the Barrier Reef. When the drillers were about 500 miles away word was sent to them that every operation was banned. They couldn't have communications; they couldn't have food; they couldn't have transport; not even hospitalization. The drillers turned tail and that was that.

By this time it had become a sort of second nature for workers to apply the same kind of tactics to get hold of part of the productive processes and lock them up for a time -- the same tactics they had used in their pay struggles. As the technological levels developed in offices, banks, public services and so on, people started to ask, 'How do you get hold of the technology itself? How do you get hold of computerized systems, lock them up and make them fight for you?'

So when the telecommunications technicians' battle started, we'd already had some long debates in conferences and elsewhere. In fact, the telecommunications workers would on occasion set up their own circuitry to carry on this and related discussions. They'd set up their own exchanges on their own phones for a day or so, and an informal meeting in the head office would include other members throughout the country. That way a lot of information got circulated, even to and from rural areas.

By the early '70's, the impact of all this had sunk into a lot of organizations, particularly those where we'd built bridges between say, printers and journalists, between electrical engineers who'd been managing the hardware of the television broadcasting system and the people in those systems. We'd set out consciously to build those sorts of bridges so that

there would be social responsibility across occupational lines.

The printers learned very slowly on all this and so they suffered a great deal. When the crunch came for them it was at an old established newspaper something like the *London Times*. The workers there had never bridged the gap between printers and others. The whole work force there decided to strike against the new technology, but the journalists made a lousy deal with the management and were broken off from the struggle.



Transnational Brief

The strike went on for quite a while. In the postal engineers' union one of the solidarity tactics we used was to lock up all their mail, including millions of dollars of money in the central mail exchange.

You see, in Sydney we had the largest automated mail exchange in the world. Plessy's had gotten the contract for building it by buying up the postmaster general and the director general -- and Plessy's had never made a computer before.

The computer Plessy's finally built was a huge one -- I'd say the memory bank alone must have covered an area five times the size of [an average living room]. After they'd made it they couldn't program it -- they had no idea how to program it. There had been about 3500 mail sorters in the central exchange in the center of the city. They were all hand sorters, though things were clearly mechanized as far as connecting systems of delivering mail. It was a highly efficient system. But the day came when they had to walk into a totally new situation, in a huge building -- eight stories full of equipment that nobody knew how to use.

At that point they said, 'Look, we're declaring bloody war on this system. This is it.' And so this group of about 3000 alienated workers stood by and waited for the system to malfunction.

The system soon became a scandal. The buying up of people to get the contract was a national scandal. The workers wouldn't diagnose the faults. The technical people wouldn't touch anything. And so the system was practically immobilized.

On any day, the postal workers would get to work in the morning and say, 'OK, what's in the paper? Who's on strike? Well, they can't have any mail. Have we got anything of theirs? Ban it!' They put into practice what had been a theoretical doctrine. It was a very interesting case of people moving with technology.

To get back to the newspaper dispute, when it reached a stalemate the owners tried to resolve the situation by moving against the postal workers and others who had stopped the repair of teleprinters and so on. They knew that within two or three days all their international communications would be stopped by workers too.

So the postal engineers called a meeting with all the other unions and outlined a plan that we knew would get back to the owners within minutes. We already knew that their plan was to lodge criminal conspiracy charges against the whole group.

We said, 'Look, you've attacked the newspapers in areas where they're strong and they've attacked you where, as workers, you're weak. We're strong in electronic communications and we'd like you to let us direct the dispute and intensify it in all of these areas. Here's our plan. From 4:00 p.m. tomorrow, all of the radio stations owned by this newspaper will be having faults. By 6:00 they'll all be off the air. On the following day, sympathetic faults will arise in the television stations, so they'll all be off the air.'

As we had anticipated, our plan was soon back with the owners. The next day when they met with the printers they offered so much that the silly printers accepted it, embraced it. For them it looked like a good settlement, but since then (this was the last part of '77) these printers have moved forward considerably in their understanding of the technological situation. Last September, when the postal

engineers reported to a national trade union congress on technology and its challenges, the printers were among those supporting the five-year trade union moratorium on technological development.

The Black Ban

As I understand the Black Ban, it means that committees in the factories, offices and other workplaces will take a census of what they're using and demand notice of coming technological change planned by their employers. Then they'll take a look at the alternatives for the present and the future that might make for more jobs and more socially acceptable jobs.

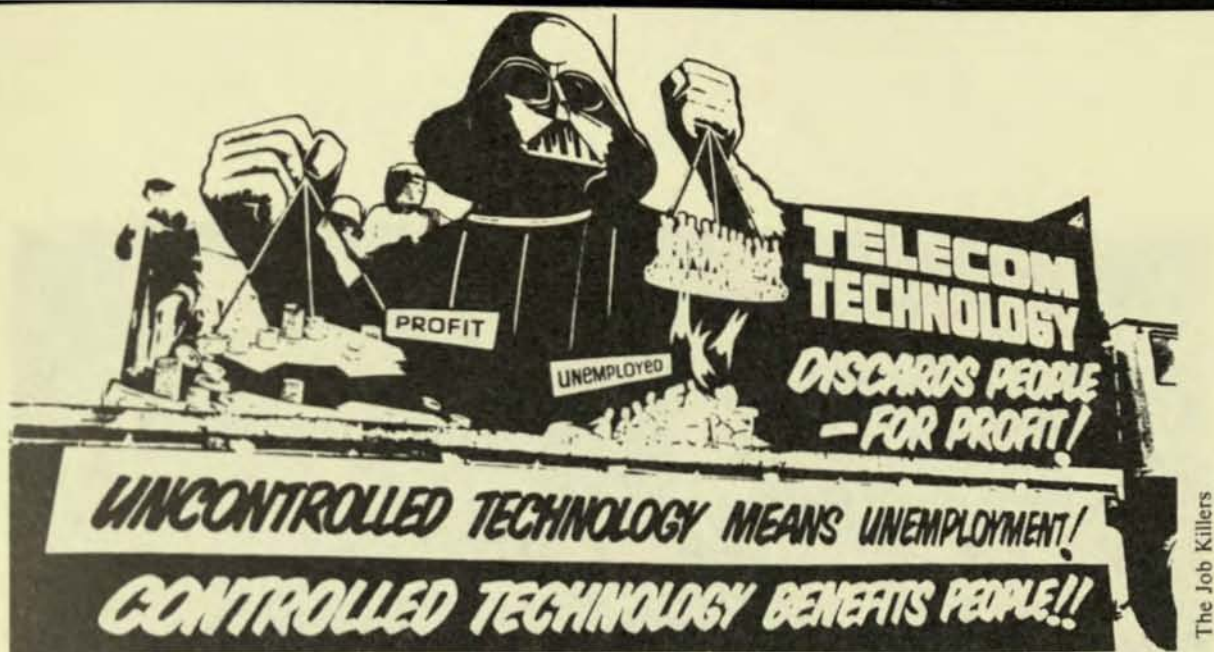
What the effects will be on Australian capital, Christ knows. But we're being so messed up already by being an offshore continent to the free production areas from Indonesia to South Korea that nothing that happens to us could be worse. It doesn't really make sense to worry that Australia will fall behind in technological development, because all the technology is really being developed in places like Japan and the Philippines. In the secondary industries such as electronics, there's no way that Australia can be economically viable compared to the money being made from oppressed Third World countries.

Why the Black Ban?

The total dominance of what is called "technological determinism" which developed after the Industrial Revolution and continues to reinforce the established power structure will not change until workers start to take control of technology and develop their own systems.

An example of this in Britain has occurred at Lucas Aerospace. Corporate planners at Lucas sent a questionnaire to the shop stewards, asking for suggestions on what should be produced. The shop stewards refused the questionnaire. They refused to commit themselves or come up with any ideas. But when the same question was posed to the workers directly, in only six months they came up with ideas for over 1200 new products! These included many socially useful products, such as a cart for kids with spina bifida and a vehicle that can run on rails or on rubber tires.

The Black Ban in Australia is one strategy in the struggle to achieve this kind of control



May Day parade. Brisbane, Australia, 1978.

and to tap workers' inventiveness in order to produce new and more useful products.

The U.S. automobile industry is an example of how the installation of new technologies can materially worsen the condition of workers. There, management is trying to introduce "Computer-Aided Manufacturing." In CAM, video monitors and small computers on the assembly lines make continuous reports on workers' performance -- when a worker punches in; how fast he or she works; how often the line is stopped because of breakdowns. It's like a foreman standing over you 24 hours a day. This is a revolution in control over workers by management -- which I think no group of workers will accept.

In Australia, the telecommunications workers are serving as the ones to bell the cat. But the Black Bans are not implemented yet. The idea of a moratorium on technology that isn't under workers' control has to spread further and in more fields than telecommunications. The ideas have to circulate in the shops and offices. People have to gain in understanding and then say, "Let's have a crack at this."

Already, Australian white collar trade unions have joined forces with the blue-collar councils. Together they voted 95% in favor of continuing the Bans on uranium transport and 100% for the Black Bans -- a victory in the struggle for workers' control over technology and over their lives.

At this stage in the second round of the computer revolution, no working class -- no matter how smart -- is going to have a really good picture of all that's required, even in one particular country. The telecommunications

engineer who makes the microprocessor or the silicon chip circuitry has a primary responsibility to make sure that other people learn about them. Workers will have to face these new technologies and translate their consequences into programs that are effective and can be made to stick.

We Australians have to make sure that the Black Ban decision of the Trade Union Congress is heard throughout the world's industrial system -- in all the trade unions, East and West, and through the socialist and communist parties. That's my concept of it: to take hold of the technology, make everybody have a look at it; examine its consequences; look for alternatives and alternative consequences; look for the socially acceptable within the changing technology; and look for the ideological assumptions of ruling classes within the technology in order to put a working class imprint and direction on it. We don't know whether that can be done, but sometime in history, some working class will have to do it.

Footnotes

1. *The Job Killers: Technology and the Economic Crisis of Workers*, is available from the Transnational Cooperative, G.P.O. Box 161, Sydney NSW, 2001, Australia.

Another excellent and popularly oriented publication to emerge from the concerted public education campaign on this topic is *The New Technology*, published by Counter Information Services, 9 Poland Street, London W1, England. It can also be ordered from Southwest Book Services, 4951 Topline Drive, Dallas, Texas 75247, for \$2.95.

2. *The Job Killers*, *op. cit.*

How Can We Cure the Machines?

by Alan Roberts

Physical exertion need not be unpleasant, as any football or squash player will testify. Even pick-and-shovel work or the manipulation of heavy loads can produce a rewarding glow in a volunteer whose muscles are adequate to the task, particularly in good weather and on a holiday basis.

It is quite different when the brute necessity of gaining a living demands such activity without respite -- rain or shine, whether you feel like it or not, and regardless of the current state of your arthritis. This is close to the condition of a draft animal and leaves only a small margin of life in which something like human freedom can be enjoyed. Reverent eulogies to the mystic beauty of labor indeed exist, but are rarely observed to flow from people chained for life to any working tool more massive than the pen.

To liberate humanity from compulsory labor is a necessary condition for total liberation; to eliminate extreme physical effort is a particularly important aspect of this process. This is why people look, and quite rightly, to science and technology as holding the promise of liberation, and why they particularly value the sources of power now available which replace the human muscle.

It is all the more remarkable, then, that proposals to expand society's power supply now evoke opposition throughout the industrialized countries, wherever the state of civil liberties allows its expression. This sentiment does not

aim to restore the human muscle to its historical role. It is directed against quite specific forms of technology, which are seen as betraying that promise of liberation which technology still holds out. The straw men who are alleged to abominate all technology would need to have a peculiar program indeed. What are they supposed to advocate -- ban the wheel, burn all the digging sticks?

It is true that this sentiment is often given a misleadingly general expression. In Australia, for example, as in most countries where the wedding of science to the way of life was celebrated long ago, the honeymoon is over. Now the air is thick with recriminations against the former idol. It is looked on with distrust and fear by a wide cross-section of people, from residents threatened by a freeway's bulldozers to bank clerks due for sacrifice to the Moloch of the computer.

This is no mere lovers' quarrel. The depth of the disillusion can be read from such data as the spread of the alternative technology, simple-living movement or the decline of enrollments in science and engineering courses. Advertisers appeal to it. Governments must now reckon with it. Giant corporations like Shell, employing social scientists to peer into the years ahead, prepare contingency plans for production and marketing in a future where the revulsion against "expansion" and "progress" may shape national policy.



Control room operator, Humboldt Bay Nuclear Power Plant.

It's not necessary here to justify this revolt against technology; there are enough well-documented cases extant to save me the trouble. I will simply state that it is usually real evils which are under attack and that the widespread opposition to unlimited technological progress is itself a heartening sign of a shift from the mass society and the homogenized consumers of a couple of decades ago towards something much better.

The Machines and Social Attitudes

Although the defects of modern technology can readily be exposed by an appeal to the brute facts, it is not so easy to explain and understand how those defects arose and why they continue to breed so profusely. Of course, we do not lack for general observations about the attitudes of mind which encourage and spawn harmful technologies. We might say, for example, that the trend of modern technology is indifferent or inimical to the welfare of the people affected. Worshiping abstractions like progress, size and ingenuity, it neglects the sole justification for its existence: human welfare.

Or we might point to the culturally inbuilt urge to "dominate" nature, which now runs counter to the ecological imperative of nurturing the only biosphere we have. We might even analyze this in terms of the Judaeo-Christian tradition, contrasting it unfavorably with the more enlightened Buddhist way. Or

the "objectivist" mode of thought could be indicted in its entirety, and blamed for the creation of a social world deprived of feeling and basically inhuman, mimicking the grey and impoverished universe of the laboratory.

To describe such states of mind does not have to be a false or useless pursuit. Undoubtedly a way of life needs its cultural supports, its conventional wisdom, its dominant ideologies, and so is vulnerable to critical attack on this plane. But such critiques, however true they may be, can hardly satisfy us if our aim is not just to refute a view in theory but to change a state of affairs in practice.

In a way, these criticisms of social attitudes fail by their very success. They can be formulated in so many different ways and within such a variety of conceptual frameworks that even though they give a whole host of illuminating insights, none can really recommend itself as the one crucial point to grasp. They rarely address themselves to the questions that need answering if a viable change is to be achieved -- questions such as: why are these attitudes so prevalent? What are their economic, social and political supports? What must be changed for these attitudes to change?

The Marxist Critique

There is another approach which certainly remedies these deficiencies: the traditional Marxist critique, common to a whole spectrum

of political thought that is otherwise very divergent. In this approach, the root of harmful technological practices is located in the economic sphere and stems from the private ownership of the productive machinery. Capitalism, producing for profit rather than use, will seize on even the most noxious technology if it promises fat returns. The solution is then apparent and unambiguous: get rid of capitalism.

This view may appear simple, but it cannot be dismissed as simplistic. Capitalism has an altogether overt criterion that controls the bulk of its economic activity -- the search for profit. It is not a question of hard-hearted Scrooges insisting on their rights as exploiters, but of a system which can reject the demands of its driving motor only at the risk of choking it off altogether and bringing the system itself to a halt.

It is optimistic to use the word "endless," since a possible end is only too grimly apparent.

I would agree, then, that a capitalist society *must* bring forth an endless series of harmful technologies. To accept the inevitability of capitalism is to envisage a likewise endless series of rearguard actions to combat and limit the harm such technologies can do. Indeed, it is optimistic here to use the word "endless," since a possible end to the series is only too grimly apparent.

So far, so good; but it is hardly far enough. Countries which have shut off the private-profit motor seem, in general, hardly less enthusiastic in speeding towards the ecological abyss and equipping themselves with the technological apparatus most essential to this race. Their attitude towards nuclear power and chemical wastes, for example, tells us much.

Of course, the orthodox-marxist schools will extend their analysis to cover such phenomena. It is hardly necessary to comment on the "loyalist" trends, faithful unto death to a particular State, who may deny -- in the teeth of the evidence -- that it suffers environmental and social damage through harmful technology, and/or explain how a reactor in the U.S.S.R. is quite a different thing from one in the U.S. After the People's Bomb, we are offered the

People's Reactor.

Maoists will account for Soviet technology and its "convergence" to the capitalist pattern by the turn of the Soviet leadership to "revisionist" ideas. (Some maoist trends will now say the same about China.) Other schools will solve the problem by dubbing the U.S.S.R. a state-capitalist country; naturally its technology will be capitalist also.

Most trends within the Trotskyist movement will relate the development of technology in such countries as the U.S.S.R. and China to the usurpation of political power by a bureaucracy. This analysis sees it as hardly surprising that an exploiting caste -- the bureaucracy -- will have a technological policy similar to that of an exploiting class -- the capitalists.

I cannot accept any of these "supplementary" explanations as satisfactory. Indeed, it is when we compare them with the case against capitalist technology that their deficiencies emerge most clearly. None of them provides a clear logical thread that indisputably ties the harmful technologies to the social and material interests of a powerful group of people who simply cannot abandon them without abandoning their privileged positions. Is it just a coincidence, then, that the same technological means suit the purposes of both capitalists and bureaucrats? But if we call it a coincidence, this is just the same as saying "I don't understand it," although we have dignified our ignorance with a four-syllable label.

Understanding is vital here. Unless we see clearly why harmful technologies arise, whether in the U.S., the U.S.S.R. or ancient Mesopotamia, we cannot be sure that the society of our hopes will really see their elimination. The scale of potential damage, both social and ecological, is now so intimidating that we must regard the achievement of benign technology as an acid test for any projected new society.

I do not believe that the task of making some preliminary generalizations about harmful technologies can be achieved simply by fixing a watershed date, so that everything up to 1930 (or 1890 or 1780) was good and everything after that has been bad. One can point to harmful technologies that existed as long ago as Adam Smith and to liberatory ones that were developed last year. The problem is to disentangle the unwelcome strand and trace it back to its social origins.

The Myth of Economic Rationality

Most critiques of modern technology could easily lead to the conclusion that its unwelcome consequences arise from the single-minded, deplorable but *successful* pursuit of a narrowly conceived rationality: the production of more goods with less labor cost. This goal of greater economic efficiency is, of course, the proclaimed goal of all the systems we are discussing. Capitalism prides itself on delivering the goods as no other system has done and the Soviet leadership accepts the criterion of higher productivity as eventually determining the outcome of the struggle between their "socialism" and the world system of imperialism.

However, the fact that a country's leaders have proclaimed something is not an infallible guarantee of its truth. It need not even be assumed that those leaders are telling conscious lies: people have a great ability to kid themselves when the truth is unpalatable. In any case, it is not their motivations we are concerned with but their actual productive goals as revealed in practice. Are they really dedicated to economic efficiency above all?

No, they are not. To support this assertion fully would require much more time and space than are available here, but some significant indicators are worth considering.

Suppose that the aim of production really was the attainment of maximum efficiency in strictly economic terms. Here are some activities we could expect to see. First, *workers' control*. Evidence now exists from many sources that the productivity of workers increases

The scale of potential damage is now so intimidating that we must regard the achievement of benign technology as an acid test for any projected new society.

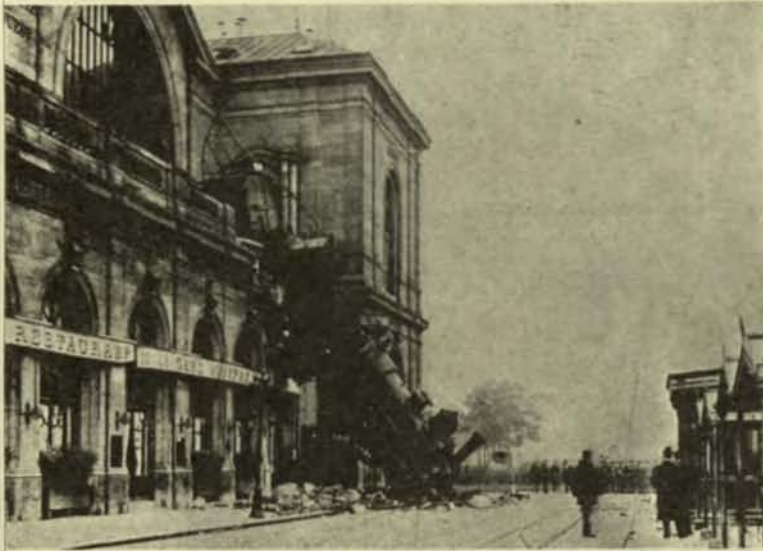
dramatically when a scheme of self-organizing work groups replaces the usual pattern of hierarchical control. A typical productivity rise seems to be about 20%. Seizing on these results from Sweden, Norway, Great Britain and the U.S., our single-minded economic leaders would be implementing a vast experimental program throughout industry designed to pave the way for the generalized introduction of such autonomous work groups.

Secondly, we could expect the end of nuclear power plants. Noting the hard evidence that nuclear power stations show a catastrophic drop in efficiency as they are built larger, all the relevant representatives of "Economic Man" would have cut back on plant ratings years ago, when the data first emerged. And of course, our devotees of economic efficiency would



Icarus. *Empire State Building, New York, 1930.*

Italy: Autonomia / Semiotexte



never have ordered larger and larger plants in the absence of operating data on even the smallest ones. In fact, they would never have gone nuclear at all.

Such examples can be multiplied. In all such cases, careful and superbly rational decision-makers would be drawing the necessary conclusions. In fact they show little sign of doing so. Despite the cases where expanded scale or more complex technology is manifestly less efficient, their investment decisions seem to be guided by unshakeable dogmas: *bigger is better, more centralized is better, more complex is better.*

Of course, much of the time they may still be right. In the past they were certainly right in most industries if we retain the narrow economic criterion of what is "better." Even now it is difficult to say how often they are wrong; the examination of alleged "economies of scale" is studded with notorious ambiguities and new technologies are not easy to evaluate.

The point to be appreciated here is that the decision-makers themselves operate in a grey area of uncertainty, as sociologists who specialize in this field are quick to recognize. Are the examples cited above rare and negligible phenomena or do they represent the tip of the iceberg? We do not know. Nor do the decision-makers.

The Profit Motive and Control

But isn't the profit motive a sufficient guarantee that, within certain limits, investment will be channeled into new capital goods that

really raise productivity? This is indeed true for that sector of the capitalist economy which remains competitive. But this sector is not dominant today. The system of "free enterprise" lives on only in the self-congratulatory and blatantly false speeches of company chairmen engaged in public relations exercises.

Today we are dealing with a system of monopoly in which a few giant firms dominate the market. So long as each of these firms takes the same path of technological development, they need not fear the consequences of a bad decision. The extra cost of a "mistake" will simply be passed on to the consumer in a price rise.

But there is another and perhaps even more important factor to be considered -- the State. No capitalist system can maintain itself today without constant and massive intervention by the State in the daily workings of its economy. We live in a society "stabilized" by defense contracts, investment allowances, import tariffs, direct and indirect subsidies of every kind.

The nuclear power industry in the U.S. bears eloquent testimony to the effects of this intervention. Dubious about the profitability of the field (and with good reason) General Electric and Westinghouse were persuaded to enter it only after the offer of guaranteed State contracts. The power companies, for their part, agreed to buy reactors only when the Federal Government brandished the stick of "public power" and dangled the carrot of lavish subsidies.

In short, it is just not true that the evil content of modern technology can be seen as an unfortunate by-product of the search for greater economic efficiency. On the contrary, when the trend to over-centralization, over-complexity, and gigantism comes into conflict with a narrowly-conceived economic "rationality", it is the latter which we find giving way.

In some cases the deviation from economic rationality can be easily understood. Whether in capitalist or "socialist" countries, the political or economic leadership can not really be expected to grasp eagerly at the opportunities for increased productivity that arise from eliminating hierarchical control of the work process. As a writer in the *Spectator* observed over a century ago, such arrangements "do not leave a clear place for the mas-

ter." (Quoting this, Marx added, "Quelle horreur!").

Who Benefits from Bad Technology?

Big, centralized, complex. On whose ears do these words fall sweetly? What social groupings can be expected to favor technology having these characteristics?

Let us first consider and then push to one side the most obvious candidates: scientists, engineers and technologists. They must be considered because of their special interest in such developments. Any new advance, even if the novelty is only in size, must call on their abilities and depend on their achievements. Their social importance will increase, the resources under their control will expand, they may even make a little more money. Looking at it a bit less crudely, such motivations as scientific curiosity or the engineer's compulsion to make a dream into an objective reality -- driving forces by no means to be despised -- will predispose them towards climbing new Everests simply because they're there or can be built.

But if technologists must be put aside in our considerations, it is because that is just how they are treated when conflict arises over their projects and proposals. Their social power in the kind of decision-making we're considering is minimal. To the boards of giant corporations they are simply employees who must know their station, and they rank considerably below the marketing branch. To the cabinet minister or the Politburo member they are advisers on a leash, in a relationship usually tinged with some contempt for their political naivete.

The technologists do not rank high among the decision-makers even when the question is one of introducing new technology. But there are other groups, similarly benefiting from these trends in technology, who cannot be so easily dismissed. They include the executive officers of large corporations (private or State,) the wielders of political power (whether in parliamentary or single-party system,) and the highly-placed administrators.

Hierarchy and the Machines

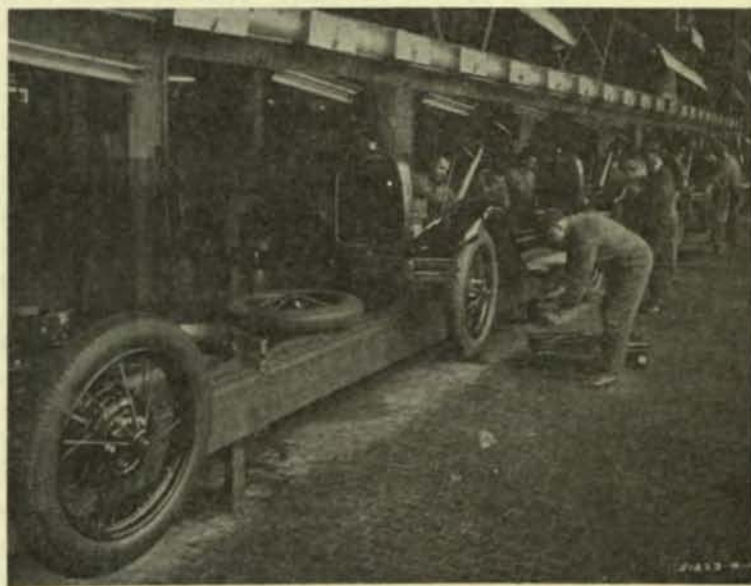
If we recall the social evils of modern technology denounced by its critics, it will be apparent that every single one of them is only an evil if viewed from "below." If one ascends

sufficiently high in the social, economic or political structure, they are each transformed into nearly-unmixed blessings.

The withdrawal of initiative and understanding from the work force? Only another way of saying that more responsibility accrues to the management level. Manipulation of the consumer? But this lightens the task of the economic hierarchy. Politically, it results in a population easier to administer and less liable to irritate with "unreasonable" demands. The loss of citizen autonomy and community through centralization? But there is nothing wrong with this increased dependence on distant authorities -- nothing wrong, that is, if I happen to be part of such an authority, so that my power increases with your dependence.

The point hardly needs laboring further. We are dealing with societies that incorporate a ramifying network of hierarchy -- hierarchy in the productive sphere, for example, with power and authority increasing steadily as we move up from shop floor through plant manager to managing director. It is a structure of inequality that characterizes all the major social and political institutions.

But it is within this hierarchy that decisions on new technology are made -- further decisions on the investment of capital, on the relative rates of growth of different branches of a firm, on the State encouragement awarded to different forms of industrial undertakings. These all-important decisions which allocate resources and lay down the main lines of



Ford assembly line, 1928

research and development determine what will be technologically feasible in a few year's time. It is not hard to understand, then, why technological deformations take the particular form that they do or why this form is so similar in the hierarchical societies of both East and West.

Appreciating this, we might well wonder not why technology is deformed but why the deformations have not swollen to far more monstrous size. (One short answer might be, wait and see.) But of course the hierarchy's decision-makers operate within severe constraints, the most important of which is the proclaimed desideratum of "economic efficiency." We have already noted, however, the significant range of cases in which these constraints may be evaded and a freer rein given to the centralizing, expanding forces which suit a hierarchy's book.

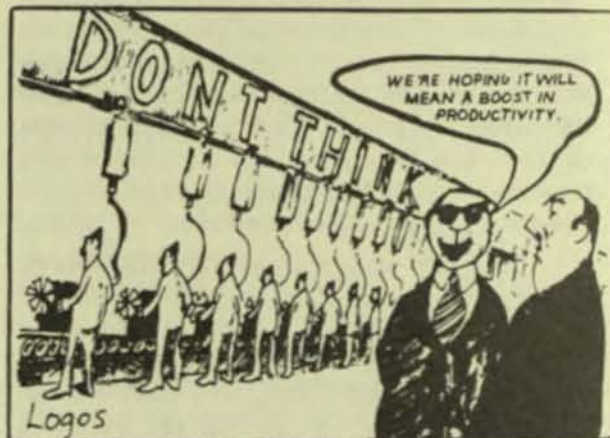
It should be emphasized that nothing above implies the existence of a conscious conspiracy with ruthless hierarchs gathering in a smoke-filled room to plot fresh moves towards centralization, size and complexity, rubbing their hands with glee as they chuckle, "Now they will be even more helpless and dependent." No, such a conclusion would greatly underestimate the complexities of the human mind and the mechanisms by which what suits us becomes what is right.

Nor should the general concept of "hierarchy" delude us into imagining that all hierarchies are equal in power. In a capitalist country, each hierarchy -- political, educational, social -- will in practice subordinate its goals to those of the economic system and its profit motive; by a not-so curious coincidence, the values and attitudes it has historically formed will attend to this requirement almost automatically. In the Soviet Union, it is the political hierarchy which has both the first word and the last word; again, no coincidence. In this respect as in many others there are profound differences between the two types of hierarchical rule which cannot be glossed over, despite the similarities that allow their technological convergence.

To sum up, then: in both "East" and "West" decisions on the nature of new technology are made by groups which -- whatever their differences, both within each camp and between the camps -- share a common interest in maintaining and strengthening hierarchical

structures of social relationship. And today, this control over the development of technology is infinitely more important to a hierarchy than in previous history. It seems reasonable to conclude that to retain this trump card they must retain control over the disposition of the product, either by legal ownership as in countries like the U.S. or by the use of political power to dub themselves the true representatives of the owner as in countries like the U.S.S.R.

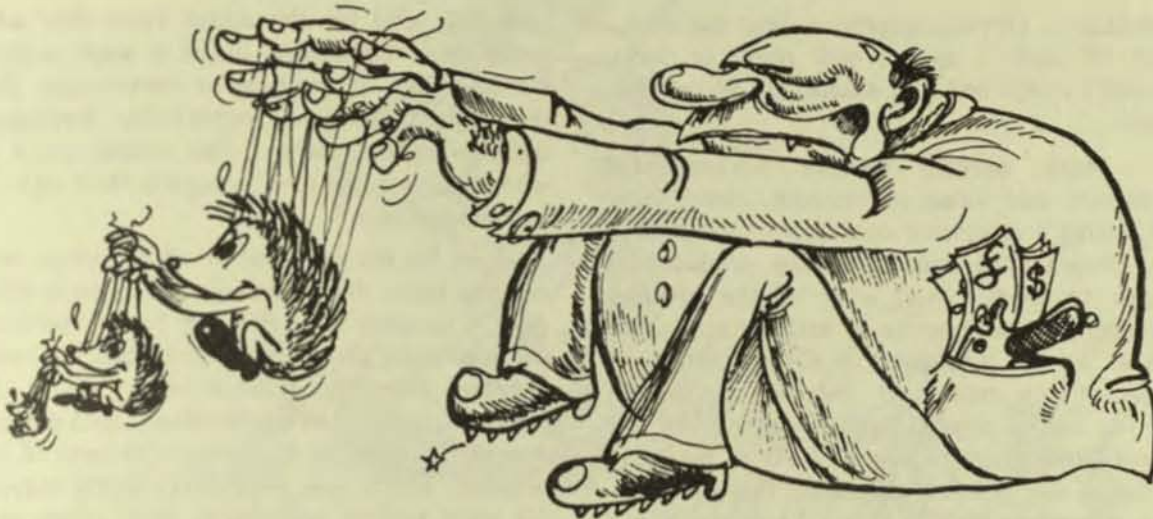
Can a small minority exercising control over production be relied upon to bias the direction of technological advance so as to serve their existing or developing interest? I would confidently expect that they would want to do so. As to whether they would be able to, I would reply, almost certainly. I do not share that faith in the workings of representative institutions which allows one to believe in constitutional arrangements that force a minority exercising power -- in this case, over the products of other people's labor -- to do so in the general good. I think that one can have too much reliance on paper provisions and that it is salutary here to compare reality and the actual amount of popular power with the verbal assurances of a parliamentary democratic system or with the even more comforting phrases of the Soviet Constitution.



Self-Management

The conclusion to which these remarks lead should now be clear: that there is no remedy for damaging technology short of complete self-management in the sphere of production -- including, above all, the full disposition of their product by the producers themselves.

"Self-management" has become an "in" word in recent years -- indeed, the ranks of its



verbal supporters were swelled in 1978 by the addition of no less a figure than the Prime Minister of Australia. This may be considered a classic example of hypocrisy as defined by Oscar Wilde: the tribute paid to virtue by vice. But many adherents to the concept who are far from hypocritical would still recoil from the "extreme" character of the definition above.

Most socialists have agreed fully with their opponents that the rightful recipient should be the owner of the productive capital. Their disagreements have usually been over the identity of this owner.

The contrary idea -- that some other people or some other body is rightfully entitled to the produce -- did not arrive on the scene five minutes ago; it was gradually developed over centuries and embedded in our culture in a thousand ways. The depth to which it has become rooted and the thoroughness of our acculturation to it is shown by one extraordinary fact alone: that it has never been questioned by the great bulk of opponents to the capitalist system.

Most socialists of the last century have accepted not just the general idea but the actual form it has taken in capitalist society. They have assented not just to the rightfulness of assigning the product away from the producers, but to the grounds which capitalist legality lays down for choosing who the recipients shall be. That is to say, they have usually agreed fully with their opponents that the rightful recipient should be the owner of the productive capital -- machines, raw materials, land. Their disagree-

ments have usually been over the identity of this owner.

For supporters of capitalism, private ownership was desirable; for most socialists, the only permissible owner was the State. That this owner then took the product -- rather than the producers themselves -- then went without saying; it was common ground.

Given this deep penetration of the contrary concept, it may be understood why self-management as defined above can seem a proposition of Martian weirdness. Each of the real difficulties and problems of self-management will be seen not as posing a historical task which humanity must tackle, but as refuting the whole idea in one move. In the next and final section, I will try to indicate -- with unavoidable brevity -- how some of the main objections may be met.

The Road to a Solution

The particular evils of technology that we have been surveying -- gigantism, over-centralization, over-complexity -- do not seem likely to continue in a system of producer control. There are no ideological or material reasons why producers should favor such trends, when their economic efficiency is either doubtful or squarely negative. Thus, even if producers' self-management breeds its own distortions and insufficiencies, there is no reason to expect these errors to have the destructive and even fatal character of the policies peculiar to a group with vested interests in hierarchy.

Nevertheless, we cannot rest comfortably on such a general ground for approval, no matter how fundamental and decisive we may

consider it. Obvious questions about the workings of such a system will occur in most people's minds and they should not be brushed aside.

Many workers (service workers, for example) add value to material, rather than producing a completed commodity. What does the slogan "the product to the producers?" mean to them? And what of the revenue needed for undertakings of national scope, for social welfare payments, or for the establishment of new industries? What of the welfare of the community, if held to ransom by the particularist greed of a small body of workers? What of the industrial stagnation that could follow if workers decided that a Christmas bonus was preferable to funds for new investment?

There is no remedy for damaging technology short of complete self-management in the sphere of production.

The first response to such queries should really be a series of counter-questions: If the producers are not to claim the product, what people or what body is to do so? What measures can realistically be expected to prevent the dire consequences of such an expropriation, as outlined above? The difficulties and conflicts that would flow from producer self-management would at least take place in a world physically able to support life. Can any proposed alternative guarantee this minimum need?

It is true that the value added by many workers does not result in the appearance of a physically distinct commodity. But this has never been an objection to the working of a contract system where the body of workers con-

cerned is paid for the actual value they add, rather than maintained under a wage system. Nobody finds it mystical or unrealizable that they should thus sell a "commodity" having no definite physical form. The crucial point is whether this initial sale is properly their right or somebody else's.

As for the financing of undertakings on a national scale, there seem no objections in principle -- certainly none that can be derived from the arguments above -- to a deduction for these purposes from the realized value. Even the substantial cut taken by the feudal lord did not deprive the peasant of the right to most of his product, which still provided enough surplus for some kind of investment under commoner control. In like manner, the imposition of company tax still leaves a capitalist corporation in substantial control of its product and able to finance investment and new technology. The institutional arrangements for collecting such funds, in a self-managed economy, would of course depend on the shape of the broader society outside.

Nothing said here should be taken as opposing the need for economic and social planning -- unless, of course one assumes that any plans must necessarily be imposed from above and then have the "force of law," to quote the ominous terminology of the U.S.S.R. The themes dealt with here relate not to the need for planning in any modern economy but to the agreed basis on which the planning should proceed: with the product already handed over to a planning elite, or remaining in the hands of the body of producers responsible for its creation.

It would be no change that a group of workers managing production could hold the community to ransom; capitalist firms already



Philadelphia Solidarity



Philadelphian Solidarity

have exactly this power. But of course the community can also hold those workers to ransom -- presumably, for instance, they would like to buy at a reasonable price the bread that other workers bake. In a society of autonomous work collectives rather than atomized consumers, such defensive actions would be so easily organized that they would not need to be called upon. Common sense would prevail.

If workers had the say, would they usually prefer immediate consumption to saving for investment? A study by Stephen A. Marglin ('What Do Bosses Do?,' Part 2, *Review of Radical Political Economy*, Spring 1975) suggests that indeed a hierarchical form of control over the surplus results in a higher rate of investment and a speedier growth in the GNP. I think it quite likely (though not certain) that lower growth rates would characterize a self-managed economy; it is now up to the critics of this feature, bearing in mind ecological necessities and the real content of the increased national products we have witnessed, to explain why this is a bad thing. Or rather, why this is such a bad thing that it warrants the retention of hierarchical control, with all that implies, over the surplus invested.

Conclusion

These remarks, inadequate and abstract as they are, must suffice here. A single feature of social reality has been abstracted from its con-

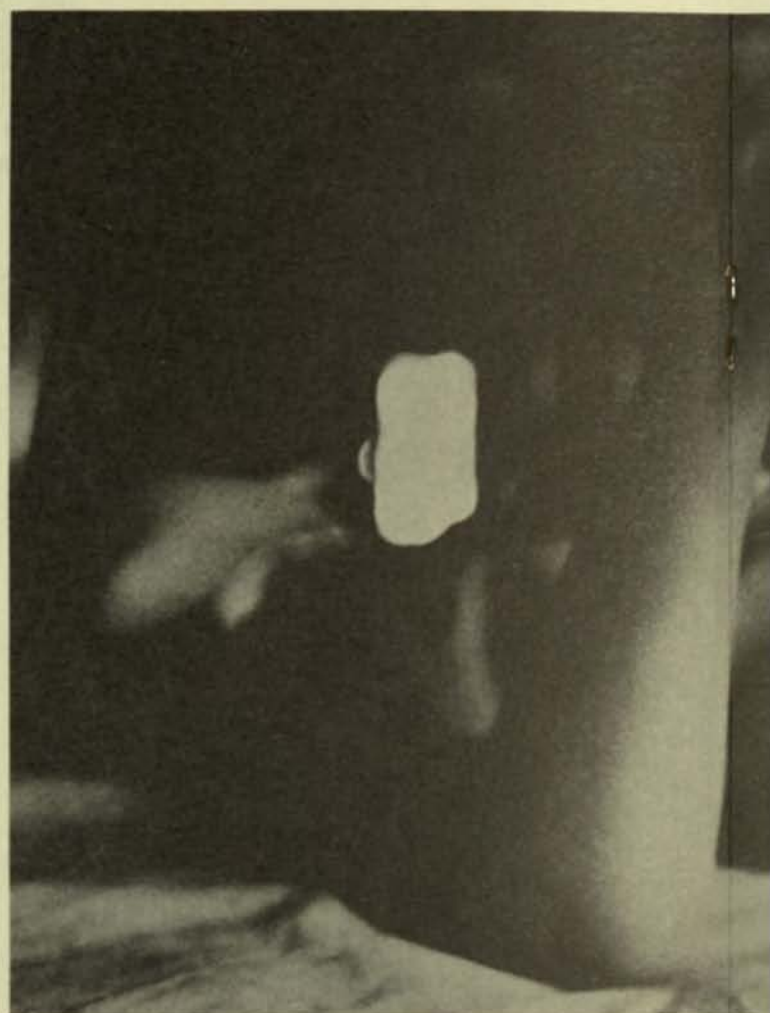
text and considered in relative isolation. The significance of self-management in production cannot be adequately discussed without looking at the wider social fabric and the need for replacing hierarchical structures in every social sphere.

However, one important point should be mentioned here. The concept of self-management is not some bright idea which just occurred to me or to a few other individuals with privileged access to theoretical truth. Self-management is the most convenient and appropriate term for describing the thrust of a great number of social movements, involving not hundreds but millions of fairly ordinary people. In the past twenty years or so, it has emerged from the anteroom of theory into the arena of practice. For this we must thank not only the stimulating efforts of a handful of propagandists but also the blunders and manifest irrationality of the various hierarchical systems.

Their abuse of technology is one of the major irrationalities stimulating opposition. It becomes more apparent as the means at their disposal grow in power and destructive potential. A theoretical study can reveal the connection between hierarchical control and technologically deformed ways of life. But this connection has already been *felt*, increasingly strongly, by millions of people who may lack the taste or the schooling for theory but who can nevertheless change the world in practice.

No Frontiers: Notes on Transnational Networks

by Peter Hayes



Minimata disease.

Foreword

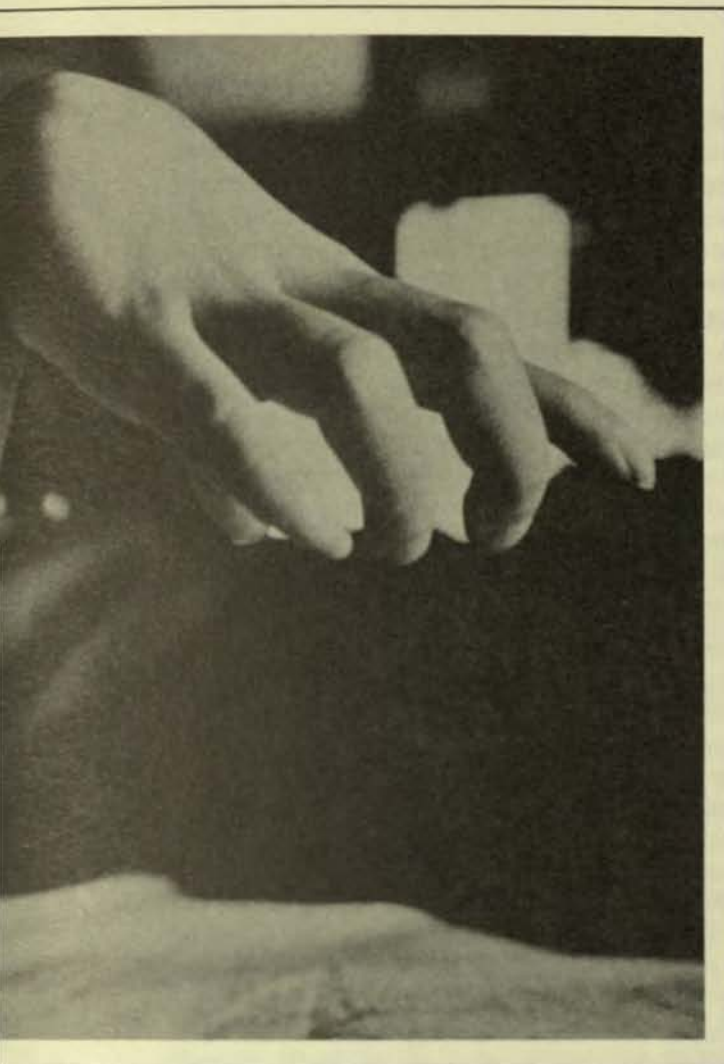
This report (1), written four years ago for sleepy U.N. bureaucrats, reflects my own theoretical underdevelopment at the time. While there is nothing specific in the report demanding urgent rectification, I wish to note some important points which I neglected in my original analysis.

First, I implied in my analysis of the structure and function of networks that they embody and realize the values of equity, self-reliance, and ecological balance. Thus I wrote enthusiastically (if not very lyrically) about their potential. While networks are undoubtedly an efficient social technology for achieving these ends in particular contexts, it is not true that all networks take these values as their goals.

Peter Hayes is an activist on energy issues who has worked with Friends of the Earth in Australia. He was Director of the Environment Liaison Center in Nairobi, Kenya from 1975-1976, during which time this study was prepared. He is currently engaged in transnational anti-nuclear work. Comments or inquiries should be directed to: Peter Hayes, ERG-100, T-4, U.C. Berkeley, Berkeley, CA 94720.

I now feel that the distinguishing characteristic of networks is the high level of motivation of their members to communicate across formal social and political boundaries. Networks can also be distinguished from all bureaucratic "command" organizations by the "bottom-up" characteristic of such communication, regardless of their overall goals. There is no such thing as a "top-down" network.

Moreover, I discussed networks without describing their political and social contexts. Networks are discrete entities from the "internal" perspective of information flow, and my definition of networks includes the fact that their members are acting unconventionally. However, the internal structure and function of a network can only be understood by viewing it



Tadahiro Ogawa

in the matrix of conventional relationships from which its actors and their motivations are drawn.

The regulating principles which keep networks under control and limit their extension and efficiency are the basic fault lines which cleave capitalist societies. My analysis, therefore, was somewhat a-historical: it neglected the social and political determinants of the problems around which networks spring up and the nature of the information they exchange.

A further conclusion follows this retreat to history. Networks exist because people strive to overcome all the ways they are shredded and pulverized under advanced capitalism -- the fragmentation, segmentation, marginalization, and feudalization of their lives. Finding themselves in continual conflict with themselves and others, people seek to deflect and overcome this social disintegration by using networks.

The paradox is that the issues which stimulate people to enter networks (which attempt to transcend the age, sexual, racial, national and tribal differences which are deployed against their class unity) are also issues which can be resolved only at the level of *structural change*. Such change cannot be achieved with the social and political resources of issue-oriented networks. This has resulted in lots of frustrated networks.

Finally, my report did not ask which people are stimulated to enter networks -- to whom is this social technology useful? In my experience, it seems that networks primarily exist among social groups who may be undercapitalized but who have a sufficiently comfortable standard of living to organize beyond mere daily survival. For the poorest strata of the overdeveloped countries, networks are generally irrelevant social tools, beyond their budgets of time and energy. In the underdeveloped countries, networks are usually covert and highly structured, to avoid the immediate repression attracted by unorthodox and subversive social and political behavior. Consequently, networks are found mainly in the overdeveloped societies, reaching into international levels of social and political organization.

The historical grounding for the fantastic proliferation of networks is found in the degree to which communities have been fragmented by capitalist exploitation. Since informal networks are primarily aimed at reducing isolation and overcoming social divisions, networks as such would become obsolete if a reconstructed, socialist society succeeded in abolishing such divisions. Such a reconstruction remains problematical. The important question is what role networks will play in the transitional struggle.

NETWORKS

The day someone discovers how to unify, without uniting, the different groups of every country, of every continent, of every race and religion, then we will have found a strength that is more powerful even than nuclear power -- the strength of love. That is where the real strength lies.(2)

Definition

The term network, in its most minimal definition, is a number of spatially dispersed elements connected by intersecting lines of communication. (3) In another definition, the

term describes "the relationship between formal and informal groups, particularly at a grass-roots level." (4)

How Networks Operate

Networks can be termed "informal associations" which include action groups, movements and temporary cooperating mechanisms. (5) They operate with a *decentralized mode of action*, characterized by coordination of many points of activity, and they are relatively *unstructured*. Often there is "no formal dividing line of membership." (6) These characteristics need not imply disorganization or a lack of order, but a different kind of coordination. (7)

Network analyst Anthony Judge states that the network is

appropriate to today's rapidly-changing conditions which constantly give rise to fresh problems and unforeseen requirements for action -- requirements which cannot be rapidly and satisfactorily distributed to organizations working in isolation within rigidly defined programs. The network permits all the decentralization necessary to satisfy the need for autonomous organizational development and individual initiative. It also provides for very rapid centralization, canalization and focusing of resources the moment any complex problem (or natural disaster) emerges which requires the talents of a particular configuration or constellation of transnational organizations (or other bodies). (8)

One member of a grass-roots network described it as "very issue-oriented ... [it] involves working with and changing our own peoples' concepts. We really have to become our own experts." (9) The informality of networks allows the relationships within and among them to be horizontal, as opposed to vertical and hierarchical. Optimally, each actor in a network can benefit by participation and command increased resources. Since a unanimously agreed-upon common policy is not often required of an informal network, the actors can work at the highest common factor rather than the lowest common denominator. Status, prestige and divergencies are accommodated without irrevocable breakdown of relations in the whole network: conflicting members simply disengage.

Information Flows within Informal Networks

Networks often rely on *information clearing houses* (10), which sort and decipher information to make it comprehensible to a wider audience, reorient it to make it locale-relevant, and apply information from past experiences to new situations. One such clearinghouse, the Tasmanian Environment Centre in Australia, states that "*ideas and information must be used as tools* the environment 'movement' there are people who know; or who have friends who know; or who have contacts inside various industries, departments and organizations who know. And there are people, everywhere, who have the ferret-like ability to question the 'experts' and 'authorities' and get information from such sources before it becomes published



Australia

as 'news.' The use of the network is one of our most valued weapons in defense of the environment. After all, the wreckers and developers don't often wait for a 'report' to be made public." (11)

Transnational Networks

Transnational networks are local action groups interlinked across national boundaries. These networks spring up to share common experiences and to undertake joint action. Thus, "what happened thousands of miles away provides the incentive for new initiatives all over the world." (12)

Transnational networks, habitually run on a shoestring, ensure the maximum utilization of local resources over long distances and broad conflict fronts, emphasizing specific issues, and minimizing 'keep in touch for the sake of keeping in touch' kind of activities. (13) Communication toward synchronized action is often achieved through *travel* ('mobile actors'), as well as through messages and other means of sharing information.

The Jishu Koza network, a Japan-based transnational environmental network, exemplifies many of the characteristics of informal grass-roots networks: it has no one center or prime controller, and it is highly informal, drawing its strength from interactions among members. A leading Japanese environmentalist states, "Jishu Koza is not an organization at all. We are a kind of telephone switchboard; we liken ourselves to a movement. Sometimes we say [that] we will not be any kind of organization." He notes further that "trade unions and parties did not work successfully on pollution issues, especially because at the top some were erased, bribed or corrupted. In our network, there is independence [and] as much bilateral, personal and informal contact as possible. The other side cannot find the Center. If the other side selects a Center and bribes him, the whole network doesn't change." (14)

Reactive Networks

The Jishu Koza network is an example of a *reactive* network. As the evidence of the severe neurological effects of mercury poisoning emerged at Minamata and Niigata, the struggle of the local people against the factories was confused by the importing of "independent" researchers who put out irrelevant or

partial information. It was only through the continual interaction of the victims that this diversionary information was systematically debunked by committed scientists and the needs and problems of the local victims were correctly assessed. In 1967, the Niigata victims commenced a civil action which was won in 1971. In Minamata, the local community was more fragmented and only undertook legal action after Niigata victims visited in 1968.

The local Japanese experience with mercury proved to be relevant to situations in Scandinavian countries as well as to Italy, Holland, Canada, America, Puerto Rico, Brazil and Australia. In Ontario, Canada, the Dryden River and the English River were contaminated by a pulp mill, affecting the Indians in two reserves. In 1971 the Ontario government started a 'Fish for Fun' campaign [catch them, but don't eat them] because of the high mercury contamination of the fish. But since the tourist resorts continued to serve fish to their U.S. visitors, the Indians didn't take the ban on eating local fish seriously. The Indians began showing signs of mercury poisoning, but their symptoms were at first attributed to alcoholism.

In May 1974, a Canadian who had been alarmed by the similarities of the victims to those at Minamata visited Japan; in 1975 three Japanese experts formerly involved with the Minamata case came to Ontario. As in Japan, the Canadian company tried to refute their responsibility, stating that they "did not cause the mercury to turn to poison," but rather that "nature performed a process of biological methylation which produces the lethal methylmercury combination." (15)

Links in this transnational network developed first between the victims of the disease in one country and then moved across national boundaries when special expertise was needed in the diagnosis and treatment of the disease, as well as in the method of approaching the pollution issue. Both the victims and the experts have visited each other's communities to establish direct relations. Although the mercury conflicts were on a local and national basis, the information transferred from one national confrontation to another increased the efficiency of local environmentalists who knew the arguments and counterarguments.

Importance of Strategic Thinking

In a Swedish case of mercury pollution, the fishing community was outraged by the restrictions on fishing areas closed after mercury pollution from paper pulp factories, whereas in another case in Australia, this was avoided by prior consultation with the fishing community by environmentalists. Friends of the Earth in Australia note "the same pattern of deceit that occurred in other parts of the world" over methyl mercury. (16)

After mercury pollution in Thailand by Asahi Glass Company, a joint exhibition on pollution by Jishu Koza and the Japan-Thailand Youth Friendship Movement was organized in Bangkok in 1974. (17) "This combination of both movements brought great success. Cooperation by Thai and Japanese citizens who keep watching the pollution exporting enterprises has reached a point where we can exchange information and take action together." (18). An evolution from a *reaction* to the local experience of mercury pollution to a *preventive* approach can be seen in this example.

Preventive Networks

Preventive networks arise which seek resolution of the specific issues they tackle through *structural change*. Such issues are manifestations of persistent problems, and long-standing networks are the result.

One of the most vibrant transnational networks is aimed at halting nuclear power. One of its layers is Friends of the Earth International, "a loosely linked network of separate FOE organizations," (19) all of which are "completely autonomous." (20) For example, FOE of the United Kingdom is a permanent organizational entity which acts with 150 local groups to embed policy changes in local action and is "systematically developing what has become a network extending from Cornwall to Orkney. Each group is led by a coordinator whose job includes liaising with the head office. [However,] groups are autonomous and are free to choose their own campaigns. . . ." (21)

The anti-nuclear movement began independently in many countries. There is evidence confirming that "the diffusion develops as an outward movement in small steps and simultaneous inner condensation takes place. Occasional jumps of the innovation over longer distances at the beginning of the process tend

to create secondary centers later on. The point of introduction in a new country is its primate city. . . the centers next in rank follow. Soon, however, this order is broken up and replaced by one where the neighborhood effect dominates over the pure size succession." (22) Almost all the anti-nuclear groups which operate transnationally are urban-based.

The Canadian Coalition for Nuclear Responsibility views the nuclear controversy "as a focal point and a rallying point for one of the most crucial questions of our time. This question goes far beyond whether or not nuclear energy is an acceptable technology for generating electricity. The question is: given the incredible power of modern technology, who should make the decisions in our society, and in what manner, and for what purposes?" (23) It is the consideration of such structural questions that typifies long-standing preventive networks.

As a leader of the Danish Organization for Information About Nuclear Power, (which has been instrumental in the indefinite postponement of Danish nuclear power) (24) puts it:

The battle against nuclear energy is increasingly seen as an ideal model and test case for these 'strategies for survival' through the politics of society. It is only from a broad critical basis among public opinion and with continual links back that political structures can emerge which have the stature to face the many forces threatening life. In the battle against nuclear energy there lies a chance, for the first time and perhaps for the last time, of creating such political structures in a democratic way. (25)

Conclusion

The transnational networks described so far have been negative in some degree -- whether reactive, defensive, or preventive. On the positive side are networks which emerge to diffuse innovative ideas and potentials for change.

Todos en Bicicleta, a network of about 50-70 bicycle action groups, represents a potentially powerful base for political action. Although concentrated for the most part in developed countries, the base is broadening. (26) In 1974, Todos En Bicicleta held a

major demonstration in Mexico City. The integration of bicycles with public transit is an *innovation* that goes hand in hand with the preventive approach of opposing the automobile industry.

The important question now, for all transnational networks, is that of strategy. As the International Foundation for Social Innovation puts it:

No hierarchy can reflect the complexity of the interrelations between concepts, problems or organizations, interrelations which it is nevertheless desirable to perceive in order to take decisions.

As a result it seems necessary to think up structures backed up by the appropriate conceptual tools which will enable the new and complex problems which are constantly emerging to be mastered. It is a question of defining what could be called a "network strategy" to facilitate -- or catalyze -- the appearance, the development and the adaptation of inter-organizational networks capable of dealing with the entanglement of problems in terms of values perceived at all levels of the social system. (27)

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The Trials of Prestel

by Fred Lamond

The British Post Office wonders if political rather than technical problems blacked out its Prestel demonstration at a French exhibit last June.

On the first day of the exhibit on telecommunications which was organized by the French computer professional society, AFCET, the Prestel demonstration worked beautifully. But a rival French television data access system, called Titan and sponsored by the French telecommunications directorate, was a flop. When the French minister for PTT [Poste Telegraphique et Telephonique] passed the two exhibits in his inaugural visit, he didn't appear pleased at the contrast.

On the second day of the three-day exhibit, the British engineers on the Prestel exhibit arrived in the morning to find that their two lines had mysteriously gone dead during the night. Engineers from France's telecommunications service blamed weather interference. But weather wasn't interfering with lines to London used by other British exhibitors.

By noon, the AFCET administrative office was sufficiently concerned to put one of its telephone lines at the disposal of the British exhibit. An extension cable was run from the AFCET office to the British Post Office's exhibit, and Prestel demonstrations went back on the air. But not for long. By 4 p.m. that line, too, had mysteriously gone dead.

Certain by now that they were dogged by political and not technical gremlins, the British Prestel team packed their bags and left for home without waiting for the end of the show.

This event followed by two months another incident when Britain's Prestel (Viewdata) service was to have been demonstrated in Paris to the Western European Union, the defense organization of European NATO members. The Union was interested in British Post Office software for a possible internal data

base inquiry service.

The British were forced to call off the demonstration when its request to the French telecommunications directorate for a temporary circuit between the Union's headquarters in Paris and London to access the Post Office's Prestel computer was curtly turned down.

Behind these incidents lies a French attempt to prevent the British developed viewdata standard from being adopted by CCITT [the International Telegraph and Telephone Consultative Committee of the International Telecommunication Union] as the world's norm for "videotex" services. At international meetings, French delegates have been raising numerous objections and putting forward hosts of amendments to the proposed standard. The British suspect them of seeking more time for Titan to catch up to the British system, which enjoys a 12 - 18 month advance.

The French fear that if the British viewdata standard is adopted worldwide, British industry will have an unbeatable lead in supplying videotex hardware and software to PTT's in other countries, as well as to the incipient boom in in-house corporate viewdata services. But other countries' observers are more likely to suspect a massive national technological inferiority complex. If such an opinion spread internationally, French industry would hardly be helped by it, and the only winners from delays imposed on international recognition of the British viewdata standard would be the Japanese.

French engineers developing the Titan videotex system realize this better than most, and were most unhappy at the Paris tribulations of their Prestel rivals. They are hoping to exhibit Titan at other international exhibitions in other countries, and now fear that they too might be blacked out in retaliation.

Fred Lamond is London correspondent for *Datamation* magazine. This article is reprinted from *Datamation*, Vol.25, No. 3 (August, 1979), p. 77.



CIS Report, The New Technology

All the Questions You've Wanted to Ask About Microchips

Q: How does it work?

A: Put simply, the silicon-chip is like a computer that has been squeezed down to a millionth of its normal size. You could hold 10,000 million of them in the palm of your hand. And yet, just one of these chips can be programmed with more information than is contained in every book ever written. Staggering, isn't it?

Q: Will the chip affect my sex life?

A: (*A Doctor writes*): It is too soon to say. But already the signs are that the chip will bring about the greatest bedroom revolution since the invention of the continental quilt.

Q: I heard someone say on one of those phone-ins that the chip will mean the end of money as we know it. Does that mean that it is 'goodbye' to the old-fashioned wage packet?

A: Next caller, please.

Q: No, but seriously, George, I've heard a lot about this so-called silicon business, but what I want to know is this. I mean, when the chips are down, across the board, what does this chip actually mean in terms of everyday life? I mean, I'm talking to you now, on the telephone, man-to-man. Am I right or wrong, George?

A: Yes, yes, get on with it.

Q: And we're also on the radio, right?

A: Z-z-z-z-z-z-z.

Q: Yes, well, what they're saying is that, when this chip comes, there won't be no more radio or telephones. So what I want to ask you, George, is -- where does that leave us? You and I, George, we could be totally redundant. I mean, they could get a chip and put it where you are, and that would be the end of you, wouldn't it, George?

A: Let's take a break.

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Kentucky Fried Farming

by Marcy Darnovsky

Control Data Corporation is the second largest computer corporation in the world, with revenues of over \$2 billion a year and operations in 33 countries. Why then have non-profit community groups and alternative technology activists been finding CDC sprouting up in all of their carefully tilled gardens?

In describing its corporate mission, Control Data explains that "we view the major unmet needs of society as opportunities to pursue profitable business." Toward that end, CDC has been courting alternative technology groups around the world, offering them financial support in return for data developed from their research. For the last few years, members of CDC's staff have been quietly omnipresent at major appropriate technology gatherings.

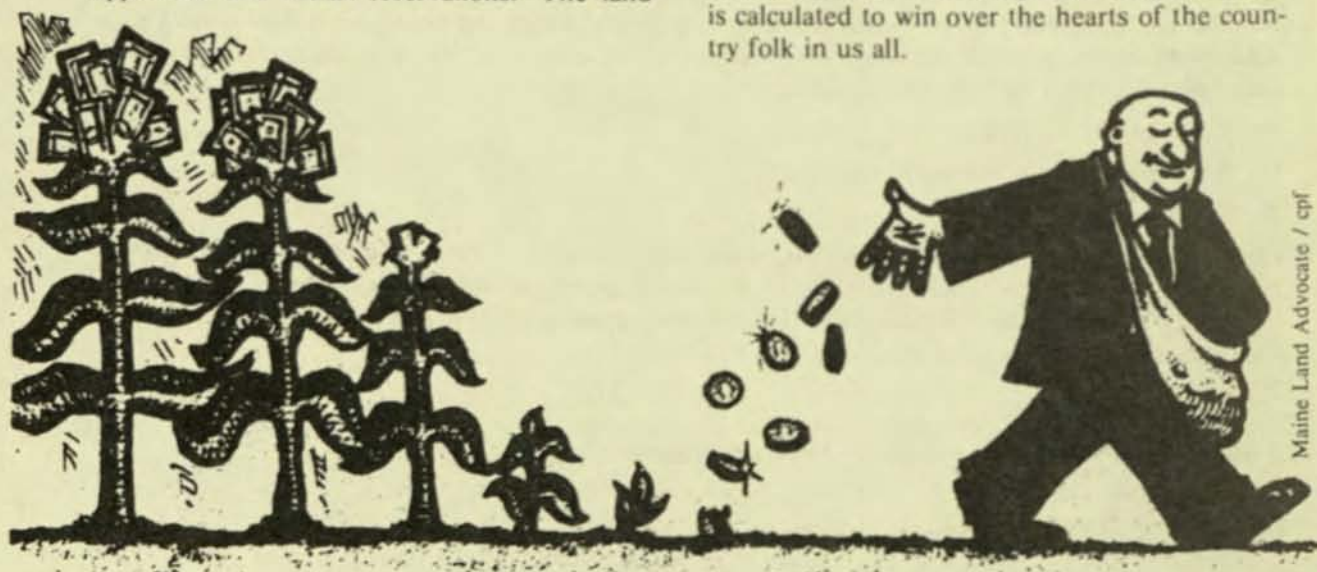
One of CDC's efforts has been the development of a program to ease the plight of the family farmer and take us "back to the countryside via technology." To the accompaniment of much rhetoric about the family farm and tributes to alternative agricultural technology, Control Data is now entering the small farm arena in a big way.

The plan is to buy up large blocks of land in underdeveloped areas such as central Appalachia and Indian reservations. The land

then would be divided up and resold in small plots to would-be family farmers, quite possibly with financing arranged through CDC's highly profitable subsidiary, Commercial Credit Company (though CDC claims that "we will tend not to hold mortgages, but rather help the farmers find credit elsewhere.") Regardless, the land will be part of a package deal that includes "assistance in the organization" of centralized purchasing, processing units and markets.

CDC views small farming as a potential growth area in a period of economic and energy crises. "Better solutions to many of the basic problems plaguing the nation's food chain can be obtained by means of the small family farm than can be achieved through the large capital-intensive, fossil-fuel based operation," says Control Data chairman William Norris, echoing the arguments that ecologists have been making for years.

Norris is the prime mover behind CDC's alternative technology and small farm activities. He grew up on a family farm in Nebraska and he's not averse to hauling out his childhood in the interests of his project. "We almost lost that farm during the great depression," he confides in a born-in-a-log-cabin biography that is calculated to win over the hearts of the country folk in us all.



Maine Land Advocate / cdf

But the real key to CDC's enthusiasm about their small farms program may well be the company's intention of supplying the farmers with computer-based instruction (on the PLATO system which CDC so far has been unable to market successfully elsewhere) and with a computerized agricultural data base that will include information on crop mix optimization, weather forecasts, alternative technology, market futures and the like.

Some observers in the information technology field surmise that the agricultural data base is part of a long-term CDC strategem to corner the world market on agricultural and technological information. Pat Gorman, general manager of CDC's Corporate Business Development, has commented that "we would like to be for the world what the USDA is for the U.S., relative to crop monitoring and inventory plans."

CDC has already developed Technotec, a computerized international technology exchange service which enables firms to list products, technologies, capabilities and needs they can offer or to search the Technotec data base for same. CDC's profit comes from fees for listing (\$400 per item per year) and a charge for searching (\$90 per hour.)

The information and materials that CDC has been soliciting from alternative technology sources would probably go into Technotec. However, many of the food, land and appropriate technology groups that are being invited to participate in CDC's venture are accustomed to viewing information as something to be shared, not as a commodity to be sold for the price the market will bear. They are therefore hostile to a scheme that will almost surely exclude "those who could most benefit by information exchange." One activist wrote, "The rich and the information-rich get to meet each other in Technotec's computerized cocktail party."

Control Data's forays into what has long been the private -- and sometimes lonely -- terrain of the alternative technologists have caused a stir among their circles. The multinational is dangling its billions before the eyes of resource starved visionaries and offering to initiate projects that seem remarkably similar to those already on the alternative technology agenda. Yet many are unwilling to go for the bait.

In the beginning of 1979, concern about the situation led Gil Friend of the California



CDC Monitor

Office of Appropriate Technology to compile information about CDC and send a review of the company's relevant activities to a hundred alternative technology, farmer and community groups. He asked for feedback and suggested that a response to the CDC offers of money and overtures of support be based on a cooperative assessment.

Nearly 50 responses were received and recirculated. A few of those consulted saw no problem and didn't understand the fuss. But others were wary and many were openly hostile. CDC's plan was variously described as a siren song and a scheme for sharecropping. "There is little difference in the future which CDC proposes and that which McDonald's has adopted," wrote someone from Illinois. "It's a network of franchises united by a centralized servicing system and the ketchup in their blood."

Another observer commented, "We are watching a serious effort . . . to harness these productive and efficient small farmers with an electronic yoke over which they have no control. This is the latest and most skillful effort of large-scale corporate capital to move into agriculture . . . The problem facing U.S. farmers is not inadequate technology . . . the root problems are economic and political."

Other respondents pointed out how smoothly CDC's small farm activities seem to mesh with the most recent recommendations of the Committee on Economic Development, an unofficial policy-making body composed of 200 business and university bigwigs. CED has been lurking behind the scenes in the field of agriculture policy for many years.

In the early 60's, CED decided that the rate of return on agricultural investment was too low: it was not possible for both "capital and labor to earn an adequate return in agriculture." The solution that CED settled on was the removal of labor.

A 1962 CED report proposed doing away with price supports on crops so as to reduce the American farm population by one third. The goal was to move 2.2 million people off the farms in five years. Or as Kenneth Boulding, one of the report's authors, put it, "The only way I know to get toothpaste out of a tube is to squeeze. And the only way to get people out of agriculture is likewise to squeeze agriculture . . .

If the toothpaste is thick, you have to put real pressure on it."

The U.S. Government followed CED's recommendations and the 2.2 million farmers were eliminated, though it took ten years instead of five. By 1974, a two-tier system had been created with a few large farms and the majority of the rest poor enough for welfare, which CED was more than happy to advise the government to provide. CED also recognized the advantage of allowing the remaining small farms to supply labor-intensive "inputs" (feeder pigs, calves, etc.) to the large agribusiness farms.

This information has only recently been pieced together by food and land activists. (1) The added fact that a Control Data director, Joseph Barr, was one of the key people in CED who issued the 1974 report served to fuel suspicions about the meaning of Control Data's commitment to "social responsibility." "One begins to wonder," said a food and land activist, "if the long-term strategy of corporate capitalism isn't to create problems, like the destruction of our family farms and rural communities, and then come along and try to make money from 'solving' the 'problem,' like Control Data is proposing."

As an outgrowth of the discussions on CDC, a national meeting took place in Evanston, Illinois in April of 1979. About 35 alternative technology types and a few farmers talked among themselves on the first day of the meeting and faced off with three CDC officials the following morning. (2)

Many of the meeting participants felt that the corporate execs evaded some of the important questions. For example, CDC's General



Berkeley Barb

Manager of Corporate Strategy Implementation couldn't say what studies had been done to show that their small farm plan would be profitable. "But I'm sure that information is up in Mr. Norris' personal computer," he promised, tapping his forehead.

One participant commented that "at the end of the first day, no one knew what to think. After CDC left on the second day, everyone was pretty unanimous in agreeing that the whole thing stank." A farmer concluded, "There's only so much pie. And CDC trying to get part of it can only make things worse for the farmer."

But the bad reviews haven't deterred CDC. The company has set up a subsidiary called Rural Venture Inc. and has committed \$3 million to the program. The December 1979 issue of *Farm Journal* reports that CDC has already invested over \$5 million in its agribusiness planning and development efforts. (3)

Farm Journal portrayed in highly favorable light a related CDC project in east-central Minnesota. The Deer Valley Corporation, a for-profit company composed of 15 farm families, has been set up to promote the sharing of agricultural information, skills and equipment. The farmers hope to begin marketing and dis-

tribution soon and food processing eventually.

Control Data's Ralph Thomson explains that his corporation "serves as a catalyst" to the Deer Valley project. According to *Farm Journal*, CDC "made proposals and then let the farmers work out their own plans" and "provided some capital to help with farm financing." CDC also hired a former farm manager who visits each of the Deer Valley farms to offer technical assistance and hold meetings on topics like raising hogs and growing specialty vegetable crops. Ralph Thomson explains that CDC is also "compiling data from the participating farms and from a number of state and federal sources" to "generate individual farm management plans."

Farm Journal reports that "all of the Deer Valley farmers are outspoken in their support of the project." Indeed some of them, the magazine says, are "evangelical." One Deer Valley farmer, Mike Genereux, believes that the CDC project is "the best thing going for the small farmer. It's our hope for a real future." Genereux not only owns 105 acres of farmland on which he uses draft horses instead of a tractor, but also "works part-time for Control Data."

The *Farm Journal* article quotes several other farmers, presumably more objective than a CDC employee, who also are impressed by CDC's financial support, management assistance and educational programs. The success of the Deer Valley project may serve to allay some of the earlier fears and suspicions of small farmers and alternative technology activists.

But the article also confirms the predictions about CDC's long-range plans: "Marketing the information is precisely what Control Data sees as its ultimate target. That provides the corporate motivation behind Deer Valley and CDC's other agribusiness projects." CDC's Ralph Thomson sees agriculture and rural development as "our greatest challenge in the 1980's, not only for the U.S. but for all the Third World countries as well."

Are the farmers striking a mutually advantageous deal with CDC, or are they stumbling into a masterminded trap that will ultimately make them obsolete? For the present, those who have come into contact with CDC haven't voiced the high level of suspicion that the alternative technologists and social critics

have evidenced. Is this because the farmers don't (or can't) concern themselves with the long-term, world-encompassing point of view of which the critics are so proud? Or is it rather that they don't suffer from the paranoia that also characterizes the critics?

Ultimately, the monopolization of agricultural information by a corporation is unlikely to benefit food producers or consumers. The computer technology that CDC is offering may actually aid in the production and distribution of food, but this same technology *could* be developed under the control of the farmers and the eaters. If that doesn't happen soon, however, it never will. You don't have to be a city slicker to know that the market abhors a vacuum.



Footnotes

1. See *The Loss of the Family Farm*, available from Agribusiness Accountability Publications, Box 31331, San Francisco, CA 94110.
2. After the Evanston meeting, a report called *Control Data Control Data Control Data Control Data -- A look at the Small Farm and Appropriate Technology Programs of Control Data Corporation* was published to foster continued discussion of the situation. The eight page tabloid is available for \$.50 from: CDC Monitor, Agribusiness Accountability Publications, Box 31331, San Francisco, CA 94110. Bulk rate, \$.10 each for 25 or more.
3. David Born, "How a big corporation sponsors small farmers," *Farm Journal*.

Public Radio at the Crossroads: Pie in the Sky?

by Steve Heimel

The Public Radio Satellite System could become one of the most powerful decentralizing communications tools ever created, but it may never attain its potential. Public radio does not seem to be equal to the task of making the satellite system anything more than a fancier way of moving pre-prepared tapes around, rather than as a medium for interactive and innovative real-time programming.

Non-commercial radio has always been kind of dull. Ten years ago, when it was even more unexciting than it is today, the tax-funded Corporation for Public Broadcasting (CPB) set up its own radio network -- a centralized system of program origination for providing the stations with more attractive, well produced programming. This network, known as National Public Radio (NPR), differed from its equivalent agency in public television because it created the programming itself, instead of simply distributing programming made by the stations.

This step was necessary ten years ago. At that time, the individual stations didn't have enough resources or imagination to put out radio capable of attracting large audiences. Now, however, the stations do have the resources to do their own programming and they still aren't attracting the audiences. Perhaps they are falling short in the imagination category.

Public radio has improved, both because of the NPR program production and because the stations are beginning to put out their own. But NPR still maintains control of the way the programming is distributed, whether by satellite or other means, which puts it in an ideal position to freeze out any production competition -- from the stations or anywhere else.

Headwaters is an independent radio production group in Pittsburgh, Pennsylvania which reports on science, technology, industrial development and environmental issues.

The System

Applications for communications satellites are multiplying like jackrabbits, but nobody in radio has yet come up with a system to match what NPR's Public Radio Satellite System (PRSS) can do. The only one that comes close is the Washington-based Mutual Broadcasting System, which has found it economically convenient to replace its long-lines telephone feed system with a set of three satellite transponder channels. The receive-only ground terminals are being installed at Mutual affiliate stations this year.

The taxpayer-financed Public Radio Satellite System is already on line, and it is clearly superior. It connects about 150 stations now and will reach 207 when fully installed. Seventeen of them are equipped with uplink capability -- they can send a signal out to the satellite transponders as well as receive it. NPR plans to lease out as many as twelve transponder channels, but only four are currently in use. By the middle of next year a queueing system will enable member stations to set their equipment to automatically store the programs received from the satellite that they want to broadcast.

Satellite interconnection brings many advantages. Programs move with little quality loss. The system is capable of stereo. Because the need to ship tapes is reduced, programming can be distributed faster. Stations can communicate among themselves, with regional and common-interest linkages possible. Real-time live programming is possible in new and fascinating ways.

There are also disadvantages. For one thing, the system does not include all public radio stations. Only seventeen of the stations can feed live material into the interconnect



Photo courtesy National Public Radio

Programs are transmitted to the WESTAR communications satellite from 16 origination points around the country. The satellite amplifies and re-transmits the programs for reception at ground terminals serving public radio stations.

without buying telephone lines. And the technology may be needlessly cumbersome. By getting such an early start, CPB has saddled its stations with expensive 32-foot Rockwell International dishes and first-generation receiving equipment designed for the lower-power, lower-frequency (4 - 6 GHz) satellites. Newer satellites operating at higher powers and frequencies make such elaborate equipment unnecessary. Mutual's dishes, for instance, are only ten feet in diameter.

The most serious disadvantages, however, may come from the way the use of the system is being approached. In an attempt to make PRSS self-sufficient, the NPR Distribution Division has set up a structure of fees to be paid by those putting signals into it, that is, generating programs from outside. There is also a handling fee for the uplink station and other fees for registration, indemnification, etc.

Of the four channels currently being used, the NPR Program Service generally occupies channels one and two. All material from other sources is fed through the other two channels, grouped by NPR under the rubric "Extended Program Service." We will learn

more about the future of channels three and four when NPR issues its report on the first three months of system use.

Who Makes Radio?

The increased funding and incentives made available through the Public Broadcasting Act of 1967 brought improvements to public radio. Much credit for this goes to the NPR Program Service which dispenses clean, beautifully produced and sometimes even meaningful radio for member stations from its Washington, D.C. production center.

Other production initiatives have been arising from smaller, community-licensed radio stations which are not so closely tied to the public broadcasting bureaucracy. Community groups rather than educational institutions hold the FCC licenses for these stations. They tend to involve many non-professionals in their operations, and while sometimes erratic, their work tends to have a lot of vitality and be tied closely to the grassroots.

About fifty such community broadcasting groups belong to the National Federation of Community Broadcasters. Most of them have

not been provided with satellite interconnections because they are thought by CPB to be too small and specialized. No community station has an uplink, which is particularly unfortunate because of the high level of creativity and innovation many of them display.

Of course, the money -- and therefore a great deal of the talent -- is still in commercial radio. However, there has been some crossover into noncommercial radio by people attracted to its creative latitude.

All of these factors are contributing to a growing "independent producer" movement, a trend which appeared earlier in public television. More and more make-your-own-radio is turning up, much of it highly innovative.

Innovative work outside the public broadcasting establishment frequently takes place at the personal expense of the producers, many of whom can afford to make radio only in their spare time. They know their work can be heard through such community radio tape exchanges as the Pacifica and NFCB Program Services, whose libraries have been rapidly filling with more and more award-quality material. But these services are rarely able to provide much compensation to the producers.

Who Wants Radio?

There are approximately a thousand non-commercial radio stations on the air today but only 207, about a fifth of them, will be connected to the Public Radio Satellite System. Some of the excluded stations are so small and specialized that the satellite would be of no use to them, but many others could make more imaginative use of the PRSS than the stations that have it.

The stations that do get the independent productions through the Extended Program Service don't seem to have much use for them. These stations usually belong to a college or, even worse, to some regional or state public broadcasting authority. Such bureaucracies tend to operate rather slothful, elitist facilities which are conservative enough to avoid unpredictable and controversial involvements.

The regular NPR Program Service, on the other hand, is available to such stations at no cost as one of the benefits of membership. It provides much of the outside programming they need -- for instance, continuous news and feature programming during both morning and

afternoon drive-time periods. The material is well-produced and well-financed, much of it by taxpayers.

This state of affairs discourages participation by independent radio producers who are likely to have difficulties marketing their work to stations that already have what they consider to be a fine product available to them. It seems reasonable to assume that the stations most likely to be interested in innovative programming will be those that are the most lively themselves -- and most of the liveliest stations are not included in the 207 that will be given the PRSS.

It gets worse. Not only does NPR's regular Program Service dominate public radio for the reasons of slickness and convenience mentioned before, but on the PRSS satellite system the Program Service material will take precedence over all other traffic.

As it stands, independent producers are told that they must insure themselves for a million dollars (no exaggeration) in case anybody sues the stations. And the distribution path between the producers and the stations is tortuous. For a fee, NPR will play your sample tape on channel three or four. For a bigger fee, they'll tell you who wants it. For an even bigger fee, they'll do it again. For even more, they will send out bills. By the time all those fees have been added into the program's price, nobody can afford to pay for it -- assuming any of the 207 stations on the satellite system was interested in the first place.

Now or Never for Community Radio

Lack of connection to the satellite system will not be a permanent state of affairs. Actually, it won't be long before anybody who wants one will be able to have a satellite downlink. Hell, they'll be selling them in Sears. Therefore, even the smallest stations will soon be able to receive programming from the NPR Program Service -- but will they get an uplink?

Given a sufficient number of uplinks, a satellite system such as PRSS has tremendous potential for *interactive* use -- news, for instance, could be done in a way that would really stretch and flex the system. Radio communities could be formed of people in different towns who are working on land use, public school, farm or environmental issues. They could compare notes and cross-assign by satel-

lite. News could be assembled which would set its agenda by issues instead of headlines, using many people actually in contact with real situations. Local music, storytelling, comedy and oral history could be exchanged. New radio forms which haven't been invented yet would no doubt spring up. Unfortunately, there are no plans to use PRSS for such purposes.

At this moment, certain deadlines are compounding the inequities of PRSS distribution and its implicit politics. NPR is not obliged to find uses for all twelve of those transponder channels, but it has to decide how many it wants by the end of 1981. In fact, NPR had to make a declaration on channels five through eight by May 1 of this year. They can add as many as four more channels at the end of this year but if they took only two in May, the most they could have in 1981 would be ten.

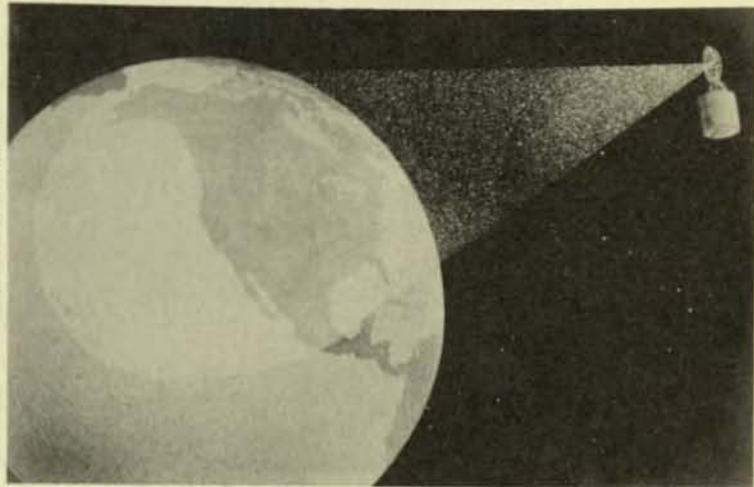
NPR could well take fewer than ten. Or maybe they won't take any more channels at all! Western Union, the satellite owner, wouldn't mind. The recent misfiring of two satellite launchings has created a logjam in the existing channels. They've got plenty of customers.

All these stumbling blocks serve to obscure the more fundamental conceptual flaws in approaches to the Public Radio Satellite System. Time is the critical element.

The wolves are close to the door. The most rapidly growing segment of communication satellite use is data management and there is a limit to how much satellite capacity can be orbited. In the long run, international treaties, interference and the physical limits of the technology are sure to bring a wave of digitalization which will put real-time use at a premium. The resource for noncommercial use exists now, but for a limited period of time.

It is not out of the question that over the next twenty months we will see a subdued failure in public radio. Independent producers may fail to fill up the channels and community radio stations may not see the potential of the technology. News people may fail to exchange material. The public radio stations seem destined to fail to come up with the kind of meaningful adaption to the satellite which would initiate interactive use and co-evolution of the elements of the system.

Photo courtesy National Public Radio



The signal coverage area (footprint) of the WESTAR satellite.

Programming instead may very well stay dull and preconceived and continue down its seamless path of insignificance. In the winter of 1981, the people at the NPR Distribution Division may scratch their heads and wonder whatever in the world possessed them to think that they'd ever need twelve channels of satellite transponders.

A step which adds a note of heightened urgency was taken in March, when the FCC decided to permit public television stations to lease out the use of their satellite dishes. Radio will follow soon.

It shouldn't interfere at all, you understand -- the new clients will simply use the existing dishes and hook their own demodulators to them. They can pipe the signal off to wherever they want. The dish doesn't care -- it just looks at the satellite and takes in all of its signal anyway. The stations can still get the same amount of signal they got before, with the same demodulators. They can also, as FCC Chairman Charles Ferris proudly told the Public Radio Conference in Kansas City last month, serve as a source of income for the stations, so they won't have to ask their viewers for money so often.

The fact remains that noncommercial facilities are being used for commercial purposes. The precedent is set. Today they're selling demodulator connections. Will it be transponder channels tomorrow?

The Politics of Participation

by Sandy Emerson

Reviews of:

Nelkin, Dorothy, ed. *Controversy: Politics of Technical Decisions*. Beverly Hills: SAGE Publications, 1979.

and

Nelkin, Dorothy. *Technological Decisions and Democracy: European Experiments in Public Participation*. Beverly Hills: SAGE Publications, 1977.

Dorothy Nelkin is an avid analyst of the growth and development of public participation in technological decision-making -- the process by which, over the last ten years, debates about new technologies have been forced to emerge from the laboratory (and the corporate boardroom) and face increasingly skeptical public scrutiny. These two books and a recent article* present a number of case studies which illustrate various forms of public participation in technological decisions.

Drawing on both U.S. and European examples, Nelkin categorizes some types of citizen participation and analyzes the factors which determine how much influence the public really can have. Nelkin's taxonomic approach provides both a useful index of various strategies and tactics, and a vocabulary for the debate over public participation.

Nelkin apparently favors public participation, but in general she tends to reject editorializing in favor of academic objectivity. Although she clearly details how token citizen participation is used by governments to give their decisions a veneer of legitimacy, she feels that "it is only through accommodation -- the working out of conflicting values -- that new political relationships . . . can evolve." Nelkin views such accommodation as a "realistic" goal, but -- as she admits -- the deck is heavily stacked in favor of those in power. Given such odds, it's hard to see how viable alternatives could emerge without some more dramatic and equitable contest, arbitrated not by "existing institutions" but by the people themselves.

Indeed, Nelkin does emphasize that the real issue is who's in charge: who has the last word, whatever the decision-making process. However, the inadequacy of most citizen participation attempts is further compounded by the way in which the controversies are framed. In the context of the requirement of global capitalism for short-term profits, the terms of the debate over technology are usually limited to immediate, quantifiable aspects while the more abstract and long-term considerations are ignored.

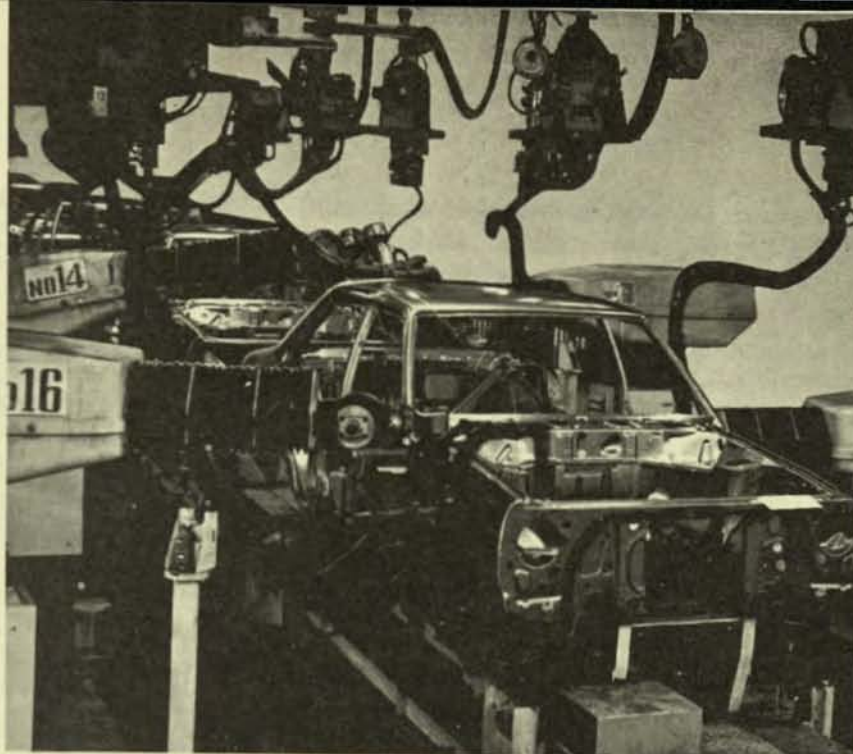
In a recent interview with *The Journal of Community Communications* Nelkin commented that the most effective means of public "participation" have been the clearly oppositional ones: lawsuits, protests, and strikes. In these, the focus is forcibly shifted away from contests over "expertise" to other fundamental issues such as jobs, the environment, or the economy.

Although the sense of frustration that usually accrues when people try to find their way into the decision-making process (even when their right to do so has been certified by law) comes across clearly in Nelkin's studies, the social change potential inherent in grass-roots opposition movements is given too little mention. Activism is valuable not only for its occasional victories, but also because it can give people training in collective action and a taste for managing their own social institutions.

* (Nelkin, Dorothy, and Michael Pollack: "Public Participation in Technological Decisions: Reality or Grand Illusion?", *Technology Review*, August/September, 1979)

Technology at Work

by Ron Rothbart



The Job Killers

Computer-aided manufacturing at the Nissan Motor Company in Japan.

Case Studies on the Labor Process. Andrew Zimblast, editor. New York: Monthly Review Press, 1979, 314 pages.

Harry Braverman's groundbreaking work, *Labor and Monopoly Capital* (Monthly Review Press, 1974) has provoked a flood of new literature on the labor process and the social implications of new production technologies.

In this new collection, one of Zimblast's aims was to counter the argument that while technological development can downgrade or eliminate jobs, it simultaneously creates new, more highly skilled and challenging work. In "The Industrialization of Computer Programming: From Programming to 'Software Production,'" Philip Kraft looks at the occupation of computer programmer as 'a litmus paper test' of the skill upgrading thesis, since the programmer is the creation and agent of "the most spectacular technology yet" and since programming directly and indirectly replaces other occupations.

Kraft finds, however, that the history of programming resembles that of other occupations. At first, the programmer was involved in every aspect of program design, information sequence and entry, debugging, and maintenance. Later, systems analysis (a high-level skill) became a separate occupation, as did coding (a more mechanical task.)

Currently, programming tasks are being increasingly divided up into sub-specialties and piecework, through the use of high-level (modular) languages, canned programs and

sub-programs, and structured programming, "the software manager's answer to the assembly line." In structured programming, subroutines or "modules" are assigned to low-level programmers who must follow rigid coding guidelines and need know nothing about the overall system of which their module is a part.

Moreover, although the number of programmers has been growing quickly, they still only make up half of one percent of the employed. "This is hardly a figure to take comfort from if programming is expected to take up the slack caused by technology induced unemployment," Kraft points out. Instead, these trends in the field of programming seem to show that "even the most complex work can be trivialized."

The social impact of the new production technologies is not limited to its deskilling effect alone. It also can destroy an occupational community and weaken the unity and power of a union. Herb Mills' study of longshore work, "The San Francisco Waterfront: The Social Consequences of Industrial Modernization," illustrates this process.

Longshore workers, says Mills, look back on the period from the late 30's to the 60's as a "golden age" when work wasn't routine. They could work a variety of jobs and locales, vary the pace and difficulty of the work, take leaves

of absence and work part-time or irregularly. Mills feels that these options "underwrote a sense of individual worth and personal autonomy."

When the International Longshoremen's and Warehousemen's Union won its fight to establish a union hiring hall, a more equitable distribution of work and income and a high degree of unity resulted. The common experience of the hiring hall, the cafe life of the waterfront and the cooperative style of work permitted the emergence of "a quite extraordinary world of discussion, reflection and debate and ... a sense of fraternity."

The actual work of loading and unloading ships was, according to Mills, complex and challenging. By comparison, modern longshore work is "utterly routine." The new technology associated with standardized cargo units makes for little variation. Operations, in fact, can be computer simulated before the vessel arrives. The work is less cooperative and can be more closely supervised. It is characterized by individual and small group tasks performed in relative isolation. The new technology has also dispersed the bases of operations, thus destroying the old waterfront neighborhood. In sum, longshore work no longer holds its former attractions and the old longshore community no longer exists.

Mills' study, like many others, analyzes the social *impact* of technology without asking about its design and development. In "Social Choice in Machine Design: The Case of Automatically Controlled Machine Tools," David F. Noble argues that production technology is not an autonomous entity which develops according to its own logic and then has an "outside" social impact. Rather, technology itself embodies social choices.

The design of technology and the manner in which it is employed are usually the result of management decisions, and their choices reflect their ideology, social position and relations with other members of society. However, what they decide is not the last word. The actual use of technology is determined by the balance of power on the shop floor.

Noble illustrates and substantiates his thesis by discussing the development of numerical control in machine shops. Numerical control is a method whereby the specifications for a machine part can be translated into electronic

signals which control the path of a cutting tool. The N/C tape thus circumvents the skill and experience of the machinist.

In tracing the development of numerical control, Noble finds that it was chosen over an alternative technology, record-playback (which inspired Kurt Vonnegut's *Player Piano*.) Since record-playback recorded the motions of a machine under the command of a skilled machinist, management was still dependent on skilled labor. Noble argues that management chose numerical control over record-playback in part because it saw this technology as a means of gaining complete control over the production process. Moreover, this technology was also deployed in such a way that the design and modification element -- computer programming -- was separated from its implementation -- machine-tending, thus further deskilling and fragmenting the production process.

In practice, numerical control turned out to demand more skill and motivation from machinists than had been anticipated. However, the choices made in machine design and deployment clearly reflected the interests of management.

Installing new production technologies such as numerical control is not merely an attempt to minimize costs. In part, technical control and job de-skilling help minimize costs by reducing worker resistance. In the case of numerical control, cost-minimization was not an imperative because machine design was government subsidized. The ideology of control, not the profit motive, was at work here. This ideology, says Noble, reflects "*the reality of the capitalist mode of production. The distrust of human beings by engineers is a manifestation of capital's distrust of labor. The elimination of human error and uncertainty is the engineering expression of capital's attempt to minimize its dependence on labor. The ideology of engineering, in short, mirrors the antagonistic relations of capitalist production.*"

The possibility of different kinds of deployment of technology is illustrated by comparing the use of the latest generation of numerical control, Computer Numerical Control, in different machine shops. CNC puts a micro-computer in each machine, making it possible to edit and even create programs at the machine itself. This amounts to the reintroduction of the record-playback concept in an updated digitized form.

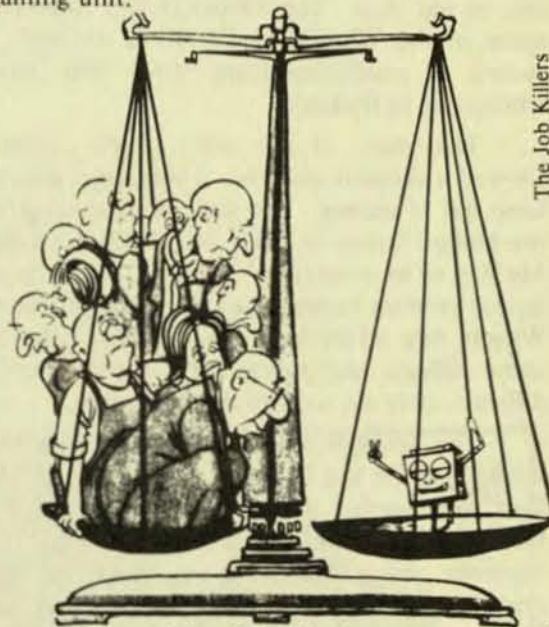
But at a typical plant in Massachusetts operators are not permitted to edit programs. "Managers are afraid of losing shop-floor control or confusing their tidy labor classification and wage system," Noble explains. By contrast, a unique set of circumstances has led to a different approach at a similar plant in Kongsberg, Norway. There, all operators are trained in N/C programming and can restructure as well as edit tapes. This is not a management job-enlargement scheme; it is the result of continual vigilance and struggle on the part of workers. Noble explains that "when management plans to introduce a new computer-based production system, for example, the union must assume as a matter of course (based on long experience) that the proposed design reflects purposes that are not necessarily consonant with the interests of the workers."

At Kongsberg a conscious struggle continues over the introduction of new technology. However, the economic, political and cultural factors that make this possible are uniquely favorable at Kongsberg. By contrast, the history of the International Typographical Union, told by Andrew Zimblast in "Technology and the Labor Process in the Printing Industry" does not make for optimism about successfully challenging the design and deployment of technology within capitalism. [In what follows, I am supplementing his account with other information.]

Despite the introduction of the linotype machine and a depression in the 1890's, the ITU was able to maintain an unusually high degree of job control because of a continually expanding demand for print media and the willingness of the New York local to strike when management tried to employ nonunion printers to operate the new machines. Newspapers are especially vulnerable to strikes because of the character of their market -- they are local, there is a new product each day, and the paper must maintain a steady relationship with its advertisers.

With the advent of the next wave of new technology in the 1960's -- typesetting, phototypesetting and word-processing -- the New York local was able to win a contract in 1965 which gave it veto power over new technology. However, the victory was pyrrhic. Between 1963 and 1967, four New York papers folded,

resulting in the loss of 971 regular and 140 substitute jobs. There were various factors involved, but the failure of New York papers to introduce labor-saving devices may have spelled the difference. In fact, the larger New York papers seem to have agreed to the veto in the expectation of the demise of their competitors. "It is possible," Zimblast points out, "that due to competition among capitals (be it municipal, national or international) the successful harnessing of technology by labor requires a focus that goes beyond the individual plant or bargaining unit."



The Job Killers

The remaining New York papers prepared for the next contract negotiations by forming communications conglomerates and establishing secret training centers for non-union employees. In 1972, a strike closed the *Morning Telegraph*, eliminating 260 more jobs. In May, 1974 the *Daily News* was able to keep publishing during a strike with only 35 non-union employees. Influenced by these developments, in August, 1974 the ITU surrendered its veto over technology in exchange for lifetime job guarantees and other benefits. Both sides recognized that the benefits "represented the last hurrah" for the typographical union.

Zimblast concludes that if militant unionism could reshape technological development, the printers would have been able to do it. Their eventual capitulation shows that "the actual reshaping of technology is the task of a broad political movement. . . . The sufficient condition may be an entirely different mode of production."

Communications and Coercion: the Creation of War Hysteria in World War I

by H.L. Mencken

from *Notes on Democracy*, 1926

Government under democracy is ... government by orgy, almost by orgasm. Its processes are most beautifully displayed at times when they stand most naked -- for example, in war days. The history of the American share in the World War [W.W. I] is simply a record of conflicting fears, more than once amounting to frenzies.

The mob, at the start of the uproar, showed a classical reaction: it was eager only to keep out of danger. The most popular song, in the United States, in 1915, was "I Didn't Raise My Boy to be a Soldier." In 1916, on his fraudulent promise to preserve that boy from harm, Wilson was re-elected. There then followed some difficult manoeuvres -- but perhaps not so difficult, after all, to skillful demagogues.

The problem was to substitute a new and worse fear for the one that prevailed -- a new fear so powerful that it would reconcile the mob to the thought of entering the war. The business was undertaken resolutely on the morning after election day. Thereafter, for three months, every official agency lent a hand. No ship went down to a submarine's torpedo anywhere on the seven seas that the State Department did not report that American citizens -- nay, American infants in the their mothers' arms -- were aboard.

Diplomatic note followed diplomatic note, each new one surpassing all its predecessors in moral indignation. The Department of Justice ascribed all fires, floods and industrial accidents to German agents. The newspapers were filled with dreadful surmises, many of them officially inspired, about the probable effects upon the United States of the prospective German victory. It was obvious to everyone, even to the mob, that a victorious Germany would unquestionably demand an accounting for the United States' gross violations of neutrality.

Thus a choice of fears was set up. The first was a fear of a Germany heavily beset, but making alarming progress against her foes. The second was a fear of Germany delivered from

them, and thirsting for revenge on a false and venal friend. The second fear soon engulfed the first. By the time February came the mob was reconciled to entering the war -- reconciled, but surely not eager.

There remained the problem of converting reluctant acquiescence into enthusiasm. It was solved, as always, by manufacturing new fears. The history of the process remains to be written by competent hands: it will be a contribution to the literature of mob psychology of the highest importance. But the main outlines are familiar enough.

The whole power of the government was concentrated upon throwing the plain people into a panic. All sense was heaved overboard, and there ensued a chase of bugaboos on a truly epic scale. Nothing like it had ever been seen in the world before, for no democratic state as populous as the United States had ever gone to war before. I pass over the details, and pause only to recall the fact that the American people, by the end of 1917, were in such terror that they lived in what was substantially a state of siege, though the foe was 3000 miles away and obviously unable to do them any damage.

It was only the draft, I believe, that gave them sufficient courage to attempt actual hostilities. That ingenious device, by relieving the overwhelming majority of them of any obligation to take up arms, made them bold. Before it was adopted they were heavily in favour of contributing only munitions and money to the cause of democracy, with perhaps a few divisions of Regulars added for the moral effect. But once it became apparent that a given individual, John Doe, would not have to serve, he, John Doe, developed an altruistic eagerness for a frontal attack in force. For every Richard Roe in the conscript camps there were a dozen John Does thus safely at home, with wages high and the show growing enjoyable. So an heroic mood came upon the people, and their fear was concealed by a truculent front. But not from students of mob psychology.



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