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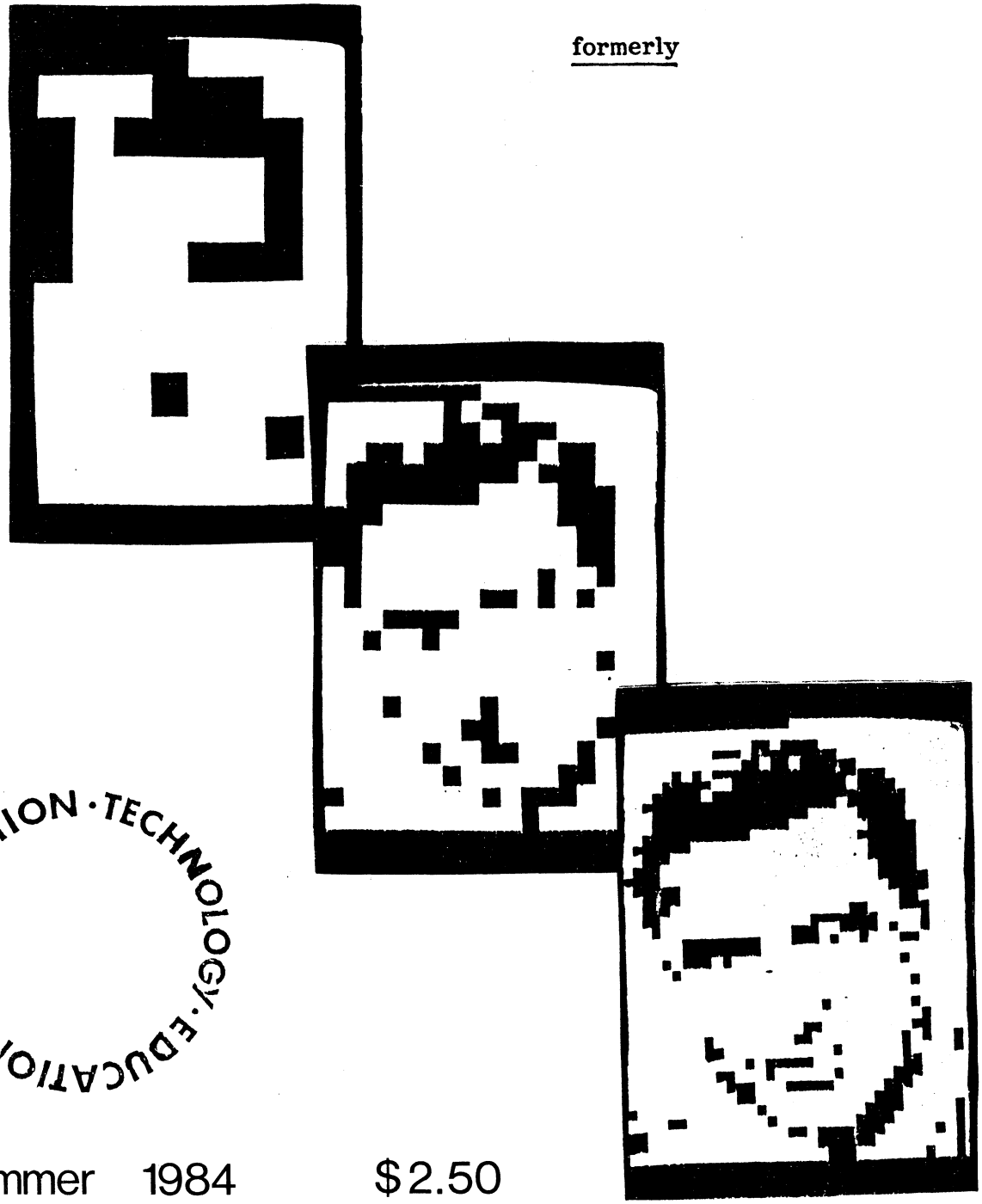

INFORMATION · TECHNOLOGY/EDUCATION

Summer 1984 $2.50

24 Education Links

Contents

Education Links is produced by a group of teachers, students and university staff working to bring about democratic and socially progressive change in Australian schooling, as part of a board political movement toward a socialist revolution in Australia. The magazine aims to present a socialist analysis of a wide range of teoretical and practical issues in education and is not affiliated with any political party.

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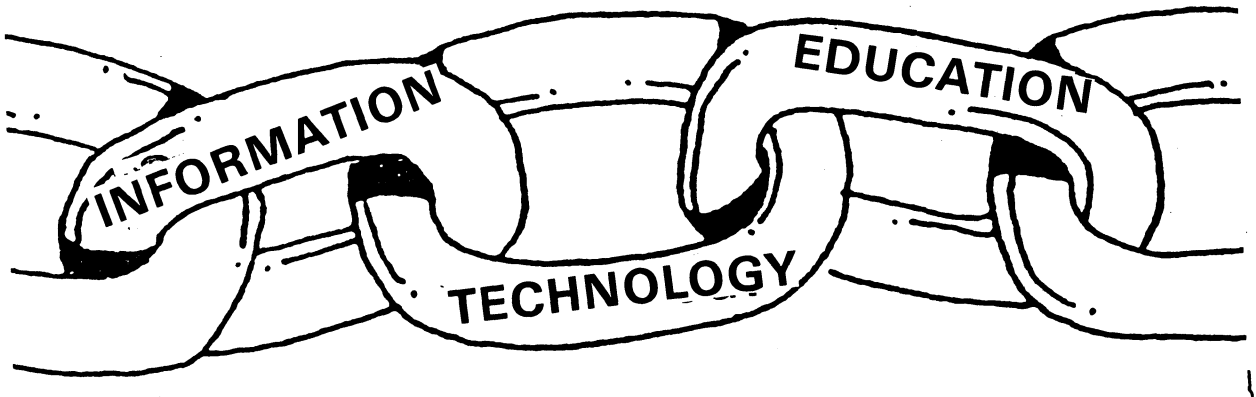


In *RED 11*, the "Dossier" focussed on Computer Education *before* these were "buzz-words". The four years of recession since then have seen microcomputers move from the prodigy to the commonplace. Word-processors have changed from something we'd heard of to something we've all encountered. The developments of which these processes are a part have had far-reaching consequences for education.

So it's time we focussed once more on information technology (I.T.). We are aware that this is not the only new technology of profound, though we doubt "revolutionary", importance. Bio-engineering, to name only one other, is no less significant for its lack of space in this issue!

Last time we called our editorial "Computers through RED Glasses". In *Education Links 24*, we try to extend our analysis further than computers, to information technology as a whole. Though we wish to continue developing a socialist perspective, we would like to reach a wider readership, "linking" into progressive "networks" within the community.

It is a pity that No 24 has a New South Wales "bias" (though we suspect that similar things are happening in other states, possibly faster). This emphasis was not intended, and we would welcome future contributions from interstate to overcome this.

We will not attempt to outline in this small space all concerns of No 24. The overview article, put together by Terri Seddon with considerable collective input, does this in some detail.

The interview with Stephen Hughes explores the relationship between the growth of technology and the development of capitalism. Hughes shows how the social relationships which developed under capitalism have influenced the form and direction of I.T. He also makes suggestions about how these issues might be raised by radical teachers.

John Bowker gives positive and practical examples of how this technology can be used by progressive forces.

Jan Butland looks at what is happening with computers in schools across Australia and in New Zealand, and considers the pros and cons of various approaches.

Education Links 24 contains much more which we will leave you to explore!

We invite collective or individual contributions to *Education Links 25* for early in the New Year. This issue will be on Women and Education, as was *RED 6*. Socialist theory and practice have developed in this area, too, in the meantime, and deserves a wider audience.

See you in No 25!

What is *computers in education* all about? Children weren't taught to use the telephone or television — why are computers different? Why teach computer awareness when computers are everywhere? Why is it now, in the 1980's, in a time of economic recession, that the big push for computers in education takes place?

There are lots of questions. Teasing them apart is difficult but essential. Today computers seem to be flowing into schools without question. At a recent computer conference in Sydney, nearly all the papers seemed to see computers as "A Good Thing". But who are they good for? The students? Teachers?

The collective has grappled with some of these questions. We are concerned that an agenda for *"computers in education"* is emerging which pre-empts important debate about relative benefits and dangers of the new technology. We sense that "gee whizzery" and a crisis mentality are sweeping people along in an uncritical search for panaceas.

I.T. MORE OF THE SAME?

Computers, information technology and all that hype

This overview is an attempt to examine some of the complex issues involved in computers in education in the 1980's, providing a provisional map to the new technology. It is important to note that we do not take an anti-technology approach. We see technology both helping and hindering the struggle for a more egalitarian society. But seeing the cracks and fissures in the apparent monolith which is capitalism depends upon our position. Like cracks in a wall, if you stand too close, they seem enormous. Stand too far back, and you see only the wall. Our developing understanding involves seeing both the wall and the cracks, and realistically putting them into perspective.

Computers in education, I.T. and N.I.T.

To talk of just "computers" is really old hat. The new buzz phrases are Information Technology (I.T.) and New Information Technology (N.I.T.). But the new phrases are more than just trendy, they mark a new level of integration in the microprocessor, telecommunications and satellite fields. We use the term I.T. here because it better represents the integrated character of the information industry.

Developments in military research during the first and second World Wars provided the ground work for the I.T. "revolution". Computers were developed for the Manhattan Bomb project. Radar provided the impetus to the development of semi-conductors, solid state transistors and integrated circuits. Through the 1950's these two lines, with heavy US Defense Department funding coverged, giving practical solid state computers by the 1960's.(1) Although there was extensive military application for the new microprocessing technology, commerical applications were more tentative. This is reflected by the slow entry of large corporations such as IBM into the microprocessor field. Through the 1970's the main commercial application was in hand-held calculators and computer games. Since then commercial strategy has focussed on the business information system, the "electronic office" based on the word processor, and the domestic information system, based on the television. These developments hinge on the convergence of microprocessor and telecommunications technology. The battle lines have been drawn for massive corporate struggle for control of the I.T. industry with monopolists in the computer field trying to enter telecommunications while preserving their own monopoly, and vice versa.(2)

I.T. is then, the product of a complex computing/communications industry which at present comprises a highly competitive mix of large multinational and small companies providing military, business, domestic, educational and leisure I.T. applications. These include computers, electronic information transfer equipment, records, cassettes, TV and radio. The industry is organised on an international level with financial and intellectual resources, and power, concentrated in a few First World countries. Actual production occurs globally where labour is cheap and social conditions appropriate.

The vision of I.T., as clean and scientific, providing unlimited access to information and information transfer facilities, glosses over the private control of I.T., the unhealthy and exploitative conditions of its production, the corporate struggle for control of the industry and the inevitable emergence of enormous information multinations — all of this leads to massive centralisation of power with important social implications.

The managing-director of Olivetti noted in 1979:

> The taylorisation of the first factories ... enabled the labour force to be controlled and was the necessary pre-requisite to the subsequent mechanisation and automation of the productive process. In this way taylorised industries were able to win competition over the putting-out system ... Information technology (microelectronics) is basically a technology of co-ordination and control of the labour force, the white-collar workers which taylorian organisation does not cover.(3)

But I.T. extends beyond co-ordination and control

of the office. The office and "home of the future" are constructed around essentially similar information systems shaped, controlled and produced by a decreasing number of multinational corporations. I.T. therefore provides channels for heightened corporate control of both public *and private* life by extending the process of Taylorisation to the office and even the home.

To talk of just "computers" is really old hat. The new buzz phrases are Information Technology (I.T.) and New Information Technology (N.I.T.). But the new phrases are more than just trendy, they mark a new level of integration in the microprocessor, telecommunications and satellite fields.

I.T. then, is a development which centralises power on a global scale. For all the talk about "computers in education", this is really only one fairly small section of an international I.T. industry.

I.T. and schooling in perspective

The rhetoric of crisis, post-industrial society and the third technological revolution floods the media. I.T. is presented as the way of the future — inevitable progress leading to a brave new world. It is easy to be swept along by this technological determinism and forget that the hype is simply a way of legitimising technological change which *is* under human control. Similarly, the rhetoric of change can mask important continuities so we neglect to ask how big a change I.T. really represents.

I.T. has produced changes in the labour process. But capitalism has always been a technologically dynamic system: I.T. pervades many facets of social life in addition to work. But so have refrigerators, telephones, and further back, gas lighting. What we must remember in all the hype, is that I.T. is one more product of a system which pursues profit at any social cost.

Our thinking about I.T. must therefore proceed on two levels. The first sees the *continuities* — between I.T. and all other capitalist technology, between schooling with and schooling without computers. These continuities grow out of the character of capitalism — a class-based system of production for profit rather than social need. The second level focuses on the *specifics* — the features of I.T. compared to other technology, and the particular effects of I.T. and computers in education in contemporary crisis-ridden capitalism.

Some continuities: an overall view

One continuity is the relationship between capitalism and technology. Broadly, there are three commonly adopted positions toward technology in general and I.T. in particular:

— Technology equals progress and progress is good. This common view assumes a consensual society where differences of interest are temporary and are resolved in the common good.

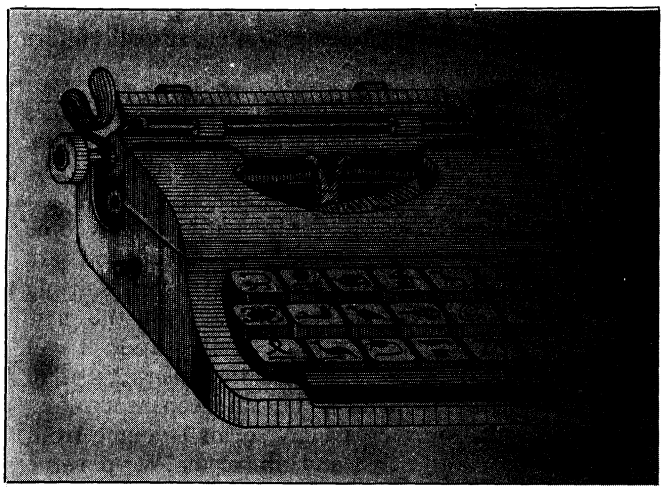
— Technology is neutral, but existing in a society where there are more or less powerful groups. In this context, neutral technology is used in the interests of the powerful to the detriment of the powerless.

— Technology is not neutral, it is capitalist technology. Technology is a product of our existing capitalist system in which the promotion of particular research, the development of particular innovations and their applications in particular ways are shaped by the dual concerns of maximising profitability and ensuring class domination.

Our analysis of technology builds on the last position(4). This does not mean that technology should be resisted at all costs. Rather, we see technology as the double-edged product of an unequal society. It has incidentally improved the quality of life of sections of the working class; but more fundamentally it has supported existing patterns of power, and limited the development of a more equal society. A discussion of technology is only meaningful if it includes a critique of existing exploitative social relations and a vision of a technology, shaped by different social imperatives.

Another continuity is the relationship between capitalism and schooling. Mainstream educationists do not recognise "capitalism" as such. Instead they talk about "influences from the social context". The social context is seen to comprise a series of discrete "factors" which act on education. A more fruitful position is to see education as linked to capitalist social arrangements. This includes training children to become future workers and responsible citizens by shaping their "knowledge, skills and attitudes". In addition, schooling serves to maintain existing patterns of power by legitimising the status quo and perpetuating a predominant ideology which shapes peoples' thinking and practice.

Both schooling and technology are therefore significant in capitalist production and reproduction. Of course, neither continuity is entirely smooth and functional. Resistance and struggle occur because capitalism is an inherently conflict-ridden system. Any development within the capitalist system is therefore inevitably infused with class antagonisms.



Some specifics: a closer focus

I.T. is different from other technology in a number of ways, although the difference is often only one of degree.

Capitalist technology has always displaced and deskilled labour and has tended to make people the extension of the machine. I.T. follows these tendencies. People's apprehension about I.T. is justified when the Federal Minister for Science and Technology writes:

> Computerisation has the same aim as contraception — to eliminate people. The contraceptive pill has done for the birth rate what the silicon chip is intended to do for the labour force.(6)

Apprehension about I.T. shows people's "good sense" when US researchers working on artificial intelligence and general problem solving argue that:

> ...there is greater economy and efficiency in trying to educate human beings to react to stimuli in the same way that a computer responds to programming, than in fitting the computer to fulfil human needs.(7)

Because computers are presented as "thinking machines" the fear of being controlled by the machine is intensified. This is increased by the very precise controls and commands required to make the machine run. Thee is no place for human variation or impulse. Any deviation from the set commands is met with ERROR — the human subject has erred. The effect of all this is to distort: the machine appears god-like and above human control. It becomes the focus of our fear, apprehension and antagonism. It's the machine which appears to take jobs and deskill workers. And this serves to take attention away from the real roots of our alienation.

I.T. distorts also by reifying information. In reality information is a process of making sense of the world so we can act in it. It is a process of knowing, which involves understanding meanings that are embedded in history and particular social contexts. We come to know through acting and interacting in the social world. But I.T. pre-packages information into fixed, consumable bits shaped by its limitations — its binary logic, its production by I.T. experts. Social meaning is replaced by pre-defined corporate meaning derived from the experience of US, Japanese or Western European technocrats working for the information of multinationals. Through I.T., "first world" meanings suffuse the globe producing an homogenised international culture and transnational people.

When information becomes a commodity, it becomes a thing to be acquired and possessed, bought and sold. It provides the basis for class fragmentation along the fracture line of the information-rich and information-poor. Those without access to information will become the next group of "disadvantaged". These tendencies are not new but with I.T. the process is intensified, shifting the patterns of access and control. With the new concentration and centralisation of information it will be IBM or other transnational corporations rather than a medieval church, which is the gatekeeper of information. Information increasingly seems to come from outside ourselves and to stand above us. We devalue our own understandings in favour of information from experts upon whom we become dependent. We lose the ability to challenge what we see around us because "we do not have enough information". Our ways of knowing are reduced to the computers' ways of knowing, we see the world through the "eyes" of I.T., through the commodity and the market place. The world appears as one of atomised individuals, exchanging, acquiring, fighting for self in the dog-eat-dog world of contemporary capitalism.

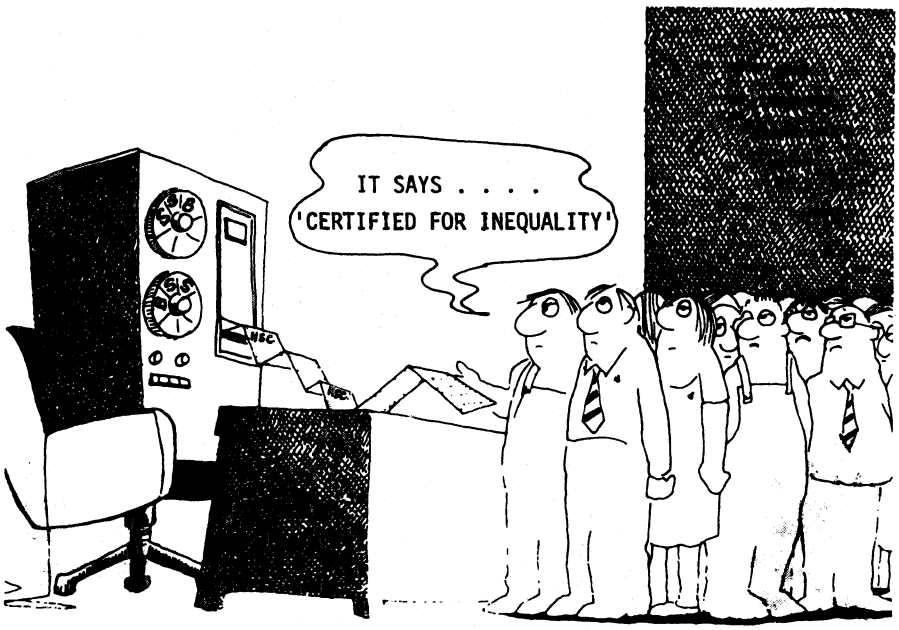
I.T. and the contemporary crisis

Critical in our analysis of I.T. is the current international capitalist crisis. Its economic dimensions include overproduction of goods, the expansion of credit, fierce competition for markets and ruthless cost-cutting to ensure profitability. Rising unemployment has been the obvious outcome. The political dimensions are potentially enormous. Capitalism is already a less than global system. The increased exploitation necessary to renew profitability can only threaten remaining capitalism. The costs of crisis in the affluent countries have been relatively small compared to Third World countries where for many even basic needs — food, shelter — are denied. How long will South Africa, the Philippines and South American countries be able to deny their people justice? Even in the affluent countries the benign face of capitalism is slipping: violence against miners in Britain, youth unemployment which shows that education alone won't get you a job, resurgent fascist rhetoric articulated by the respectable as well as the ratbag right. People are seeing through to the nasty side of capitalism. But with an atomised, individualistic consciousness locked into the logic of commodities and exchange, the response is cynicism, individual scapegoating and a sense of betrayal.

"Recovery" from crisis demands massive restructuring to renew profitability and to contain class antagonism. With the deepening economic recession, I.T. has become particularly significant. First, overproduction in the I.T. industry has led to ruthless competition, very rapid technological development and an "aggressive marketing campaign"(8). The entry of the massive IBM into the personal computer market sent shockwaves through the industry because of its power to undercut smaller competitors. Second, I.T. marketing has been well received by other sections of industry, keen to cut back on production costs. The advantage of I.T. to companies is summarised by Wiener, the father of cybernetics: "Let us remember that the automatic machine ... is the precise economic equivalent of slave labor. Any labor which competes with slave labor must accept the economic consequences of slave labor"(9). Third, I.T. has been particularly attractive because it increases labour discipline by directly regulating the rhythm and speed of work; the "thinking machine" becomes easily the focus of antagonism, it shapes human consciousness and reinforces a sense of alienation. Why not just enjoy yourself, there's nothing you can do. Listen to more records wailing about love, watch more telly in the privacy of your home, prepare for war with one more game of space invaders.

In Australia, the effects of the international economic crisis relates to our place in the reorganisation of the

Pacific region. This corporate "Pacific Rim strategy" involves a division of labour among countries bordering the Pacific. The US and Japan supply capital, technology and expertise; Australia, Canada and New Zealand provide foodstuffs, raw materials and energy; the former colonial areas supply cheap raw materials and labour. The consequences of the Pacific Rim strategy in Australia have been the decline of manufacturing and the shedding of labour as production is moved "off-shore" and an increasing emphasis on capital-intensive industry to maintain a technological advantage as competition becomes more intense in the international marketplace (9). In this context, interest in "sunrise" industries, talk of the leisured society and changing conceptions of work, and concern to expand educational provision and skills, can be seen as responses to the dual political threats of long term structural unemployment and national decline. It is against this backdrop that we begin to understand the current push for, and hype about *computers in education.*



Why "computers in education"?

In times of crisis the relative significance of the school's role in training the young, and maintaining the status quo through class domination and ideological legitimation, shifts in favour of the latter. But simultaneously, schools are a drain on state revenues which increases concerns for cost-cutting and efficiency, and they are a site of struggle in which the stratified teaching service aligns with conflicting class interests. The restructuring of education reflects these multiple concerns.

In the present crisis the restructuring of schooling has been rapidly and relatively easily achieved. High youth unemployment makes it reasonable to suppose that the schools are failing, after all kids used to get jobs when they left school. The logical solution is to change the schools. Academic courses and schools for some, "relevant" courses for the rest — the rest now destined for deskilled work or the new "leisured" status. Because "computers are taking our jobs" it is sensible to teach about computers, perhaps then our kids will get jobs. Educational restructuring and computers in education appear as the way forward, the way out of the crisis, they are a "Good Thing." But they also represent educational panaceas for fundamental social problems.

Who benefits and what are the effects of computers in education? Are they best for children or do they simply prepare kids for a life in which I.T. is taken for granted? What effect does learning through computers have on children's social development? Is the chatty language of the computer software enough to compensate for the reduced social interaction with peers and teachers? What is the moral effect of endless games of star wars, of bombs and comic figures in educational packages, and the violent and controlling command language — "Kill the file", "Abort a program" — which subjects the user to a precise pattern of actions determined in advance by some expert? What is the cognitive effect of shaping learning to the linear form of a machine? What will be the result of arresting language and understanding, fixing them in pre-defined corporate forms? Can there be real individualised education when structure and strategy is forced on the "user" (once called a learner) by the limitations of hardware and software?

And do they benefit teachers? I.T. has the potential to displace and deskill teachers. The introduction of I.T. has accompanied growing demands for accountability and efficiency as the fiscal crisis of the state deepened. Resistance to I.T. has weakened with rising teacher unemployment. Has I.T. replaced teachers? What are the implications of the usual assumption that educational I.T. can be funded within existing education budgets? Is it a coincidence that the fundamentalist ACE schools with a heavy emphasis on computerised education have few teachers? What provisions for I.T. in-service and pre-service training exist? What will be the balance of "gee whizzery" to socially critical content in these courses? Will it be possible to avoid the development of an I.T. elite in the teaching service?

If the benefits of I.T. are ambiguous, we are thrown back to the question: "why is I.T. pervading our schools?" The argument that computer education will help children

get jobs is questionable. For most people, working with computers will mean highly deskilled work. Little training is required to learn the sequence of buttons to be pushed and when. For these computer workers on the job training would surely be the most economic. The elite, highly trained computer worker is not trained in schools but often in private institutions such as Control Data. It would be uneconomic and politically inappropriate to disseminate sophisticated computer skills to all. School computer education would seem to have little relevance to future computer employment.

We would argue that the introduction of I.T. is most significant as a facet of restructuring concerned predominantly with the maintenance of class domination. I.T. is a means of social control of both teachers and students within schools, and more general control external to schools. The shaping of a "commodity consciousness' with its atomised, alienated individualism undermines the social practice necessary to confront the structural roots of exploitation and oppression. The individualisation of learning tends to deprive students of the oppotunity to develop a social understanding of the world, an appreciation of structural arrangements and the possibilities of resistance. The reification of information intensifies powerlessness and dependence on experts. it reinforces compliance to the machine and passivity toward authority. Economic and political centralisation means that I.T. serves as a form of imperialism. Satellites do increase the possibilities of long distance education, but also facilitate surveillance and a decreased need for teachers. Transnational I.T. can be spread to all corners of the globe — a doubtful benefit of the "new egalitarianism".

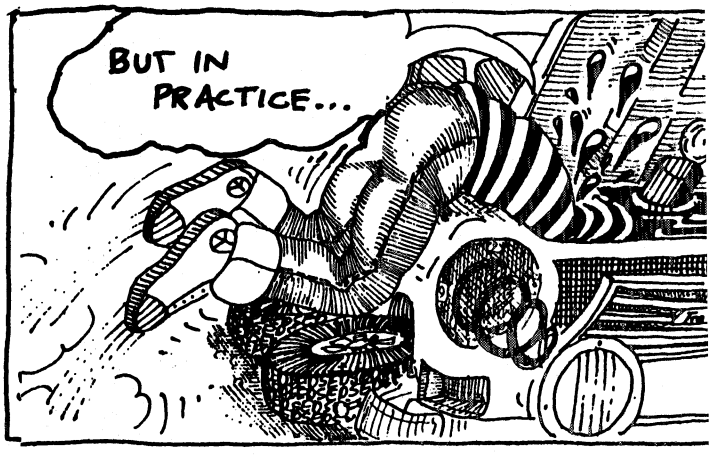
Information increasingly seems to come from outside ourselves and to stand above us. We devalue our own understanding in favour of information from experts upon whom we become dependent ... Our ways of knowing are reduced to the computers' ways of knowing, we see the world through the "eyes" if I.T., through the commodity and the market place.

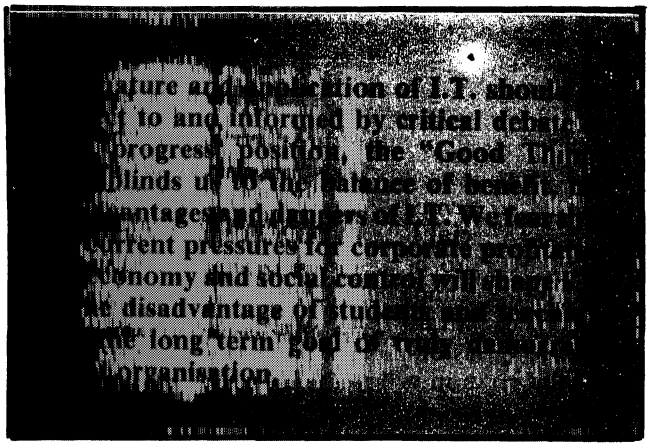
It is unrealistic now, to reject I.T. First, because educational applications of I.T. are out of the control of the educational sector. The spread of I.T. is a function of the industry's marketing campaign and its growing social acceptance into people's lives. Second, although we may fear the effects of I.T. on children and society, we must also recognise the educational benefits of I.T. Radio and colour television have enriched schooling. Children are enthusiastic about computers and may well learn easily from them.

But to accept that I.T. is with us, that it forms part of the wall of contemporary capitalism, is not to resign ourselves to the dictates of corporate I.T. We argue that the nature and application of I.T. should be subject to and informed by critical debate. We are concerned that the "progress" position, the "Good Thing" view blinds us to the balance of benefit, the disadvantages and dangers of I.T. We fear that the current pressures for corporate profitability, economy and social control will shape I.T. to the disadvantage of students and teachers, and the long term goal of truly democratic social organisation. The challenge for us in the 1980's is to see the present with a view to the future, to see the wall *and the cracks.*

I.T. and social transformation

It is easy to become overpowered by the weight of capitalist technology and the sheer effectiveness of capitalist institutions like schools. But to see only this is to deny history, to deny the contradictory character of capitalism in which solutions carry the seeds of new problems. It is to deny the "good sense" of people — active and creative despite the destructive and fragmenting effect of life within capitalist social relations. An important instance of this is the popular view that I.T. will facilitate communication and access to information. The "good sense" in this view is the valuing of social interaction as a way of countering the atomisation and fragmentation of life. The mistake is to see the desire for interaction and community as amenable to a technical solution *alone.* What is necessary is to connect people's critical insights to a discourse which enables them to make connections between aspects of a seemingly fragmented world and encourages social practice. A





discourse which offers genuine solutions and a vision of alternatives.

I.T. is capitalist technology but it is not entirely functional for capital. As a technology I.T. can be used to socially progressive ends, to ease collective work and to present a critical view of society to a wide audience. The effect of I.T. on the labour market is massive deskilling. But this increases *common* work experience providing the material basis for developing increasingly convergent views of the world and potentially a basis for greater working class organisation. People will act politically if their job is at risk or their work conditions threatened. Such social action provides conditions for extending people's critical insights and understanding of our social system. Even for the elite scientists and technologists, the nature and fragmentation of intellectual labour in the I.T. industry tends to increase individual frustration, leading to social solutions such as informal networking. Finally I.T. does increase potential human power through technical means. Such benefits would be useful, although not essential, in the transition to a truly democratic system. What all this means is that I.T. is a site for struggle and questions of control, access and content must be high on the agenda.

The introduction of computers in schools and the formalising of computer awareness courses can be viewed with mixed feelings. They could just mark a new and powerful form of class domination through the control of teacher and student. But such domination is not inevitable. The particular character and application of I.T. will ultimately depend upon the outcomes of political struggles over access, content and control. We must grasp the opportunities to develop a critical understanding of the new technolkogy and offer a new vision of the future. This means seeing computers as one product of an international, integrated I.T. industry as this forces us to confront the global social implications of capitalism in its most recent crisis. It means facing and thinking through the political and economic implications of centralised multinational and government control of information. It means developing links and connections in both our understanding and practice. It means developing a way of talking with people which cuts through the egotist "commodified consciousness" making them deaf to the possibility of a better future for all.

Notes and References:

1. Over 90% of semiconductor R&D funds came from the US Department of Defense. See D.Albury and J.Schwartz, *Partial progress: the politics of science and technology* Pluto, 1982, p.135.

2. For example the corporate struggle between IBM and AT&T and others described by F.Webster and K.Robins, Mass communications and information technology, *Socialist Register,* 1979; and Webster and Robins, Information technology: Futurism, corporations and the state. Socialist Register, 1981.

3. de Beneditti, *Financial Times,* 1979. Cited by Albury and Schwartz, 1982, p.149. Taylorisation refers to the mechanisation of production in ways which control the speed and action of the worker to maximise efficiency, e.g. the conveyor belt. The effect is to increase labour discipline and to counter collective activity by workers.

4. This argument is well developed by Albury and Schwartz, 1982: G. Carchedi, Socialist labour and information technology. *Thesis Eleven,* 9, 1984. See also interview with Phillip Hughes this issue.

5. *Sydney Morning Herald,* 8 October, 1984. p.14.

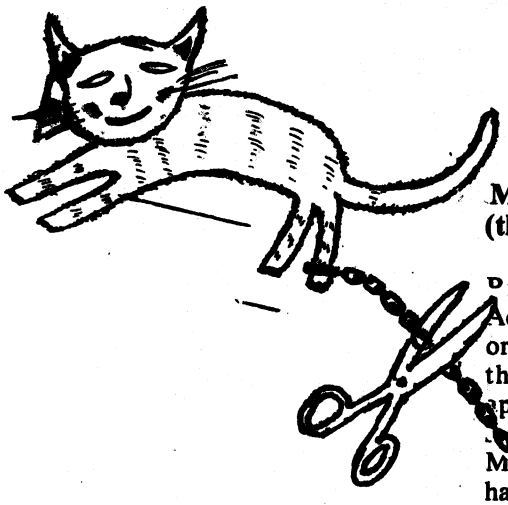
6. B. Jones, *Sleepers Awake!,* Oxford University Press, 1983, p.114.

7. Jones, p.118.

8. This returns big profits particularly when companies have a monopoly on sections of the market. Plessy and GEC are monopoly suppliers to British Telecom. Between 1979 and 1983 the former's profits rose from £46 to £176 million. GEC 1983 profits from BT was nearly £100 million. But in the present crisis, these profits are used speculatively rather than productively. Plessy now has £325 million and GEC £1.5 billion invested in the money market thanks to the British tax payer and phone user *(New Socialist,* 19, 1984, p.4).

9. N. Wiener, *The human use of human beings: Cybernetics and human beings,* 1950. Cited by Jones, 1983.

10. White,R. *Education and technology: Exploring the issue of computers in the classroom.* Paper presented at the Political Economy Conference, Canberra, 1983.



LOOSE LYNX

I.T. erminology

Hardware ..... **The machinery**
Software ..... The programs
Liveware ..... The people incorporated into the circuit
Wetware ..... The human brain
Vapourware ... A product that has been announced but not yet produced.

Push, what push?

The most recent edition of the *Sydney Morning Herald's* new colour "Good Weekend" supplement contained five full pages of computer advertisements, three of which were directed specifically at schools.

Fabius Socialism

According to the Weekly Guardian (Oct. 7), French PM Fabius "wants to modernise education by speeding up application of the program for training boys and girls in I.T. ... At primary and secondary level it is indeed a new subject intended to combine information technology with school life while at the same time renovating methods. ... The 100,000 micro-computers that were planned to be installed in teaching establishments between now and 1988 could well end up being about 200,000. The education ministry and local governments have pumped around F250 million into the programme in 1984".

Hypno School Certificate

It has come to our attention that a private "enterprise" is charging groups of HSC students $15 each per hour to "learn facts" about subjects for the exam via hypnosis. Isn't science wonderful?

More on Moonies for Peace (through Strength)

RED 21 alerted its readers to the Professors for Peace World Academy, which was attempting to organize academic respectability for the "Peace Through Strength" approach. The links which this group seemed to have to the Rev. Sun Myung Moon's Unification Church have now been revealed in a circular letter publicizing Moon's plight.

Says the letter: "The unashamedly biased trial and unfair reporting about the Rev. (Doctor) Moon is of grave concern to all academics, community leaders, and modern thinkers of the twentieth century ... In his untiring dedication to mankind, and God, ... Moon has founded, or been the inspiration behind: The International Cultural Foundation, The International Conferences on the Unity of the Sciences, The Professors World Peace Academy, The International Conference on World Religions, International Conference on World Peace, the World Media Conference, as well as many other cross cultural and interdisciplinary movements, to further the efforts towards world peace and understanding on a global level." So now you know.

Peace "Bias"

"Teachers for Peace" in Britian tell us that a group of 150 Conservantive Party MPs have introduced legislation into the House of Commons in an attempt to ban peace education in British schools. The Bill actually talks about preventing "indoctrination" of minors in schools.

Still haunted by the pre-World War II Munich events, the Tories regard any advocacy of alternatives to the use of nuclear weapons as "appeasement". They have even produced their own idea of "Peace Studies" and, ironically, it contains some of the most "biased" material yet printed on the subject. We wonder if that material would come under the purview of this attempted legislation?

Youth Studies Centre in SA

A Centre for Youth Studies has been established at the Magill Campus of the South Australian College of Advanced Education. The Centre will be independent of the College structure and be managed initially by a board of six with the co-ordinator being responsible for the daily activities of the Centre.

Research and Project grants may be arranged through the South Australian Consultancy Centre (SACESS Incorporated) to enable the generation of money to support research. The main functions of the Centre for Youth Studies will be to:

1) promote, undertake and disseminate research into youth questions and to engage in debate in this area;
2) develop a resource centre of material concerning youth questions for community and professional use;
3) offer advocacy to Governments, institutions and individuals concerning youth policies and to respond effectively to youth questions.

It is hoped that the Centre for Youth Studies will provide a forum for people working in South Australia on issues concerned with youth in addition to providing an information service on request.

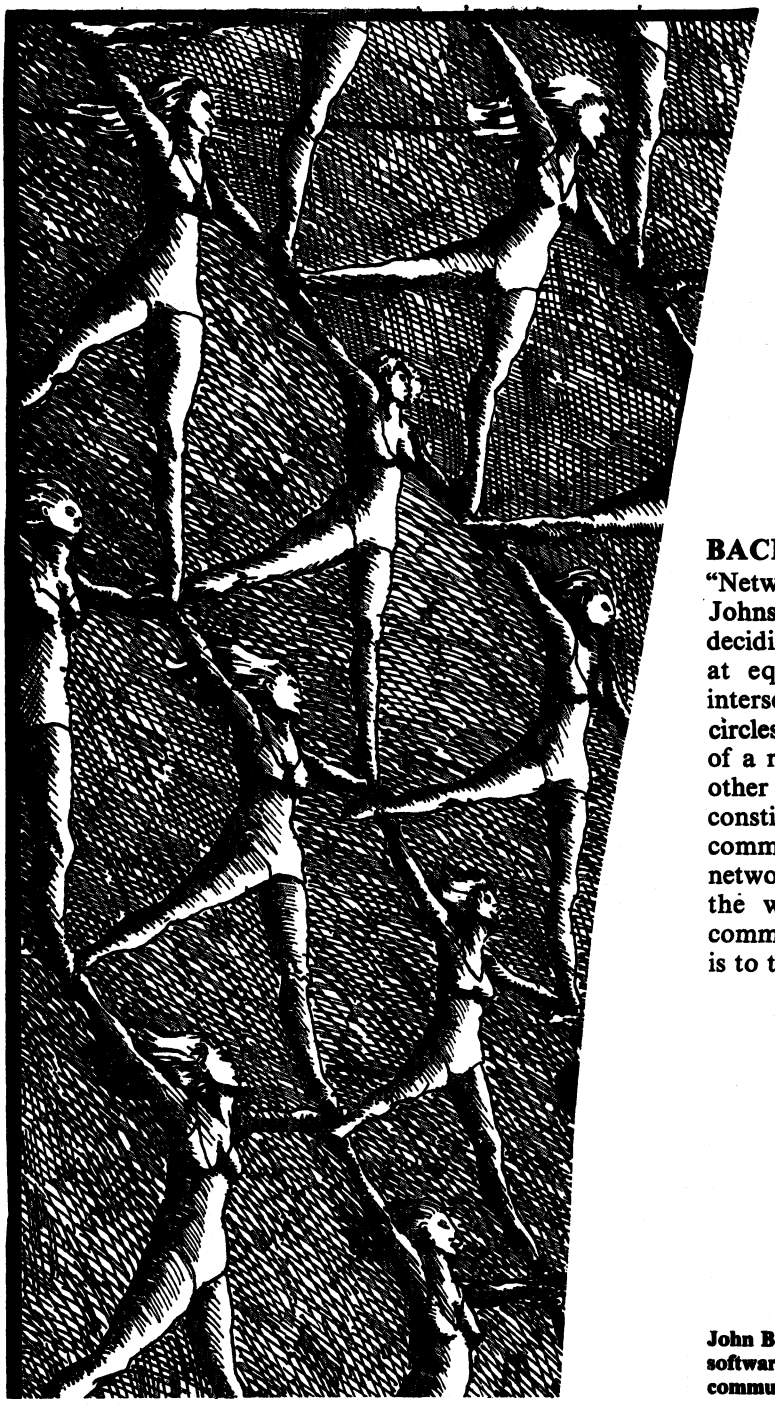
Such a centre cannot be successful without the support of all those involved in youth affairs, both in South Australia and nationally, and as a result, the Centre asks all those involved to keep the Centre informed of all related matters, events, publications and research projects. If you can help please send information to the co-ordinator.

All enquiries should be directed to:—

Mike Presdee (Co-ordinator),
South Australian CAE.,
Magill Campus,
Lorne Avenue,
Magill.
South Australia. 5070
Telephone: (08) 332 4711

NETWORKING AS A SUBVERSIVE ACTIVITY

"Networking" is a word of the Information Society: it evokes pictures of Pine Gap, satellites, and the US Defence Network; of efficient manipulation of the world economy; of ever-increasing state council; of so much that deservedly frightens people about technology, and in particular about computers. It is also a word for the eighties. Once, activities promised to keep in touch: now they vow to network. This article examines the role computers have in that vow.

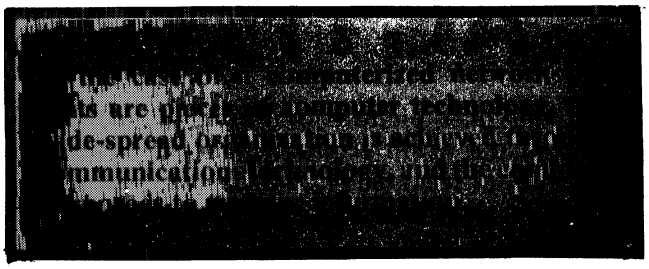


BACKGROUND

"Network" is not an easy word to define. Samuel Johnson had a lot of trouble with the concept, finally deciding it to be "Any thing reticulated or decussated, at equal distances, with interstices between the intersections." Chambers Dictionary goes round in circles, defining a network as "any structure in the form of a net", then defining a net as "a network". On the other hand it does quite well with "a system of units constituting a widely-spread organization and having a common purpose". In the case of a computerized network the units are pieces of computer technology, the wide-spread organization is achieved through communications technology, and the common purpose is to transfer information. For example, the Americans

John Bowker works with Rigi Digi Data, Newtown, which produces software commercially and helps with the software needs of local community groups.

may inflict a nuclear war upon us by relaying, under computer control, an attack command via a communications satellite to Pine Gap and thence to a computer on a nuclear submarine.



Not all computerized networks are constructed for such gruesome purposes, but all have *some* purpose: maybe, as in the case of the Community Memory Project or the Denver Open Network, that of acting as a 'community filing cabinet'; maybe, like the Electronic Information Exchange System, that of acting as an electronic clearing house; maybe, like Special Net, that of acting as a monitoring device for lobbyists and activists. In all cases, a group of people have decided to try to enchance information flow, either by their providing that information in a more accessible form, or by their providing better communications channels for that information. Of course the information itself might be worthlessd, dangerous, or potentially subversive.

The desire to share information is not new. People have managed and still manage quite well with face-to-face contact, or letters, or telephones as means of communication; and with libraries, or filing cabinets, or record cards as means of information storage and retrieval. (Indeed it is often unwise to replace effective manual systems with computerized systems). Nevertheless there are some questions that appropriately programmed computers cope with well: "Where can I find free-range duck eggs in Bondi?"; "Where can I find out about my rights as a tenant?"; "Where can I find grant-funding for my pet project?"; "What worthy causes require my attention?". Such questions often need fast answers (anything less ranges from being a hassle to becoming an insurmountable obstacle), and if someone has provided the information computers are good at giving answers comparatively quickly.

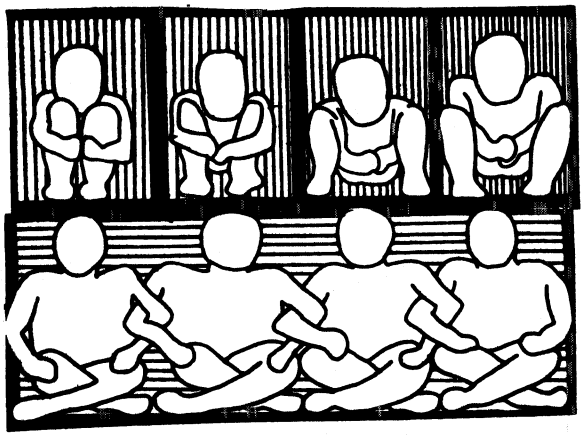
Computer-based networks, therefore, have computers as their "units" and information transfer as their "common purpose". The mechanism for creating "widely-spread organization" is provided by computers being able to talk to each other, and the vehicle for the creation is the global communications network, particularly the telephone system. Thus if you and I agree to network our computers, you can ring up my computer and use your computer to search through my information for answers to your questions. I can leave messages for you. You can send text for me to print on my printer. All these services have been available for years to academic, governmental, and commercial institutions. Some are available to the individual. And, increasingly, community oriented networks are being made available.

The *Community Memory Project* (CMP) was described in *RED* 11:

> "As the name suggests, the Community Memory computer system can remember any message and keep it around for community use. People type in a message and then label it with descriptive words or phrases called keywords. The message is then stored and can be retrieved by any of its keyworkds."

The vision of the CMP is one of street-corner computing, where public terminals to a computer network are provided in much the same way as public telephones. Anyone can provider is the one responsible the information provider is the one responsible for maintaining the information, anyone else is at liberty to tack on comments. The *Denver Open Network* provides a similar service, though using private microcomputers rather than public terminals to gain access. In both cases information is stored on powerful, expensive computers.

While one of the strengths of the Community Memory Project is that you don't have to own a computer to use it, it is also one of weaknesses: ultimately, the system's information base is monitored and controlled by one group of people. The *Electronic Information Exchange System* (EIES), based at New Jersey, tries to move away from this approach, not only allowing people to put information into the system but also allowing people to use the system as a means of transferring information between their computers. This is achieved with electronic pigeon-holes: I might want to find people and resources to help me set up a computerized community information system; I ring the EIES; I establish communication between its computer and mine; I search for people claiming interests similar to mine; I leave messages in their pigeon-hole describing my interests, and asking for their help; those who are interested can leave information in my pigeon-hole that I can copy into my computer and print on my printer.

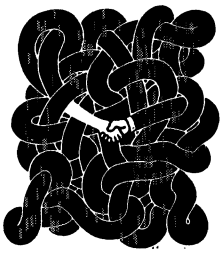


The three networks described above are general purpose in that anyone may use them for whatever purpose they see fit. *Special Net,* yet another US network, is an example of a network provided with the sole aim of monitoring single-issue information, that of concern to the disabled. Thus Special Net allows activists to keep track to relevant State legislation, Federal legislation, legal decisions, publications, conferences,

rallys, etc. The system operates as an electronic bulletin board, situated in one place but maintained by microcomputers and their operators.

IMPLEMENTATION

All the examples discussed so far are American, and although similarly constructed networks are planned in Europe (particularly England) they are not yet well-established. Apart from 'ham' networks, I am aware of no such community-based computer networks in Australia. Not that this is necessarily a bad thing: the other thread connecting the above examples is that they all use powerful computers, either as data banks for the entire network, or as clearing houses for the network; and powerful computers are easy for a few people to control, easy to mystify, and expensive. Moreover, the computer marketplace has changed rapidly in the last five years, with microcomputers coming to dominate the small group, home, and education sectors. And with microcomputers comes the possibility of a "distributed" (as opposed to "centralized") network, where information is held locally, where it is most effective, rather than remotely.

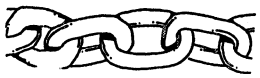


For example, many *Greenpeace* offices have acquired microcomputers in the last couple of years — to perform such functions as word-processing, producing mailing-lists, or organizing subscription systems — and recently Greenpeace established a committee to look into networking these computers world-wide. Initially they are thinking in terms of electronic mail to send both messages and documents between their computers; further into the future they hope to be able to access each other's data. Thus a Greenpeace worker in Washington who might be interested in Pine Gap could ring up a Greenpeace computer in Australia, browse through available resources, and transfer relevant information over the phone to the computer in Washington. There are obvious benefits in terms of speed of moblization around particular issues.

Distributed networks are conceptually attractive: they evoke a vision of grass-roots groups providing an enhanced information and referral service to their users, with each group holding specialized information locally, yet also with each group making that information readily accessible to other groups. There is no central control: a group has no-one to blame but itself if the information it contributes to the network is bad. Unfortunately, thanks both to the disorderly growth of the computer marketplace and to the ideological competition between groups themselves, such networks are more difficult to organise than centralized networds. In a nutshell, the problem is that of standardization. Greenpeace is recommending that its offices buy the *same* microcomputers and the *same* programs: while such regimentation is not strictly necessary, it simplifies things enormously. Technologically, the next step down is to agree on compatible communications and file management programs, and the marketplace provides well for such agreements. The hardest task is in information science. If there are 20,000 community groups in Australia, then there are 20,000 ways of classifying and retrieving information: most are variations on a handful of systems. Each group considers its dialect best. A centralized network has no such convenient mechanism. In my opinion standardization is the biggest problem to overcome in the establishment of community-based computer networks. There are three alternatives: no agreement, and an electronic Tower of Babel: several exciting years for meetings junkies, with a centralized network at the end; or a fait accompli provided by some well-meaning social entrepreneur.

Standardization is not the only problem, however. Updating — keeping data up-to-date — is a task often overlooked by network builders, be those networks manual or computerized. Examples abound of service directories being out of date even before they are available, and consequently of service providers becoming understandably reluctant to support updating procedures. The same can be true of computer-based networks. Another consideration is that the network be easy to use, in computer jargon "user-friendly". In essence, the problem is to translate queries into computer language. For example, the question "Where can I find out about my rights as a tenant" might become "Display all records for keyword = 'tenant' and keyword = rights'", which is a daunting form of English. The good news is that much effort is going into producing friendly query languages (and so-called "natural language processors"); the bad news is that no-one has got very far.

Networking in any form raises countless questions, and this article only scratches the surface. To pose but a few: How can universal access be assured? How can privacy be respected?; How can libel and other abuses be dealt with?; How can life be made hard for nosy instrumentalities?; Will the increased efficiency increase activist burn-out?; When does gee-whizzery become counter-productive?; It is worth competing with State and commercial networks?. It is both futuristically exciting and deterministically sad that such networks are going to happen anyway. Given that, and given that they *can* be exploited by activities, I only hope they come to be used as the excellent tool multinationals, governments, and academic institutions have shown them to be...



People, Information and Policy

Tom Fitzgerald

Tom Fitzgerald has had experience working with community groups in the information area.

In recent years, both in Australia and overseas, the increasing complexity of, and social impact of, various information technologies has led to lobbying for the development of a "National Information Policy" (see for example some of the documents produced by the Library Association of Australia, including the papers from their National Information Policy Seminar held on 7—8 December 1981). Much of the push for such a policy has come from the telecommunications industries, the library fraternity, and "information scientists". As a result the issues discussed tend to reflect the concerns of those in the information/communications industry which is currently being restructured and concerns relevant to the working-class and community-based groups tend to be overlooked.

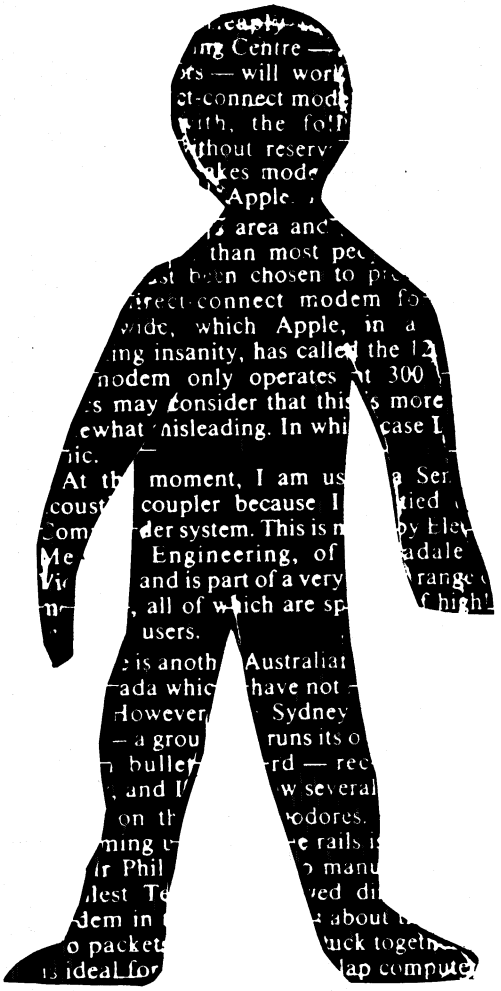
The background to the current interest in Information Policy is the development of new communications technologies and industries on the one hand, and the development of large scale private, government and research databases on the other. The amalgamation of the two create significant new areas for the generation of profits, for economic development, for research, and for public-access information banks as well as the possibility of the disappearance of a number of jobs in the clerical sector.

Some of the issues referred to in the discussion about information policy simply reflect the pre-requisites that are needed to allow an industry to successfully restructure, while others reflect struggles for control of various sectors of the new industry. Under the former come the discussion of such issues as the establishment of standards for databases and computer and communications technology, the establishing of new copyright codes, definition of legal documents etc, the development of controls on data collection etc. Under the latter come the issues of private versus public sector control of domestic satellites and of public-access databases, which sorts of information technologies should be used, and the issue of whether the "user-pays" principle should be introduced into the library sector and for other government-controled databases. Added to these are further issues such as: trans-border data-flows (and by implication multi-national control of various sectors of the information industry), freedom of information and standards concerning government collection of information, and the issue of individual privacy. The overarching concept reflected in discussions is the redefinition of information as an economic resource. Interesting and important as these issues are, they reflect developments that have occurred in large corporations, the bureaucracy and the research sector.

Parallel with the developments that have occurred at the large corporation and government bureaucracy end of the spectrum, however, there has been a gradual proliferation at the community end of services which revolve around information and information-related activities. Some of these are mild changes — expanded information service sections in government departments, community bulletin boards in libraries etc. Others are more substantial.

This is particularly true of the clustering of activities at the border of the education and welfare sectors. Thus, from the welfare side we have the development of community countries and community information services, "info-buses" etc. On the education side we have the development of school counsellors, Outreach programs in TAFE, the extension of Board of Adult Education courses, more discussion about courses in basic survival skills (e.g. basic literacy and numeracy courses), information programs for migrants, and increased emphasis on the community information role in the library sector.

All these programs emphasise, to some extent, two concepts;— *access* to information and the development



of *skills* that are necessary to be able to access (and know what it worth accessing) and effectively *use* information.

Also, some of these programs either develop skills in a collective context (e.g. some Outreach courses) or have information activities that are associated with wider collective activities e.g. Redfern and Marrickville legal centres and the Welfare Rights Centre. The Welfare Rights Centre is a good example of this, with its concept of information-giving and advocacy. Information-gaining, lobbying, advocacy and information-giving are mutually re-inforcing actitivies in such organisations. Their information gaining activities are much more effective than the sum total of the information-gaining activites of a series of isolated individuals would be. In fact, many, perhaps the majority of individuals would be. In fact, many, perhaps the majority of individual efforts in gaining information (e.g. when dealing with government departments) would be done with the assistance of or through third parties. In other words, information gaining is usually a collective activity.

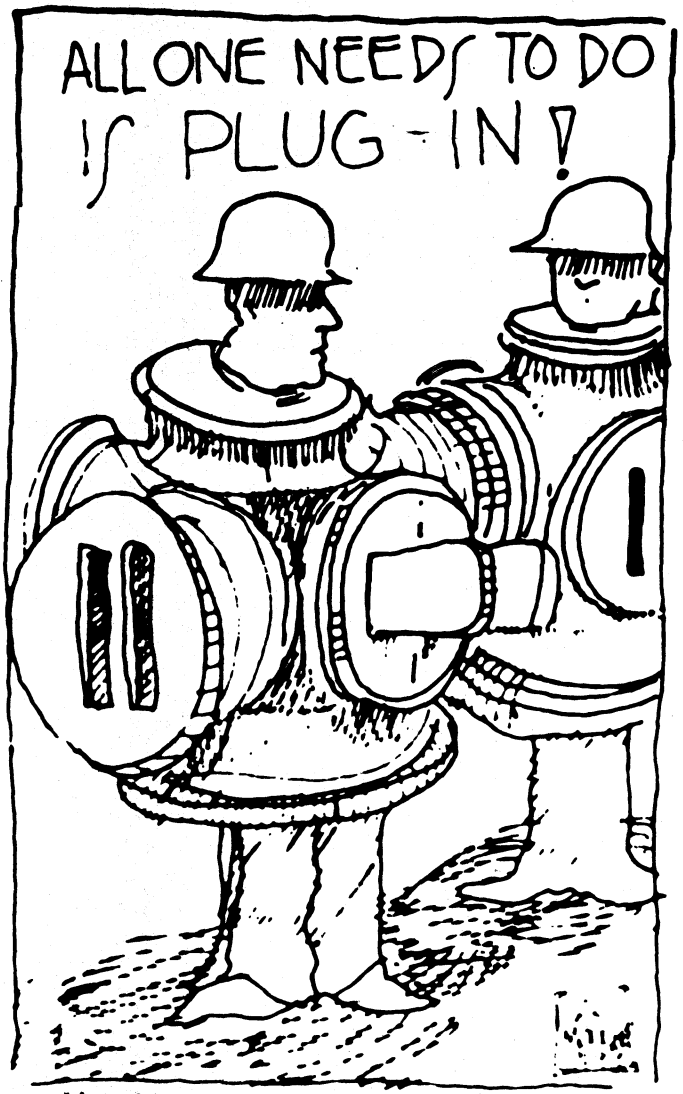
Yet most of the discussions about National Information Policy, in so far as they refer to the information needs of ordinary individuals, talk about the protection of individual privacy. Very little reference is made to the issue of access to information. Even when such reference is made, it seems to be made on the assumption that provisions for access be passive i.e. that access points be provided in large organisations.

There is little reference to the need to actively develop information-gaining skills or to the need to actively encourage that intermediate layer of community-based organisations that assist individuals in gaining access to information.

A good example of the provision of passive information access is the implementation of Freedom of Information legislation. This legislation was introduced at the Federal level in 1982. It has had two significant impacts so far. Firstly, the right to access has been established (even if it is circumscribed, particularly as regards information about how policy is formulated). Secondly and more importantly the machinery for access has been established throughout the Public Service.

However, probably the major beneficiary of the Act so far is the Public Service itself, as the introduction of the Act forced an integration of the information giving activities in various departments and forced the production of more comprehensive and more literate policy manuals (and also the production of manuals where in many areas previously there had been no adequately-stated policy at all). The fact that manuals now have to be written so that the general public can understand them, means that public servants are now also able to understand their own department's manuals (this wasn't always the case in the past).

Yet, the wider community has not effectively used the increased possibilities for access. Most Freedom of Information access requests are for details of an individual's personal file. This information is usually given without difficulty. However, what is often more important to the individual is detailed information about the policy and how it was formed. This is difficult for the individual, not primarily because of legal restrictions on access, but because most individuals, particularly



working-class people and members of disadvantaged groups, don't have the skills to effectively use the information-access opportunities available. In fact, many of these opportunities can only be effectively used by an organised intermediary group, such as the Legal Centres or the Welfare Rights Centre who can apply their collective resources to interpret the information available and determine what information is worth looking for.

So if a National Information Policy is going to be established it is going to have to contain provisions that actively encourage the development of information-seeking skills by individuals rather than just concentrate on the passive development of access points. Furthermore it will have to actively encourage the development of local, community-based organisations which can provide the necessary resources and support that communities will need if they are going to be able to effectively use the new information technologies.

Some of the issues referred to in the discussion about information polciy simply reflect the pre-requisites that are needed to allow an industry to successfully restructure, while others reflect struggles for control of various sectors of the new industry.

TECHNOLOGY: NEUTRAL OR NOT?

Stephen Hughes

In trying to sort out a socialist approach to information technology (I.T.), the Collective has confronted the horns of a dilemma. On the one horn, we find an uncritical acceptance of the new technology — Taylor-made "efficiency" for left activists. On the other horn, we find a latter-day Luddite attitude, seeing information machines only as the deskilling, disempowering servants of Capital. In this interview with Scott Poynting, Stephen Hughes uses an historical approach in an attempt to take us beyond this dilemma.

Stephen, I'm interested in how, as an historian of science, you would approach the question of whether information technology is socially "neutral". Perhaps I should first ask the question about science and technology in general.

If you look through the history of science since, say, Newton's time (1640's on), you see that at times technology seems to lead science and science follows it up, synthesizing and putting into abstract form the results and techniques that have been developed by technology. At other times science seems to take over and provide a lead.

Newton's *Principia* betrays no hint of its origin in practical matters. It's presented in completely abstract form. The Laws of Motion are presented as the result of certain axioms and hypotheses, deducted geometrically and mathematically and so on, with no inkling of the practical problems he's trying to address.

Now Newton's period sees the rise of merchant capital, with consequent developments in manufacture, etc. The technical problems that the newly developing economy raised for solution were in the areas of:

(i) ways and means of communication;
(ii) industry, particularly mining;
(iii) military (to protect sea-routes, etc).

More specifically, these involve, firstly, for ways and means of communicating:

(a) tonnage and speed of vessels;
(b) stability and manoeuvrability of vessels;
(c) navigation, tides, magnetic deviations; and
(d) canals and locks.

These are basically problems in hydrostatics, dynamics and mechanics, especially celestial mechanics.

Secondly, for industry and mining (of gold, iron, etc.) you need:

(a) raising of ores;
(b) ventilation (of mineshafts);
(c) pumping of water (out of mineshafts);
(d) smelting by air blasting; and
(e) rolling and cutting.

These are problems in mechanics of machines, hydro- and aerostatics.

Thirdly, military problems involved:

(a) armaments, processes in guns;
(b) stability and weight of guns;
(c) aiming;
(d) trajectories;
(e) air resistance, and
(f) deviation.

These are problems in gas dynamics (a form of mechanics) and general kinematics (also mechanics), including the question of free fall.

Hence, the problems of the period lay in the region of mechanics and these are precisely the areas covered in the *Principia.*

If you move a bit later on to when industrial capital is starting up, with factories and so on, you find people like Watt and a number of others who were working on steam engines and improving steam engines and such as motive forces in factories.

They, in many ways, as *technicians* are leaders of scientific development. They had to consider *new* problems posed by the development of industrial capitalism in terms of the efficiency of machines, the efficiency of energy transfers, etc: the Conservation Energy. The interesting thing for Newton is that although he developed a very successful system of mechanics which, in many ways, lasts at a simple level even today, and although today if you do a science course the Conservation of Energy etc. is derived in a very simple mathematical way from his own equations, Newton himself denied Conservation of Energy and didn't develop the concept at all, even though there were notions of it around at the time. One of the explanations of that is that there was no interest on the part of merchant capital in the efficiency of machines. Merchant capital didn't care what it took to produce commodities in terms of energy, labour time, etc. It wasn't interested in productivity *per se*; it was interested basically in exchange: buying commodities in one marketplace and selling them in another, taking advantage of differences in currency valuations and so on. Whereas when industrial capital takes off you find people like Watt (who was actually *paid* in terms of the amount of coal he could *save*) directly concerned for practical reasons with the efficiency of machines. Once capital moves into factories and employs the means of labour and labour

Stephen Hughes is studying for a PhD in the History and Philosophy of Science. He works in education and has considerable experience with computer software.

itself then it is directly concerned with the efficient use of these resources to produce commodities. It wants to do it cheaply; therefore, it has to be concerned with the efficiency of these machines; and to account for the efficiency of machines you need concepts like the Conservation of Energy, energy transformation, work, and so forth.

I've read your paper about science as *use-value*. Can you relate this to the question of whether technology is neutral?

Yes, it is helpful to consider the *use-value* of scientific theory, rather than *truth* value. Science has use-value just like for example, chairs and tables. A chair is useful because it embodies and employs certain natural principles as a structure. It also has certain *social* significance and its usefulness embodies this: it is only useful in forms of society where chairs are required. Hunter gatherers didn't have chairs. Although all the principles of chairs would have been operative then, they were not socially significant. In the same way, Newton's **F = ma** is true (within a range of application) and has probably always been true. It was operative, as a law, in Ancient Greece, but the Greeks had no *use* for that sort of concept. It wasn't until the rise of mercantile capital that this sort of concept became required for social and economic reasons.

Conversely, Ancient Greek notions of the universe — rocks having a "natural resting place" on the earth and so on — have a *truth* of a kind, but are no longer *useful*: they are use-value which has gone out of use. Similarly, Newton's theory was developed to suit the requirements of capital in his day. With developments in the nineteenth century in the chemical industry and other industries, his laws in fact were modified by Relativity, and we use different laws to cover the same material. That doesn't detract from Newton's "truth" in terms of law: it's just that other theories are more significant socially for capitalism.

Now, regarding the neutrality of science and technology, the advantage of looking at scientific theories as use-value is that it allows you to ask questions such as, "Useful for whom?", "For what purpose?", "Why has this particular problem been raised?", "Why have particular models been used to employ it?", "What's the history of these models?" ...

For example, if you looked at thermo-dynamic modelling, which is probably the fundamental model of modern science (certainly physics, chemistry, etc.) you can show quite clearly that it developed because it was a very useful model for chemical industries at the end of the last century. It had much greater predictive powers and flexibility than mechanical models, which were perfectly adequate to explain phenomena, but which were becoming cumbersome. In the situation of increasing technical change and requirements of planned economies you need models of science which are useful in developing technology and solving particular problems. Therefore, you see model shifts as you did with Einstein and the beginnings of Relativity and as you did with Carnot and thermodynamics, too.

Can we see the advent of I.T., then, in the same light?

I think that, like most technologies, it's a two-edged sword. It develops in particular directions because of the requirements of capital. It could *possibly* develop in other directions as a useful tool for helping people live their lives, but under capitalism we are likely to see:

* increased health hazards (tenosynovitis is probably a peculiarly modern disease)
* hierarchized access and control;
* dehumanizing work patterns;
* overriding concern with the "efficiency" of systems in terms of profit.

Now if you take a very basic Marxist line, the development of the productive forces is a positive step; but the point is they need not develop *in these directions.*

A common position taken is that technology is basically neutral: it just depends what you do with it. This is a bit naive, really, if you look at the way technologies are developed. A useful concept here is that of "efficiency". There are two senses of "efficient". All technologies are efficient in one of the two senses in that they solve a particular problem. They're also efficient in another sense in that they solve it in a manner suitable and acceptable to those who want the technology developed.

Computers are a good example. As machines they're good calculating devices: they can manipulate numbers and information rapidly and flexibly. But if you look at their history, they were developed in the context of the military during World War II for ballistics calculations and for code-breaking.

Since the war, all the major advances in computing technology have been made using military funds. One of the things the military is always interested in is *speed*,

and that's why you see development in machines that can work very quickly. That is, one aspect of "efficiency" for the military is speed, because it wants the ability to respond quickly.

Now that sort of "value" in a technology is not necessarily the same sort of thing that would be "efficient" for other groups of people. But when we get the machine, that aspect of it is built in and the development of the technology is aimed in the direction of increasing its speed.

Another way in which you can see I.T. is not neutral is in its surveillance possibilities. If you've got a computer that's holding a lot of data, it's very easy within the same program that stores the data and retrieves it, to put in controls so that only certain people can get at it and only certain people can put data in. This raises the question of who puts the data there and who gets access to it. In more mundane matters, in terms of extraction of surplus value, most word processors and programs used in commercial situations have built into them surveillance of the typist. The machine records typing speed, periods away from the keyboard, errors, number of times the correction key is used, etc., so that the management can get a monthly or weekly report on each typist and the rate at which they work. All those things are obviously in many ways built into the sort of technology.

If the origin of computers was in the military in the Second World War, it's still true that the major developments are there. If you look at what's happening in America — space wars, etc. — it's all based on computer technology.

In many ways the computers that we now have, certainly in the home, are adequate for anything people would want to do. But money is being poured in for other reasons and we will see spin-offs from that: computers that are far more sophisticated than most of us will ever want or need. I suspect that the sort of surveillance functions that go with them in private enterprise will easily be put into the home, too. You might have voting, banking, via your home computer, and it would be easy for a centralised system to check up and see whether you'd voted or not, or whether you declare all the money you are banking, and so on.

Some regard the use of computers in schools as just as inevitable and belated an advance as the replacement of inkwells by ballpoints. Would you agree with this?

You have to look at what they're actually doing in schools. One of the pressures for putting computers into schools comes from parents. They want computer education because they see it as the technology of the future and they don't want their children to be left out, although they don't know exactly what they want from it.

In fact there's three different things it can be used for in schools, and these don't always match the expectations of the parents and often are not very useful.

The first is Computer Aided Instruction (CAI), where the computer takes over from the teacher. This is mainly in Maths and Science, but it's also coming into the humanities, social sciences. The sort of programs that are written are basically drilling programs where you drill kids in their ability to reproduce facts or to apply rules. So you see maths programs which will drill multiplication of fractions or addition and subtraction; in English classes you'll see programs teaching kids how to spell by playing "Hangman" on the screen. (This is ironic, because the whole advent of the computer questions the need for these very skills. If you can't multiply these days, you use a calculator. Even spelling can be checked against a dictionary in a computer.) In social sciences or in history you'll see programs, especially those coming from America, which drill facts about American history or Australian history: dates or presidents or whatever. That sort of use, pushed quite strongly by the computer industry itself, certainly in its early days, is largely a waste of time.

The real worry that I have is that it is pure drilling and that there's very little that can be done apart from that without writing hugely sophisticated programs taking into account a whole range of possible responses to a situation. This would require the sort of memory which is not available on school computers. The ideological implications of such drilling should concern us all. It's rote learning. It's the learning of habits.

Is that why they are so popular with these new fundamentalist private schools?

Yes. It's dogma, just like the old text book was, in a way. But CAI is also partly a push to increase efficiency in schools, the efficiency of teaching and so on, and probably would threaten in the long run the livelihood of teachers, if it ever took off — but I suspect that it won't.

One of the things that often happens, by the way, with CAI, is that kids deliberately give the wrong answers to see what happens. It's more fun to subvert the system in this way than to go on to the next question.

They do that with teachers, too! Now what about the use of computers to teach kids programming?

Teaching kids to program is one of the things that I think parents, in a way, expect, in a certain mistaken belief that if their kids are skilled in, say, computer programming, they'll be assured of jobs. That is fundamentally mistaken: firstly because it is to some extent computers that are taking away the jobs; and, secondly, most people in the future will probably *not* be programmers. Certainly with the way the technology of computers is going, programming will become a very elite and privileged profession, in the sense that the programmer has a huge amount of control over the types of programs, etc., and it won't (with this social structure) be acceptable that just anybody would be allowed to program. It's like saying, "This is a wonderful technology; it will let all the soldiers be generals."!

Teaching programming as a means for kids to write their own programs to solve whatever problems they come up against is a possibility, but the amount of commercial programming that is done can solve most of these. These are, however, standard, ideologically-laden programs. So doing your own programming is, to an extent, empowering, in that you are not forced to rely on the sort of logics that they embody. And they do embody them: computer software is very ideologically-laden.

I think there is another argument for programming that is about jobs. The argument is to *demystify* the computer, to show how really *basic* computers are. To debunk the sort of science fiction stuff about computers taking over in a naive sense. Also to show the sort of logic built into the machines. For this I think it is best to use simple machine language, rather than the higher-powered languages like FORTRAN or BASIC or LOGO, or whatever else they're using in schools, which are themselves mystifying.

Programming is probably also useful to teach logical thinking skills (even if it is a particular type of logic). I'm thinking of the equivalent of the role that the teaching of Latin once hand, of teaching conceptual skills and skills of organisation. These, to a large extent, have gone out of schooling, as one of the negative aspects of progressive education, which has become very thematic and logically sloppy. Many of the basic skills of thinking which were once taught (very badly) through what is often called the Competitive Academic Curriculum, have gone. For the kids who need it most — working class kids, Aboriginal kids, migrant kids — there is less and less of anything like a *critical* syllabus in the schools which involves rigorous thought and thinking through implications. So, limited though it is, and certainly not for its own sake, some form of computer programming could be useful in terms of getting people used to thinking through the consequences of decisions and leading to some sort of critical thinking. At the same time I recognise that the logic computers operate with is a very simple kind of logic; certainly, it's an open question as to whether it's a "loaded" logic...

Can't computers be seen just as tools to use in the classroom, like, say, calculators?

Using them as tools is probably the most sensible thing to do with *actual* computers in schools, apart from teaching *about* computers generally, which I can talk about later. One of the useful things to do with them is to teach kids to use them as a tool, to teach skills like word processing, data-base accessing, and so on. These are *generally* useful skills that should be available to working class kids just as much as ruling class kids. This *does* raise questions of access, certainly with data bases: "*Whose* data?", "*Who* has access to *what* data?" and so on.

As well, of course, there's the question of who gets to learn these skills in schools. One of the worrying things that seems to be happening is that it's the boys rather than the girls that are getting access to computers in schools.

Are these the sort of questions you would address in the teaching *about* computers you spoke of earlier?

Yes, something else has to be done about computers and about science and technology generally in schools. Up to now, really all science teaching has been acritical of science. Any discussion of the use that science and technology is put to has gone on very sloppily, usually in the social sciences. Usually thematically: units on technology and unemployment, for example, just raising the issue without taking any definitive approach to the relations *between* technology and unemployment. What *should* occur in the natural sciences themselves is a philosophy of science strand, looking at science "from outside", as it were, not just accepting it and teaching it. In the social sciences there should be a wide-ranging program trying to develop some of the basic concepts which would enable kids to ask questions such as: "What is science?", "In whose interests is it practised?", "What are these new technologies — or *any* technology?" This means a program which develops critical thinking skills and not just "issue" discussions.

The social sciences in most schools have in many ways failed to develop a proper conceptual analysis. They've failed to be good sociology or good history, to be conceptually based. They're largely overrun by empiricism, which doesn't allow the development of critical thinking at all. There needs to be developed a solid, conceptually based and rigorous social critique built into school curriculum, probably in the social sciences, that would enable issues to be tackled at more than just "I've got this opinion and you've got that opinion". I mean not only the issue of technology, but unemployment, peace, the Bomb.... Kids need concepts which will enable them to think positively and concretely about futures, about where the world is going.

Of course, "critical thinking" is one of the things the official Education Department rhetoric *says* its new courses are about. The other sort of thing they say is that we must prepare today's pupils to cope with the information society of the future: make sure they are used to, and unafraid of, I.T. Why does Capital need the State to push computers in this way, when it was never necessary for the telephone, radio, TV, and so on?

Firstly, they claim they're teaching critical thought in, say, their computer awareness courses, but, as I've just argued, that should not be a separate subject but should be part of a thoroughgoing analysis throughout social sciences courses.

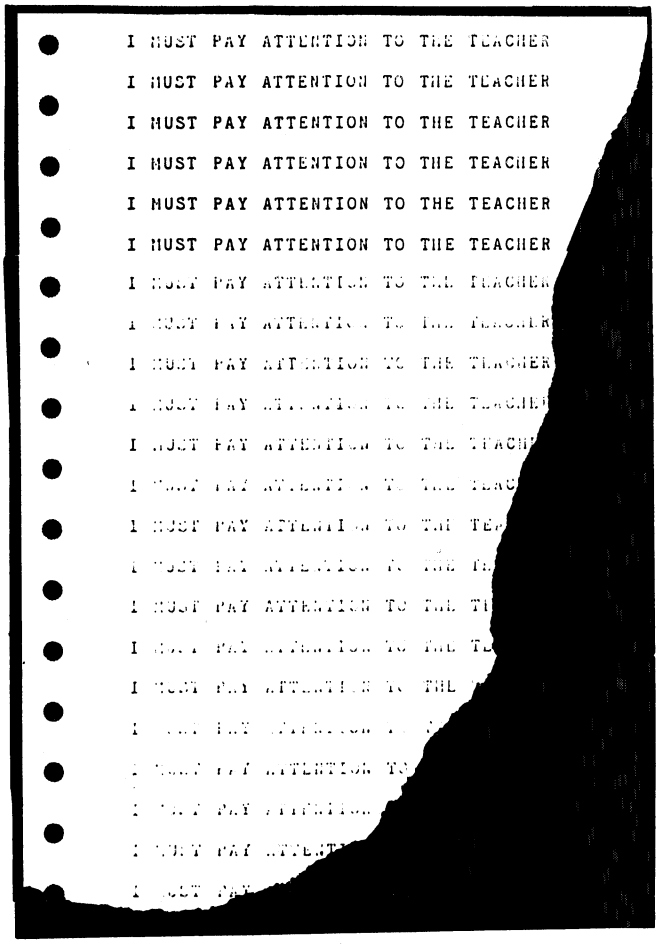
Secondly, why is it happening now? One of the answers to that is that it is a straight marketing strategy. Computer parts are only cheap if you can manufacture them in very large numbers. Obviously, the military can't use up all the chips that are produced and therefore they must be sold elsewhere. It's also a push by individual companies to get "brand awareness" in the schools. For example, Apple recently produced their "Mackintosh", which they're selling cheaply to Unis and schools all over America. They're now starting to do so in Australia. This is just to get kids familiar with their brand, familiar with using it, so that perhaps later on they'll buy Apple, because that's the one they're familiar with.

Another part of it is to foster acceptance of computers. Computers are undoubtedly producing structural unemployment and will continue to do so. I can't see the number of jobs that they're replacing being developed elsewhere. This is going to cause a crisis in the system which will not easily be solved. Obviously, one of the important ideological responses is to encourage people to accept them, treat them as normal and not as threatening machines. Whereas in many ways they really *do* threaten people, certainly their jobs. As the crisis deepens, computers will go in more and more. At IBM they boast that their junior executives have not put pen to paper for years; they use electronic mail and computer keyboards. The Commonwealth Bank is already advertising home banking services. The potential for eliminating jobs through computers is massive, and that raises questions of equity, distribution of wealth, etc., which I don't think can be avoided. So clearly one of the strategies for putting computers into schools is to get kids to accept this sort of future — not to blame computers as they otherwise might, but to accept that they go in supermarkets, banks, homes.

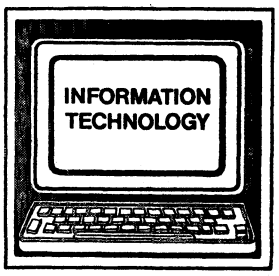
So in part it's a marketing strategy and in part it's an ideological ploy to deter potential resistance to the ways in which computers are used as job replacers.

In many ways they *could* be used to eliminate mundane jobs but to allow people then to do what's interesting. For instance, at the moment they're computerising the Department of Social Security, which, in the end, will mean fewer jobs there. It *should* mean that the mundane work is done by computer, releasing the staff who are already employed, for closer work with the clients of the DSS, assessing their needs and assisting them with more attention than current staffing will allow. But that way of using computers will not be implemented under the present system. Instead, they will eliminate jobs and increase the *monetary* efficiency of such departments.

Now those sorts of issues cannot be addressed in schools if you just teach "Computer Awareness", or even if you just use the computer as a tool, or demystify the machine through teaching programming. To ask the big questions you probably don't even need a computer in school. What kids need to know is *how* to think about computers — *and* robots and all technology.



"Computers could be used to eliminate boring and repetitive tasks."



Health Hazards

This new technology may improve the organisation and efficiency of the office but rarely brings improvements for the office workers. It is often introduced into work-places which were not designed for it and with little regard for the health and comfort of the people who will be operating it.

The hazards of Screen Based Equipment (SBE) are often played down by employers and attributed to "user resistance" to the newness and unfamiliarity of the technology. In fact people working with SBE suffer from a number of alarming physical symptoms ranging from discomfort to pain and extreme visual fatigue.

Although many of the hazards of Visual Display Units (VDUs) and microfiche viewers (MFVs) are the same, they do differ in some ways. In this leaflet the term SBE is used to refer to both VDUs and MFVs. The term VDU or MFV by itself means that a hazard is specific to that type of equipment.

1. EYE PROBLEMS

The most common complaint among VDU and microfiche users is eyestrain or visual discomfort. Because everyone gets sore and tired eyes sometimes, eyestrain may be thought of as a minor problem. But when it is an almost daily occurrence eyestrain is a serious health problem. People suffering from eyestrain will have trouble reading and doing other things that they enjoy. Eyestrain can also affect the ability to see which can be dangerous for anyone coming from work and then driving home.

What Causes These Eye Problems?

(i) Eye Defects

All SBE operators should have their eyesight tested prior to starting work with this equipment.

If glasses or contact lenses are needed they must be specifically designed for viewing SBE and paid for by the employer. Eyesight testing must not be used to screen out people with less than perfect sight. With the correct glasses a short-sighted person, long-sighted or any other sighted person is perfectly capable of working with SBE.

Nevertheless, special glasses are not the "answer" to visual problems created by working with SBE. SBE operators have to carry out a number of difficult visual tasks, often for long periods of time and with inadequate rest breaks away from the equipment.

(ii) Viewing At Close Range

One good work rule for all SBE operators is provision for a 15 minute break after every hour worked on SBE (in addition to normal tea and lunch breaks). Rest breaks should be taken in open areas away from machines. Another option is for the SBE operators to alternate jobs with other workers (for example doing one hour working on machines and one hour doing another kind of work involving viewing at greater distances).

(iii) Contrast Glare

Eyestrain can occur when the eyes have to continually adjust between light of different brightness. In SBE work the eyes have to adjust from the brightness of paper copy, to screen brightness and general background lighting.

2 TENOSYNOVITIS & OVERUSE ARM INJURIES

These problems can be caused by the rapid and repetitive movements needed for keying in information in VDU work. High keystroke rates and awkward working positions increase the risk of these overuse arm injuries.

Overuse can affect the wrist (tenosynovitis), the elbow (epicondylitis) or muscles in the neck, shoulder, upper arm and forearm (muscle strain).

It is characterised by pain and tenderness in the affected areas. There may also be swelling, numbness or tingling.

Reducing the number of keystrokes the VDU operators have to make is important in reducing the risk of overuse problems. There is no recommended keystroke rate. However, rates of 120,000 per hour and above have caused injuries. To act on the side of safety, a limit of 10,000 keystrokes could be recommended. Also important is the provision of adequate rest breaks, rotating and changing jobs with other workers, and providing comfortable seating and well designed workstations.

3. STRESS

A study done by the U.S. National Institute of Occupational Safety and Health shows that stress levels among SBE operators were the highest of any group of workers ever studied by the Institute, including air traffic controllers. These high stress levels are often experienced as feelings of anxiety.

(i) **Work monitoring.** Some VDUs can record the amount of work processed by operators and compare their work outputs. This puts continuous pressure on VDU operators to work faster and get more work done. There may be a threat of the sack or loss of bonus payments if production quotas are not met. **The use of equipment with built-in monitoring capacities should be banned in the installation stage.** If such equipment is already in use an agreement should be negotiated so that the monitoring equipment is not used for checking up on workers.

(ii) Other factors creating stress in the work environment of SBE operators come from:

- keeping pace with a machine;
- isolation from other workers;
- boring monotonous work;
- noise (especially from word processors and printers); and
- heat generated by the machines.

This material has been selected from a pamphlet produced by

The Workers Health Centre
27 John Street
Lidcombe NSW 2141
Phone: (02) 646 3233

The Workers Health Centre has available for purchase pamphlets on this and other issues of health in the workplace that may be of interest to teachers, especially those involved with career education and computer education.

SUBJECT:COMPUTERS?

Jan Butland

In, the late seventies it became apparent to even the right wing of the N.S.W. A.L.P. that some sort of social change had been occasioned by the advent of the Micro Chip, and that more could possibly follow. The immediate response of the Wran Labor government was to order the Education system to tailor the human animal so that the profitability of the changes could continue unabated.

The result was that by 1983 the N.S.W. Secondary Schools Board was ready to embark upon the information of a Syllabus Committee in Computer Education at the junior high school level. (An advisory committee is still in the process of reporting on the suitability of Computer Studies for senior High School students). Such was the normal lethargy of the N.S.W. system that all the other states, and New Zealand, had had their Computer Education programs up and running for a number of years before a committee was formed to draft a syllabus. This syllabus is being presented to the Secondary Schools as this article goes to print and will possibly be available for optional implementation in 1985 and may become compulsory in 1986.

The snails pace of the N.S.W. Educational bureaucracy did, however, allow the syllabus committee to examine, with hindsight, the syllabi in operation in both the other states and New Zealand. In Western Australia the Year Eight Syllabus contains five suggestions with the following weightings.

Table A

Topic	Description	Suggested Time (Periods)
A	Social Implication	12
B	Application	9
C	History	4
D	Components & Fundamentals	2
E	Programming and Coding	12

Whilst this table is appended as a suggestion my overall impression is that the document seems to be somewhat more prescriptive than its N.S.W equivalent.

What is even more interesting however, is the statement that programming and coding should be seen as a means to an end i.e. computer awareness, and not an end in itself — that is by writing simple programs the students will "soon realise that a computer can only do what it has been programmed to do". I would submit that such a matter could be taught in somewhat less than 12x40 minutes by using calculators and other hardwired devices.

The Victorian Syllabus, designed for Years 9 and 10 has a very heavy technoligical bias. In summary, the programme looks like this.

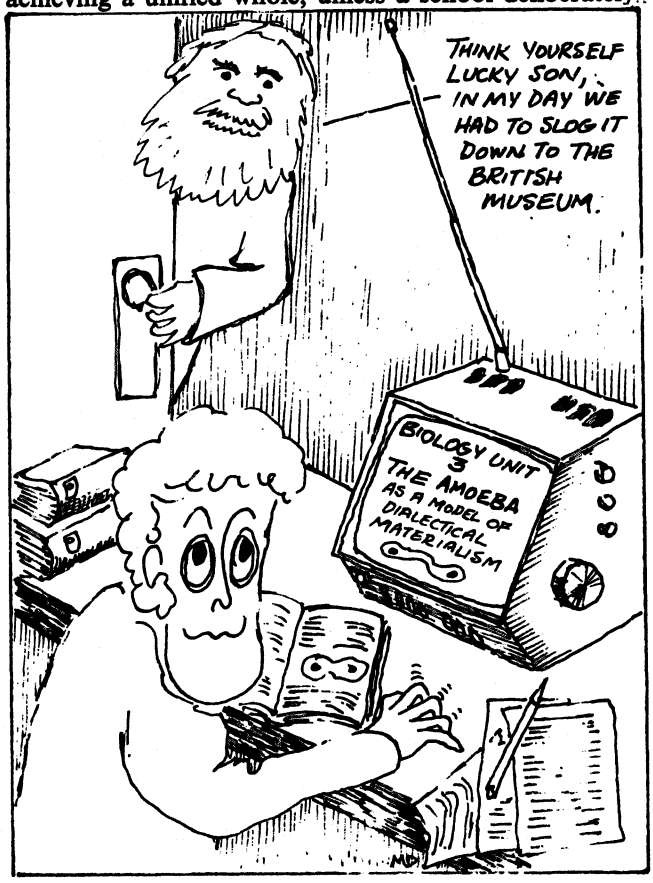
Core:

Components of a Computer	20%
History of Computers	15%
Using a computer	25%
Computer Application and Implication	40%

Extension Units — Not Compulsory
The Industrial Revolution vs Computer Revolution
Viewing Technology Through the Eyes of Writers
Types of Computers
Computer Storage Mediums
Privacy
Input-Output: Devices
The Computer & Employment
Programming
Keyboard Skills

Note of the core 40% might be concerned with social effects but nowhere is there any intent that the student would be assisted to cope with the results of such effects upon their lives.

Similarly, in Queensland it is suggested that history, applications, effects, and techniques be taught as part of the History, Science, English and Mathematics course respectively with scant attention being devoted to either achieving a unified whole, unless a school deliberately varies its own curriculum, or to developing a social awareness amongst Queenslanders.



The New Zealand document states that "hands-on interactive experience with a computer is considered to be an integral part of the design of a computer awareness course. While it would be conceivable to teach it without contact with a computer, the whole spirit of an awareness course implies direct interaction with a machine. Without this pupils are likely to form a distorted and incomplete view of the computer and its uses." The New Zealand document, which was only an advisory committee report and possible course, then gave as its aims: Firstly, to give a general understanding of the capabilities, limitations and real world understanding of the structure and operation of the computer, and to provide experiences so that pupils may approach computing with a degree of confidence. Thirdly, to study the changes is society being brought about by the application of computer technology, and the ways in which computers influence how we live.

The committee in N.S.W. recommended that the course there consist of two quite distinct subjects, one a compulsory core course for all students in Years Eight and Nine called Computer Awareness and one elective course for years Eight, Nine and Ten called Computer Studies.

The focus of the N.S.W. approach is to seek to place the individual student at the centre of a locus of social issues and experiences concerned with the total effect of computers and, most importantly, computer related technology. By answering six focus questions: What are computers? How can computers be used? How and why have computers come about? What is the influence of computer technology? What controls are there over computers? Were is "technology and society" heading?, whilst running a study of a range of applications in at least four areas of every day life, it will be hoped that the students "will be presented with factual information from which they can form their own values, judgements and attitudes." This format was arrived at by working through a number of problems.

The first argument which the committee had to address was the role, if any, should either keyboard skills, or programming have in a Computer Awareness courses? Could indeed such a course be taught without any hands on experience on a P.C. at all? The committee in fact decided to draw up a course which could allow a student to obtain a meaningful level of Computer Awareness without having any hands on experience on a classroom personal computer. Such a precept was at variance to most other extent syllabi. It is important to realise at the outset that nowhere in the Draft submitted to the Secondary Schools Board by the Computer Education Syllabus Committee are there any prescriptions against either the teaching of keyboard skills or computer programming. They are just not a key or essential element.

Equally, whilst programming may have a valid role to play in a Computer Studies elective course, is it as essential as some personal means of coping with the social realities of the new computer age? My personal argument runs along these lines:

1. Computer Awareness in particular ought to be about empowering future citizens to interact with the computer age so that its machine base is negated in a social context.
2. Progressive educators must ensure the empowerment is to do with social change and not merely making the bourgeois state more bearable. Most

importantly, such a course must relate to the lives of each student and not be a rite of passage relating to education's historic role within the capitalist system of denying the masses access to the 'good life'.

3. There are health reasons, particularly in the question of ergonomics, which make it highly undesirable that adolescents have too much contact with keyboards.

4. It has been suggested to me by several academics who teach Computer Programming that Basic is not a good language to teach in as it does not follow the logical problem solving approaches of the other languages. One academic even held that a student who had excelled in Basic could be severely handicapped when trying to learn Fortran or similiar languages.

5. There are the reasons which are based on the theory of technology change within a capitalist society. In other words, the eternal treadmil of innovation and planned obsolesence means that today's shining new "GIZMO" is tomorrow's Ho Hum junk. Why should public school students learn Computer Awareness through outmoded hardware?

6. The very limited amount of programming skills which can be taught in around 120 hours, which over two years is what may be recommended for Computer Awareness, may be so token that it will only serve to heighten the myths which disguised the true reality of knowledge as a carefully hoarded personal resource in the Information Society.

7. It was felt, both by an examination of other syllabi, and by looking at the very worthy efforts of a number of enthusiasts who had drafted other Approval Studies, that any accent on keyboard skills and programming tended to concentrate the students' attention upon an immediate interaction with a P.C. and to divert the students' attention away from the social consequences which flow from a new technology as pervasive as the micro-chip.

Viz-a-viz technology the Syllabus Committee was generally of the view that a course in Computer Awareness ought to be as much about tomorrow as it was as about today. The behavioural objectives desired to be arrived at were those of effective citizenship in a computer age.

What then are the aims and objectives of the Draft NSW Syllabus? Firstly, Computer Awareness is a course, it is suggested to the Secondary Schools Board, in which students study, reflect upon and interact with computers, computer related technologies and their social effects. The Aim of the course is:

—to develop in students those abilities which give them a greater measure of control over their lives in relation to their changing technological enviroment, individually and collectively, now and in future.

Such an aim, I submit gives a useful *carte blanche* to any progressive teacher. To achieve this aim a number of focus questions are poised which, it is suggested, the teacher should seek to answer by an examination of at least four areas of study, to achieve these objectives.

A. Skill Based Objectives

The committee feels that it is desirable that each "student should acquire those practical skills which will enable them to interact effectively with everyday computer application whilst developing the intellectual skills necessary to recognize, discuss and control the effects of computer technology on their lives."

B. Knowledge and Understanding Objectives

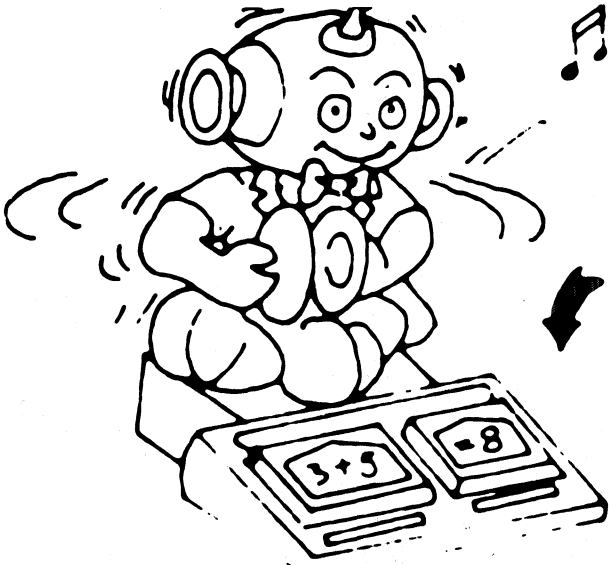
In this area the committee has submitted to the Secondary School Board that "students should be comfortable with sufficient technical knowlegde and terminology to achieve the skills and objectives. In addition, "the committee suggests" each student should be given the opportunity to acquire sufficient knowledge in the chosen areas of study to assist the student in understanding and confidently discussing the issues raised by the developments in computer based technologies as they relate to the student. The knowledge objectivies must therefore "in the opinion of the committee" be relevant to the students' individual needs."

C. Objectives Concerning Attitudes and Values

In this respect the committee sugests that "students should be provided with opportunities to explore attitudes and values associated with the ways in which computers and computer related technologies shape the future quality and direction of society and to recognize and classify their own attitudes and values with respect to controversial issues". Thus the committee concludes "students should be encouraged to develop an alert, enquiring, and critical attitude to computers and their related technologies."

It is my belief that should the Secondary Schools Board see fit to accept such a Syllabus it will give ample scope for progressive teachers to school their students in a radical range of survival skills for the new age. Certainly such students ought to avoid "Future Shock".

Whether or not the board accepts such a course remains to be seen — even if it does the Minister could still reject the whole lot as "trendy middle class bullshit" a favourite phrase of his for describing anything remotely progressive in N.S.W. Education. In any event if the course does come on line just what results are obtained will depend upon the political and ideological stance of the teachers concerned. The potential exists within such a structure to light a lovely little social time bomb for those willing to try. In any event should the aim and objectives be effectively taught then the bourgeoisie will be somewhat dismayed with the role of NSW Education in the infrastrusture of their state.



5. The ROBOT nods it head, lights its eyes, and claps, if the answer is correct

FUNDING SCHOOL COMPUTERS

School computers are usually funded by one of four ways. These are:

— Using general school funds.
— Using funds raised by school groups, such as the P&C, or other community groups.
— Using funds from the Disadvantaged Schools Programme.
— Companies occasionally donate computer hardware and/or software to schools. This is usually when there is a relevant business in the local community.

IBM and Secondary School Computer Education

IBM Australia is sponsoring a computer education program in cooperation with the State Government education bodies and teacher education institutions. The aim, according to Neil Reid, IBM's Corporate and Scientific Programs Manager, is ' "helping secondary schools," ... "to determine how they can derive maximum benefit from the use of computers in achieving educational goals." '[1]

Phase I of the program commenced in May 1984, in Sydney when lecturers from the U.S.A. conducted lectures to teacher educators from N.S.W., S.A. and Qld. as well as Canada, New Zealand and Malaysia.

Phase II is for these teacher educators to plan and conduct "in service" professional development programs in their own states. Phase II will include the provision of classroom computer laboratories at the University of Sydney, Dept. of Education, University of Queensland, Faculty of Education and in South Australia at the Angle Park Computer Centre. These labs will be used for the teacher "in service" programs.

Eleven schools have been chosen to participate in the program, and four teachers from each school are those to attend the "in service" in their states. Five schools in N.S.W. are involved; Three schools in S.A.; and three schools in Queensland; All Hallows, Springwood and Woodbridge. The IBM Quarterly, September 1984, elaborates on the choice of schools:

> '...They include public, State, Catholic, and independent with, among them, schools for the disadvantaged, and girls' schools. Schools were selected on their eagerness to participate, the make up of the student body, and their willingness for teachers to be trained.'

In Phase III, which is expected to be underway by January 1985, IBM will be setting up fully equipped computer laboratories in each school and planning computer application projects. They will also train other teachers at the schools.

From all aspects this seems to be a gallant project by IBM, they have even been "socially conscious" with their choice of schools, hence avoiding a possible criticism. The September Quarterly closes with a summary of the expected benefits of the project:

> 'The benefits of the program are expected to be increased student interest and learning opportunities in a broad range of classroom subjects, such as history, geography, language, mathematics, science, and business, as well as improved employment opportunities.'[2]

There is already the assumption that computers in schools are capable of these achievements!

What is not mentioned is what benefits there are for IBM. While ...

> 'IBM Australia will contribute 221 IBM Personal Computers and software to be gradually introduced in three States in a $2.5 million program.'[3]

They must be expecting significant returns on this investment.

Footnotes:

1. 'Each One Teach One', **IBM Quarterly** Sept. 1984, Vol 11, NO.3, p.9.
2. Ibid. p.9.
3. Ibid. p.8.

Lisa Weingarth

COMMUNITY COMPUTERS

Community Information Computer Systems is a CEP project at Canterbury CYSS which is introducing microcomputers to community centres in the Canterbury Municipality for community information, word processing and accounting. We are using Apple 11e microcomputers and an integrated software package of database, word processing and spreadsheet (the jargon term for accounting) called Appleworks.

Our first implementation site, Riverwood Community Centre is almost completed. Canterbury — Earlwood Caring Association is our second site which will commence soon after. A third partial implementation site where there is already a microcomputer is being discussed.

Amongst the tangible benefits to centres are easily accessible, up to date community information in the form of printouts for centre workers and volunteers who have an information provision function. Word processing and accounting provide faster, easily accessible central information and documentation in areas ranging from letters, to management committee minutes, to submissions, to, potentially budget details.

A less tangible benefit of the project is that centres have an opportunity to investigate and evaluate their work flow patterns with support from the project.

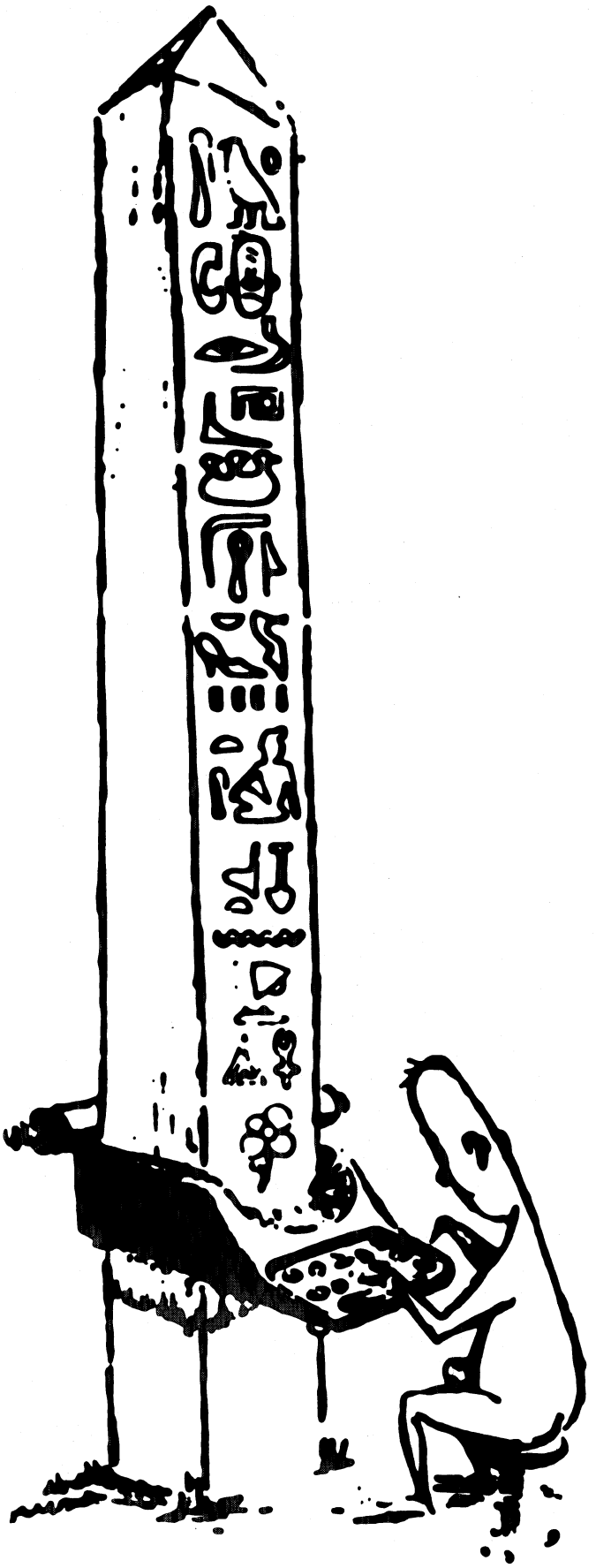
Community education about computers is a major intangible benefit of the project as volunteers, centre workers and management committee members are being trained in the use of microcomputers. Providing an introduction for people who would otherwise have little, or no, hands on experience with computers, or opportunity to use and perhaps enjoy, the quick but not very bright machines that have become a common tool. Volunteers in particular have a high interest in using the system and appear to enjoy using it. Thus at a grassroots level, demystifying technology.

Community Centres are being resourced with technology they might have difficulty acquiring for themselves. Community agencies tend not to have skills in the selection of and development of these resources, as community work appears to be one of the last areas to investigate the usefulness of computerisation. With resourcing and education they can effectively evaluate computerisation as a useful or not direction for their agencies. As a further contribution to this we are planning an end of project report on computer equipment suitable for small community organisations.

The project provides centres with potential for a greater profile within their local communities through selective use of their printouts. Greater liaison between agencies is expected through mutual education and technical support and information file sharing.

Margaret Cobb.

Margaret can be contacted by phone on 750 4333 and will be happy to answer any queries about the project.



REVIEWS

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by Cynthia Cockburn
Pluto Press, London, 1983. $14.95

It is unusual for feminists to write about men, particularly as *workers.* After all, the vast majority of books about work are already about male experience; even when looking at *gender* and the labour process, feminists have been most concerned to record *women's* experience. Cockburn takes us back to the subject of men: but what is different about her study is that she prioritises the sexuality and gender of male workers. In the printing industry she has choosen a particularly macho territory during World War *II* "three hundred retired members were wheeled back to man the barricades against women"(p.37.).

Brothers is based on fifty in-depth interviews with craftsmen in four newspaper companies, two in London and two regional. Changes since the late 1950s are briefly situated in the history of printing from the Caxton press through to the advent of linotype in the late nineteenth century. Hand typesetting required a dexterity that completely belies the myth that men are 'naturally' clumsy. Operating the linotype looks like a more repetitive and monotonous job, the main skill being in justifying the right hand margins. Yet because it was done by men it could be experienced as challenging and satisfying (p.48). The last twenty years have seen the shift from linotype to photocomposition which has become a fully electronic process. With the introduction of the QWERTY keyboard, compositors are becoming, in their words, "glorified typists" (p.95) and are in the process of disappearing as a separate occupation.

In interpreting these changes Cockburn does a wonderful job of "unpacking" the notion of "skill" and exploring the sexual meaning of work degradation. Men rely on work as a prop for their masuline identity; yet work can be fragmented and deskilled and "a man's tool made to look impotent beside the employer's new machinery "(p.135). Cockburn reminds us that partiarchy is about relations *between* men as well as between men and women. As the work becomes easier and more generalised, and the compositors feel themselves slipping down the scale "it is impossible not to sense a competitiveness and fear that has a sexual basis" (p.155). Not only is it a descent from "the priesthood of production" to the level of the common *man* but a descent to the level of woman.

Men have fought hard to keep women out, because their presence would destroy the mystique of male skills on which male superiority is based. Futhermore, men's relation to each other is mediated through the coinage of women, in a process of 'cultural rape' (p. 186). When a women turns up in a man's workplace, expecting to be decently treated "she asserts her own estimate of her worth and her own definition of her sexuality, in defiance of his" (p. 186). For men, Cockburn argues, sexual difference is based on the prinicpal of complementarity. Women, whether wives or whores, are there to complement men. In seeking to do the same work as men, women threaten to smash his complementarity, and therein lies the threat.

> Men like to think that women have "an innate aversion" to machinery (p. 177), but in associating masculinity and machinery fail to see the connection with the methods of modern management. In the words of a printer earlier this century, it is "non-moral, impersonal, machine — like, automatic; and now we are being machined in every possible way" (p. 79).

Male craft exclusiveness has often been exercised as a way of organising resistance to capitalist exploitation. But there is more than one way to go about this, and alternative choices can be made. They will involve the broadening of the horizons of trade unionism and a redefinition of work: an equal sharing of both productive and reproductive work by men and women. The way is open for a reassessment of *all* our skills, a proper valuation of women's traditional skills and a critique of technology that goes far beyond that developed by trade unions to date.

In drawing out the connections between class and sex, Cockburn applies what has become known as "dual systems" theory to explore the relation between capitalism and the sex/gender system. Her treatment is considerably more sophisticated and flexible than its American counterparts for she stresses that we should not be looking for specific locations of either system. Particularly does *not* reside in the interstices of capitalist society and the two systems are at the bottom, only conceptual models.

"It is as though we have in front of us one of those drawings used to illustrate optical illusion. We look at it one way and interpret it as a particular shape. Suddenly our perception switches and we see the same lines form another object, another meaning. One is the image of a class structure, the other of a sex/gender structure."(p.195-96)

The strength of Cockburn's book lies not in the "correctness" of its theory but in its rich insights into concrete situations and struggles. I felt moved that a feminist could write with such humanity about a group of men who have for so long displayed their contempt for women.

Cockburn offers us hope but no easy optimism. We *may* be in the process of building of sex-equal society but its just as likely that partiarchy is merely giving way to another form of male superiority. She concludes by warning that *only if masculinity ceases to be a factor determining working class organisation, action and imagination, will we avoid a fascist future and achieve a fully human one."* (p.219, italics hers)

Rosemary Pringle

New Information Technology in Education

by David Hawkridge

Croom Helen, London, 1984 £ 6.95

This book surveys developments in the field of educational technology up to 1982. The author is Professor of Applied Educational Sciences and director of the Institute of Edcuational Technology at the Open University, Milton Keynes in the United Kingdom, and although some attempt has been made to include developments in the United States and Japan, the majority of the material is drawn from the United Kingdom experience. The author avoids the common mistake, however, of equating a new technology with computers alone. Videodisks, cable television and the various forms of teletex transmissions are also considered.

On first acquaintance the book seems to have little to do with education. The text is divided into four parts, each of around six chapters. The first part, entitled "A Survey of New Information Technology", contains the usual definitions and explanations which seem mandatory in any book remotely concerned with computers. Chapters entitled "Symbols, Codes, Languages and "Makers and Sellers" provide a perfunctory introduction to some of the concepts of computing and communications, and the industry forces behind the pervasive spread of computers, respectively.

It is not until the second part that the value of the book begins to appear. Titled "New Information Technology for Learning", this part is divided into six chapters covering pre-school children, primary and secondary schools, tertiary education, vocational training and informal learning by adults. The coverage is based on studies by other workers in the field and anecdotal evidence, coupled with some solid information on particular aspects of educational computer programs from various suppliers. If it saves the cost of one dud computer program the book would have paid for itself.

The second part of the book provides an overview and examples of the use of new technology in education at all levels. Based as it is on second-hand reports however, it is largely uncritical and only briefly concerned with problems posed by technology in education. Part Three, "Problems and Constraints" restores the balance. The author defines and briefly explores five problems; the availability of suitable software (or "courseware"), the possiblility of an over-emphasis on educational media rather than the educational process, changes in the role of teachers, the possibility of widening the divisions between able and less able students, and the weakening of the educational system by commercial exploitation of educational technology. Following chapters place these problems in the wider context of social, political and economic contraints on the development and use of educational technology, but the emphasis is on raising points for discussion rather than any deeper analysis.

Part Four of the book may be considered an attempt to answer some of these problems in depicting three possible future scenarios for the use of technology in education. The three concluding chapters are titled "Learner's Heaven: an Optimist's Forecast", "Learner's Hell: a Pessimist's Forecast" and "Neither Heaven nor Hell: a Personal Forecast" and attempt to predict the outcome of the present ferment of activity.

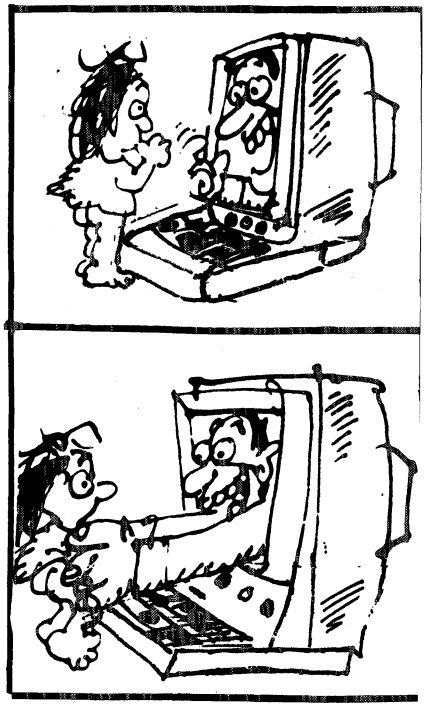
In the first of these chapters the author lists some desirable goals equal educational opportunity for all continuing, freely available access to information to suit all individual needs. Sections of the chapter then proceed to apply these ideals to the specific cases of children at home, primary and secondary schools, teacher training, tertiary education and continuing adult education, focussing on the benefits to be derived from the use of new information technology in education.

Again, however, the following chapter restores the balance, listing problems which are likely to arise. Decreasing budgets and the decline of education, increased dominance of education by private interests or education overwhelmed by technology are seen as the issues here. The author asks, however, why such developments should raise opposition, and answers his own question by writing "They will challenge deeply-held values, derived from pre-industrial society, and long-established practices, and will call in question much of the activity with which teachers and students fill their schooldays." In contrast to his earlier concern with the development of new elites, he now asks "why should we learn to read, and which of us should do so?" given the coming wide use of electronic speech recognition devices.

In the final chapter of the book David Hawkridge gives his personal forecast, "Neither Heaven nor or Hell" In a way this is the most disappointing chapter of the whole book. No doubt by the year 2000, "new instructional paradigms" based on the widespread availability of computers will begin to appear, and possibly the ideas of Seymour Papert concerning the LOGO language and the computer as an "educational laboratory" will have a wider following. Also, no doubt, information technology will be almost completely under the control of large international corporations serving their own commercial interests, as it is now. At the end of the last chapter the author summarises his view as "here is a new technology with great potential for education... Can education take advantage of it? I hope so, but that depends on us."

Despite its academic pretensions, *New Information Technology in Education* is a lightweight book. It raises issues without discussing them in detail, provides a wealth of irrelevant information on communication theory and avoids any mention of educational policy or objectives. The best parts of the book are the discussions of other peoples' experiences in Part Two and the list of references for further reading at the end.

Peter Vernon



Girls and Computers: a South Australian Report

Lynne Symons, project officer, Equal Opportunity Office, S.A. Department of Education.

Over the last ten years researchers have been investigating the generally poor performance of women in mathematics. In schools, they have found: a lack of positive role models, less active involvement by girls, less response from teachers to girls, lower levels of confidence than boys, sexist curriculum materials. Much of this can, and is being, changed in an effort to equalize girls' chances of success. It is important that this is so. It is equally important that, with many students, we question the value of this maths, that acts as a hurdle to (as one film says) "careers that are exciting and financially rewarding." Doctors — how much do they use their maths? How often have you used calculus or the sine rule since you left school? Or is it for logic that we teach so much maths? Maths teachers are not noticeably more logical in their everyday lives. Logic, anyway — the logic of following rules and asking no questions is still more prevalent in maths teaching than the logic of investigation, understanding, problem solving. Amongst all the other reasons, those who shy away from maths are alienated by its rigidity, by its experts ("it's true because I say so") and by its apparently total irrelevance to their lives. Women should be given a chance to let go of their fear, to experiment, to take risks, but at the same time we should ask how maths can be taught, and used, for a more human and democratic society.

Is Computer Education in the same situation? It is early to know, but some of the signs are there. Many of the key issues identified in this valuable report are similar to those documented in maths, and also in other areas of the curriculum (eg physical education). However, the project, coming as it does at an early stage in the development of computer policies in schools has a chance to affect the curriculum, not through intervention, but by taking affirmative action *before* programmes are well established — and such is its stated aim.

The project, from the S.A. Education Department, followed two reports issued in 1983 by the same Department — *Computing in Schools* and *Education of Girls in S.A.* — and was designed to investigate their possible interrelationship. (Policy statements from both reports are included in the appendices).

Key components considered were: curriculum (both computer studies in itself and the use of the computer across the curriculum), software development and use, professional development (at system and school level).

Different sections of the report looked at ways in which to raise awareness of the issues involved (with useful accompanying checklists), strategies for dealing with these issues, and possible future initiatives.

A comment, included in the report, from a related women's conference gives an idea of how computer education can raise fundamental issues:

> My main reaction to the conference is extremely positive. The organization was excellent in providing a balance of philosophy and practice. It also covered a broad sweep of the field from the very basis like what does a 'data base' mean to the very important questions of software content, control of information and the question of who owns computing in the school.
>
> The major concerns I have arising from what I've read and from what I've learned here over the last two days are: the notion of *linear* thinking — does this create a more docile citizen who sees things as black and white and loses the power of lateral solutions?
>
> The rush of computers into the junior primary school — does this mean that children will be launched into the assumption that machines can do the writing for you before you've actually learned to do it yourself? I'm not convinced by the argument that parents are demanding them and they're already in the home. I think that schools can make their own 'what's best for the children' decisions.
>
> The continuing control of the computing area by the science and maths fellas. This has serious implications for girls but also for the shape of the world.

Okay then, are you using computers in your school? If not, why not? If so, why? Both questions need answers.

Betty Johnston

REVIEW —

Blood and Iron

by Peter Mason, Ringwood, Victoria: Penguin Books, 1984. Paperback, $7.95.

Broadly speaking, views on the relationship between science, technology and society are of two kinds. The first treats the history of science and technology as relatively independednt of society (i.e. politics and economics). The relationship is blandly described by referring to the social implications of science or technology. The second theory — correct in my view and adopted by Peter Mason in this book — treats science, industry and the technology as social processes from the beginning. A good deal follows from this viewpoint. If one sees society as characterized by struggles between unequal classes and the domination of resistant masses by powerful political interests, then questions addressed to science, technology and industry will reflect this. Marx's discussion of machinery in *Capital Vol. 1* is a famous example of this line of inquiry. More specifically, it leads to questions about what interests are served by science, about the politics of technology, about how armaments relate to employment, and technical progress relates to war. The essence of Mason's argument is that science harnessed to killing human beings is, and historically has been, given much higher priority than science for maintaining and enriching life.

In many respects *Blood and Iron* is a charming look at some of the darker apsects of modern industrial capitalism. Woven through the account, and designed to make the story of steel production and armaments manufacture humanly intelligible, are a series of human lives, both real and fictional, though historically plausible. These lives — representative of political and economic interests and social classes — emphasize the simple but nonetheless profound point that it is people who make history though not always, or even often, in a manner of their own choosing. For example, the Krupps family, who are the principal actors on Mason's stage, are shown to be locked into a ruthless competitive drive with other capitalists such as Vickers and Armstrong. The Krupps are also tied to the real constraints of the emerging German state under Bismark and later under Hitler. At the other end of the scale we find the (fictional) Taine family are variously defeated, killed or exiled in a struggle which is shaped by Franco-German relations and class conflict in nineteenth century France. Between these two extremes we find a cast of scientists, technologists and entrepreneurs who typically, in the pursuit of knowledge and profit, serve the revolutionary development of a capitalist world system tied to permanent warfare.

At each point in the book Mason makes the political links between industry and science explicit. To cite a few examples: the Crimean war led to improvements in steel production; the same war was historically significant in laying the basis for the military-industrial state; Bismark's politics provided a framework for linking patriotism (i.e., making better guns) to profitability; from the late nineteenth century armaments production in England was justified in terms of its desirable effects in providing employment. None of these examples, and the many others besides, is made abstractly but always in terms of the personalities involved and the interests they represented.

This style of presentation is the book's signal strength. Devised originally as a set of radio talks, Mason's chapters provide an easy road into the politics of technology. Pedagogically the book would be useful reading for senior high school students and would certainly widen their perspective from the typically narrow diet which is served up in our modern secondary schools. Indeed, the book might well serve as a way to link parts of the curriculum which, by being done in different periods and rooms, convey to students a false sense of independence between subjects. At the same time, by connecting science to warfare Manson's history gives some basis for understanding the role of science in the modern world. Beyond these political-scientific linkages Mason also helps the reader who is new to this area to make geo-political links. While nation-states and economies remain important for Mason's account, it is really the international relations which define the key to understading the impelling ambition of the Krupps and the equally impelling resistance of the Taines.

However, despite these strengths the book has serious weaknesses which should be identified by a critical reader or teacher. The method of telling a human story which centres on personalities also tends to trivialize the history, for the real class interests are easily lost in the mass of intriguing personal details. In teaching about the politics of science these personal facts are, in the end, singularly irrelevant and the critical teacher must be careful to move her or his students beyond them. Otherwise, students may actually come to believe,, as Mason implies on p.175, that the arms race is the prime invention of Alfred Krupp. It is, rather, the other way around.

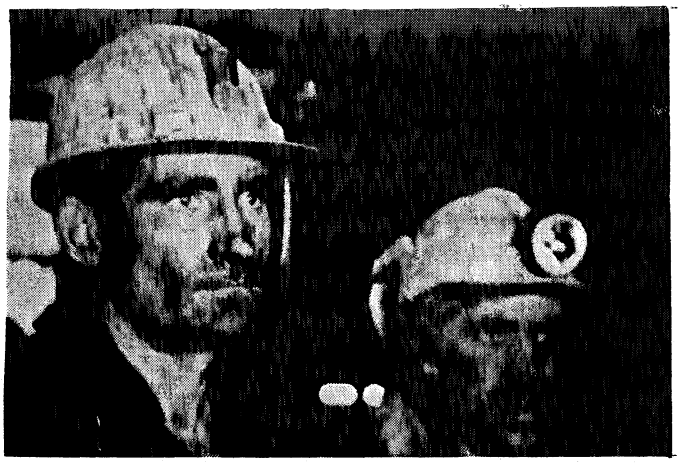
My other main point of criticism is Mason's naivete about what is required to move beyong the war economies of capitalism. Essentially his answer is flexible capitalism based on industrial democracy and cooperative managment. For example, he cites approvingly the Nuclear Corporation in America which has moved tentatively in this direction and the well-known Lucas Aerospace plan which came to grief. Mason concludes (p.178-79):

> The resistance of management to giving away any of its power is neither surprising nor new ... Then struggle may be expected to continue for at least another sixty years: deep-seated attitudes take a long time to turn around. But the Lucas workers have made a powerful demonstration, and similar schemes are being explored ... Their ideas will continue to spread until not only the Krupps and the Carnegies, but also the descendants of the Lovedales, Schillers and Taines, the foundry-workers and cooks, the secretaries and scientists, all get a say in what their lives are actually achieving.

This is a falsely optimistic liberalism which Mason's historical analysis should have warned him against. That it did not, apparently only shows how difficult it is to be really scientific about science and society. This flat conclusion to an interesting book stems, in part, I think, from Mason's tendency, already noted, to personalize history. In this way he loses any insight into the future and what he proposes for the present — gradual attitudinal change — lacks any creditable acuity. Thse problems in the book are considerable and cannot be ignored. Yet if treated critically the book does have a place in a curriculum devoted to a really useful and politically relevant education.

John Freeman-Moir.

KEMIRA DIARY OF A STRIKE



REVIEW: — *KEMIRA DIARY OF A STRIKE*

16mm colour 62 minutes at 24 fps. Producer, Director Tom Zubrycki, Editor Gil Scrine Distributed by Sydney Filmmakers Co-op. Rental $60 negotiable

In viewing *Kemira: Diary of a Strike* one is watching the making of industrial history. The actors were not professionals: they became 'actors' due to the director Tom Zubrycki's alertness in sensing the opportunity to record on film the day-to-day struggle of those involved to retain their jobs.

The drama began in September 1982 when the BHP subsidiary, Australian Iron and Steel, announced its intention to sack 400 miners from six coal pits which supplied the company's Wollongong steel works. The pit worst affected was at Kemira where 206 of the 296 workers were to go. The company's reasons for the sackings was the fall in demand for coal. The unions felt that this was just an excuse to sack workers and introduce labour saving technology. Twenty days before the sackings were to take effect a group of 31 miners from Kemira began a sit-in protest. They were all aware that Wollongong's unemployment was twice the national average and that 800 workers from the company's steel works were also to be sacked by Christmas. They were spurred into dramatic action.

While miners were sitting-in the unions began proceedings in the Coal Industry Tribunal. The film goes on to record the sequence of events as the sacking day approaches and deals particularly well with three important aspects; (1) The wives and families of the sitters-in as the subjects of attention (ii) The support activities generated outside the mine (iii) The role of the arbitration authority as mediator.

In connection with point (i) above the film team has brought the wives and families clearly into-focus. They are not depicted as playing some secondary role while the main struggle is fought out elsewhere; rather they appear as central characters with problems different from those faced by the men underground, problems such as how to cope with being single parents tempoarily, or the housebreaking which the wife felt was intended to frighten her into pressuring her husband to end the sit-in. This focus on the problems of the individuals and of the interrelationship between public and private is when the film records the eventual marriage break-up on one of the couples involved.

In connection with point (ii) above the film highlights the support given to both men and women by the local union apparatus. One is left with a strong sense of the value of age and experience. The local organisers of the support network have obviously been involved in industrial struggle before. They were simultaneously ministering to the families, providing food and comfort to the men underground, developing the struggle in the public arena such as marches adn demonstrations, mass meetings of steel workers and coal miners not yet affected by sackings, the organisation of the protest demonstration to Parliament House in Canberra and support in the Coal Industry Tribunal for the case being argued by the union officials.

Point (iii) above highlights a critical issue: That control of productive property in the public service or in private industry gives rights to order people around, in this case to order people out of work irrespective of the social consequences. The film shows clearly though that the controllers of property don't necessarily get things all their own way. In particular it reveals the effect of social pressure on bodies such as the Arbitration Commission. For example, right from the start the unions were arguing for a moratorium on the sacking but it was day 14 of the sit-in before the Coal Industry Tribunal made that recommendation which the Company declined to adopt. But by day 16 with the further build up of pressure the Tribunal ordered the Company to suspend the notices. At this news and after consultation with the union officials the miners surfaced; they had wont he first stage of the struggles. In the end they were saced. Their sit-in action had bought them valuable time during which they had generated wider public awareness of the seriousness of the jobs crisis and had been a spur to the subsequent Wollongong to Sydney 'Right to Work' march.

The film finishes with the announcement by the incoming Hawke Labor government in March 1983 of financial aid to BHP followed by the BHP takeover of Utah for $2,500,000,000.

The viewer is reminded of Hayden's words to the Canberra demonstrators that the main thing was to get rid of the Fraser government. Cold comfort.

This is a good film. It is made by people who are technically competent and who are sensitive to the many and varied ways in which the effects of social and industrial power are felt.

Gerry Phelan

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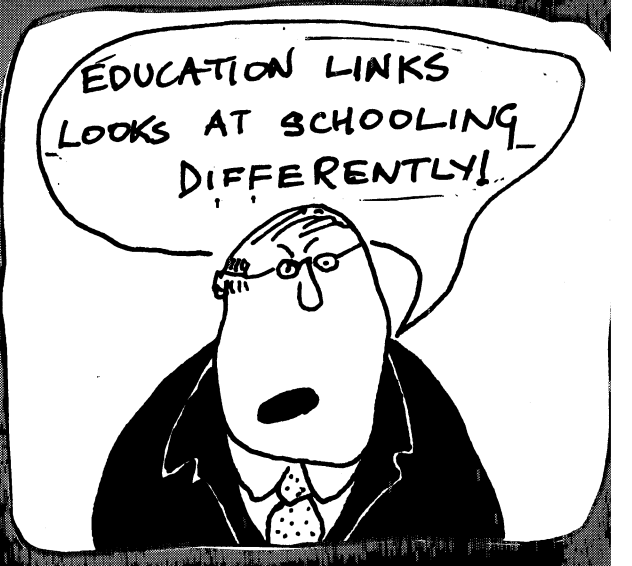

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