The Electronic Bureaucrat : *Yorick Wilks*

It seems a long time since 1964 when Harold Wilson's main platform point was a commitment to the automation and modernisation of British Industry, and to the insight that modern political life meant automation under socialism or mass redundancy under capitalism. Then came disillusion with the ability of the last Government to carry out that commitment, and, moreover, with the idea itself. Great numbers of people, not only in the Conservative Party and among the student radicals, but on the serious left also, began to say that extensive use of computers in our society might be a very bad thing indeed. Nor is that phenomenon particularly British, for the voices of disillusion sound louder in the United States, where most of the computers in the world are. There is a general failure of what Paul Goodman would call "millenarian nerve".

The crisis, if that's the word for it, stretches out in other dimensions: it passes beyond a universal dissatisfaction with the way things are being run in science and industry. The same author would say that we have a "religious" crisis on our hands, and that "an attack on the American scientific establishment is an attack on a world-wide system of belief".[1] It certainly stretches more widely than technology and science; and extends at least to the criticism of social authority, particularly bureaucratic authority, and to centralised bureaucratic authority at that. None of these aspects of the problem are new: religious crises have been survived before and, after all, it was not Mr. Heath who first thought of the idea of "getting the Government off people's backs". The writer of the *Tao Te Ching* warned rulers that,

"Listlessly govern
Happy your people
Govern exactingly
Restless your people".

The US Government's better conceived programs are off-the-cuff proof, if it were needed, that the use of advanced technology,

[1] P. Goodman, "Can technology be humane", *New York Review of Books,* 20 Nov. 1969.

together with centralised planning, does not lead necessarily to the laudable humanist goals of the planners. The increasingly general acceptance of that belief has created a particularly difficult position for what one might call the traditional Fabian, to whom it was first principle that the most efficient, reasonable, and scientific use of resources, guided by a properly intentioned Government, were all that was needed to settle most of a country's domestic political problems. He is more than usually beleaguered between left and right, because opposition to centralised technological planning is a point on which much of the left and right now agree.

I want to argue in such a way as to allay some of the fears I have mentioned. I want simply to assume that many of the grosser manifestations of our new technology can be self-correcting, given the proper legal and economic measures,[2] and that technology can in principle destroy all the garbage it produces. With regard to the second Industrial Revolution, in particular – advent of the computer, intelligent machine or what you will – I want to argue that:

(a) the manifestations of the "computer nightmare" are much further off than many of the news media lead us to believe.

(b) much of what people fear would in fact be good and useful, and, in any case, far far better than the alternative, what I shall call the "Kafka nightmare".

(c) fear of scientific development is particularly inappropriate on the left, much of which should know better.

(d) a range of traditional socialist goals can be reached with an extended use of a computer technology, and even with that at present available.

(e) such goals would be concerned not just with welfare, but with more tenuous notions like human freedom and the democratisation of social control.

In many ways an extended computer bureaucracy could provide

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[2] The threat most written about is that to individual privacy from computerised records, which I don't intend to discuss here. There is no doubt that with the use of pass-words, and areas of a computer to which access is difficult, it is possible to keep the wrong people away from information. In commonsense terms, it would be an extension of the means now used to keep a computer user from destroying the program he's running.

The extent of the danger has been surveyed in such books as A. A. Thomson, *Big Brother in Britain Today*, London 1970. Technical suggestions to counteract abuses are contained in the works of Paul Baron of the RAND Corporation, and of Prof. A. F. Westin.

the advantages of decentralisation without sacificing the traditional advantages of centralised information and planning.

This whole note is really a plea that socialists should again take technical advance *seriously*, as most Nineteenth Century socialists took it seriously.[3] If one thinks of the tradition of scientific socialism it seems odd that one should have to make such a plea. Disillusion with science now seems almost total on the left, and yet there is no reason, simply because one has given up Marx's belief that scientific advance *must* bring socialism with it, to stop looking to see whether in fact it might, or could be made to do so.

In what follows I make a suggestion as to how radical automation, not so much of manual labour as bureaucratic labour, could go some way towards meeting the demands of workers' control as well as contributing to other traditional socialist goals. What many concrete demands for such control come down to are *access* not only to records and company accounts, but to the determining factors in the decisions taken at the top level in any company. It is these latter that many companies keep firmly to themselves, on grounds of their complexity as much as their confidential nature. It is just this access to records and the bases of decisions that bureaucratic automation could improve; and the more accessible such vital facts are, the easier is spread control over the use made of them.

What is needed in Britain, at least as much as the automation of manual labour, is that of other fields of activity, and in particular, large areas of bureaucratic and managerial society. It is a presupposition of everything else I have to say that there could be such automation, here and now, with the computers at present available. I am not discussing a *possible* situation where the outstanding problem of "artificial intelligence" had been solved; a situation, that is, where machines could at least translate languages adequately and be said to understand what they read. The reports one reads frequently in the papers saying that computers can do *these* things are almost necessarily false. That can be known with some certainty, because any such technology must be preceded by successful research, and, as of now, the relevant research has just not been done. The United States Government, in particular, invested a great deal of money between 1955 and 1965 in what was called

[3] [Yorick Wilks addresses this article primarily to socialists; we believe that what he has to say concerns anyone interested in what is happening in our society, including Christians, whether they are socialists or not.—Ed.]

Mechanical Translation. By and large all that work, including most research in what is usually called Computational Linguistics, came to nothing.[4]

There is not, and never was, anything wrong with the machines themselves: they are still the faithful plodding slaves they always were, faster and more compendious than ever. Three feet of the magnetic tape most computers use can now store all the contents of a 300 page book, and a commercially available computer can read those contents in 10 seconds.

What is lacking is the programs, the routines written by programmers, that will make these machines show more than minimal intelligence or judgement. Much more could be done now with the computers and human ingenuity already available, but there is no sign of any impending blossoming of machine intelligence that should make anyone feel in the least threatened. It is not known whether there are any theoretical limits on the intelligence a machine *could* show, other than a highly formal one in the field of meta-mathematics.[5] What is sure is that any advances will produce more *machine* intelligence. It will never, nor could it be, *human* intelligence, and I think many people's worries arise from identifying the two.[6]

The main reason why we are not nearer to the automation we could now have is that there are probably ten times more computers per million population in the United States than here, though when the Conservatives came to power nineteen years ago we had the only large computers in the world. And, it should be added, that after six years of Labour rule our ailing computer industry was little better off and could even now succumb entirely.

A simple number count of computers can be misleading these days because they come in many sizes, but what is sure is that by any measure we have less computing power per head of population, not only than the United States, but than almost every country in

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[4] The official epitaph on those millions of dollars for research is contained in *Language and Machines: the computer in translation and linguistics.* Government Printing Office, 2101, Constitution Ave., Washington, D.C., U.S.A.

[5] Some would argue that there are much lower limits on machine intelligence. See the highly readable H. L. Dreyfus, *Alchemy and Artificial Intelligence,* December 1965, Memorandum P.–3244 of the RAND Corporation, Main St., Santa Monica, California, U.S.A.

[6] [See also H. L. Dreyfus, *Pseudo – Strides towards Artificial Intelligence* in T. to T. II, ii, January 1968.—Ed.]

Western Europe. We are a very long way indeed from the reported[7] situation at the Massachussetts Institute of Technology where a $35,000 computer was stolen and not missed for weeks.

A second main reason for backwardness in the U.K. is not only the lack of desire to invest in computers but the many things that go wrong when British management do buy them. They install them often enough as a concession to what they think of as public, or shareholders' opinion, but then fail to create the conditions in which the machines can be used efficiently. It has been argued recently[8] that over 40% of all the computer installations in the U.K. are inefficiently run. What that means in many cases is that their use is restricted to payroll and account calculations, which are the sorts of manipulation they do least well. One reads complaints from managers and administrators that their clerical workers are not being replaced by computers in the way they were led to expect, but the reason is usually the way the machine is being used, or misused, by that particular organization.

There is a parallel here between the "concessions" made by management to workers on the one hand, and to the forces they see as pressing for the installation of computers on the other. In both cases certain forms are gone through, but in neither is there any real penetration, or disturbance, of the existing management situation. Yet, as Stafford Beer[9] argued, in the computer situation, that is exactly what must happen if there is to be any point in installing powerful computers at all. The set-up itself must change to accommodate them, which means *changing the form of the information* passing through the system of organization. In practice that means being far more selective about information: not so much about what goes into the machine as about what comes out. A classic case of failure to observe that was reported[10] recently. The members of the Finance Committee of Inverness Town Council were presented with accounts in the form of a continuous folding sheet of 200 big paper pages 105 feet long. One member of the Committee recorded his comments on trying to understand a document spread all over the walls and floors of his home.

It could get a lot worse without the use of more intelligence and discipline when producing information from machines for human

[7] *Times Business Supplement*, 27 October, 1969.
[8] *Observer*, 7 June, 1970.
[9] Stafford Beer, *British Institute of Management Bulletin*, Vol. 1, No. 11.
[10] *The Scotsman*, 28 August, 1969.

consumption, rather than that of other machines. For example, the U.S. Government records take up some 25 million cubic feet of paper. If you were to throw away a page a second, it would take over 2,000 years to get rid of the lot. Yet, even a fairly old fashioned computer can turn out a pile of paper a mile high in a year. It is that sort of possibility that led Joel Kibbee[11] to suggest the need for a "data retriever's licence".

But, of course, this isn't a horror story and machines can and should be programmed to produce output for people with finite lifetimes. Moreover, the world of computers is itself changing. For the purposes I am discussing the machine that produces a pile of paper a mile high – it is the same as the large fizzing machine one sees in all cartoons about computers – is itself out of date. The important revolution of the last few years, from the point of view of the person who wants to use the computer, is the real-time multi-access system.

"Real time" means that a job doesn't just go into the works of a computer with an answer popping out so many minutes or seconds later, for in real-time a human operator can be informed whenever he wishes of what is going on inside the machine. He can stop the process at any point and offer new information; or he can ask for an up-to-the-minute report on progress. In that sense the machine is working within the same, or "real", time scheme as the human operator, and not only one determined by its own operations.

"Multi-access", on the other hand, means a machine that many people can use at once; usually by means of mechanical typewriters (teletypes) or screens, that both the operator and the machine can write on. These teletypes and screens can be in the office or home, and at any distance from a central machine to which they are all connected.

In both these ways the modern computer has moved away from the popular image of the big "batch processing" machine, capable in many people's minds of controlling human beings as if they were robots. The real-time multi-access machine, which need cost only £2,000 while being as powerful as the biggest computers of 20 years ago, is much more suited to the role of "electronic bureaucrat": not a controller at all but by turns a secretary, helper, advice giver and administrator.

[11] J. M. Kibbee, *The executive and the information explosion,* System Development Corp., Santa Monica, Calif. SP–2777, March 1967.

I shall want to argue that many of our present man-bureaucrat relations would be better replaced by man-machine, or rather man-electronic bureaucrat, relations, and that much more could be done along those lines with the machines and programming skills at present available. What would be examples of these dispensable man-bureaucrat relations?

One of the best places to start is tax calculations. Unlike the United States, the British authorities still want to check every tax payer's returns. In the United States one taxes oneself, and only a sample of the returns are individually checked. This simplification enables the U.S., with four times our population, to manage with about the same number of tax officials as ourselves. Added to that problem, the structure of our tax system is so complex that in one case, that of Corporation Tax, the officials simply refused to calculate it on its introduction and, one might add, why should they?

If British Tax Policy remains what it now is, then there is clearly a situation ripe for bureaucratic automation. But what of the man-bureaucrat relations involved? How many people do not understand their annual tax declaration forms, or their code or tax assessments, yet know that there is nothing to be gained by trying to locate a helpful official in the local Government rabbit-warren?

It is not hard to imagine how different things might be. Teletypes could be made available in large numbers in public buildings, so that those who wanted could be asked questions at them, and their answers would themselves constitute that person's tax return. A simple system of identifying the user by means of a plastic card inserted into the teletype, or better still by the use of pass words, would prevent a return being filed by the wrong person. If, at any point the tax payer did not understand the question he was being asked, he could type that in, and have the questions simplified or rephrased.

A situation even more suitable for this approach is welfare benefits. It has been revealed[12] that the Ministry of Social Security issues over 3,000 kinds of claim form for all types of benefit, and administers about the same number of *kinds* of means test, while the local authorities administer 1,733 means test schemes (3,146 with rent rebate schemes added in). Not surprisingly, the same report reveals that over 90% of poor families fail to obtain the benefits to which they are entitled.

[12] *The Times,* 17 October, 1968.

It has been proposed to remedy this by producing a booklet on "welfare rights",[13] but the difficulty then remains that the people most in need of it will be among those least able to obtain and make use of it. How much easier if the applicant had to do no more to start with than to sit at the teletype and type the word "help". Perhaps some less paternalistic and emotionally loaded word would be better, but that happens to be the one used in many programming systems to teach beginners the programming language to use. Once contact had been established in that way, the system could elicit, by means of a series of careful questions, the applicant's resources and needs, and then inform him exactly what he was entitled to. He could even make his claim formally during the same session at the teletype.

This possibility of tailoring what an American would call a "welfare package"[14] to an individual is the obverse of the common fear about computer storage of personal details. Storing personal details of this sort can enable people to be treated individually by a system *in ways that they want*, and in ways that would not be possible with merely human administration. Only with these sorts of contemporary bureaucratic advances can, for example, a big firm contemplate paying only those employees by cheque who want to be so paid.

A case where something is actually being done in this country is the calculation and despatch of all allowances that normally come by post – unemployment pay and so on. A system to calculate these and then address and despatch them is at present more than half programmed. Here one's complaint might be that although something is being done, the Government have not made this fact clear and public enough. But what about applications for passports: why do they still take three weeks? Development permission, permits and grants of every kind could be printed out more or less on the spot if the relevant information was provided for the computer by teletype. Student applications for admission to the Universities is another case crying out for some kind of automation of this sort.

[13] T. Lynes, *Welfare Rights*, Fabian Tract 395, July, 1969.

[14] J. Cogswell et al., *Design of a man-machine counselling system*. System Development Corp., Santa Monica, Cal. SP-2576, 1966.

J. K. Harris, *Automating Welfare*, System Development Corp., SP-2698, 1967.

R. M. Lind, *Automating Welfare – a commentary*, System Development Corp., SP-2699, 1967.

Again, it has often been pointed out that if overworked magistrates were reminded at the time of previous sentences in cases like the one they were trying, then the whole slow process would be speeded up, and at the same time something done to remove the scandal of "same offence, different court, strikingly different sentence".

On a different point, we could improve on the Swedish national list of job vacancies. Anyone contemplating a change of job should be able to sit down at a teletype, specify his qualifications and wants, and immediately get a typed selection of nation wide vacancies on the spot, with no copying or form filling. What, apart from cheap housing, could be more conducive to the greater job mobility we are always being told we need? And that would be only a first stage. With the developments at present available enabling machines to communicate with each other, it would be possible for the same man at the same teletype to initate applications to the machines of the firms of his choice.

In all these examples, the important common factor is that it is now a quite straightforward matter for the untrained layman to sit at a teletype and retrieve information from a computer. Nor does he have to know *in advance* exactly what it is he wants to know — that can itself be settled in the course of a dialogue between the user and the machine.

But my main point concerns not obtaining information but decisions, even though there is no clear line between the two. For deciding *what* information to give, or to ask for, in a given situation is clearly a decision itself.

A remark at a recent conference[15] could serve as a "negative text" for what I have to say. Speaking at a Council of Europe Conference on safeguarding privacy, a M. Juvigny said:

> "Once one relies on a machine to 'rationalize' options in expenditure, planning, development, military policy, education and the like, with all the rigidity that machine-made choices involve, then the very concept of democracy may be jeopardized."

It takes no great care to see that the force of this quotation comes from the pun on two senses of "rigidity". But as to its main claim, how may democracy be jeopardized? For it seems to me that, on the contrary, the possibility of automating large areas of our present managerial and bureaucratic structure offers not just added conveniences, but new possibilities of advance in our general

[15] *The Times*, 2 October, 1970.

thinking about society. The very existence of an "electronic bureaucrat" would effectively divide administrative decisions into two kinds. On the one hand, there would be those decisions that the mechanical bureaucrat was competent to take. These would be the vast majority of them; the routine decisions and those that result from direct calculation of any kind. On the other hand, there would be the decisions that it was not competent to take, those which required human judgement. These latter decisions would be the important ones and, to go back to the industrial context, they would be decisions which one might expect workers and citizens in general, to *want* to take part in making. Among the decisions needing human judgement would be those about what goals an electronic bureaucrat would pursue in taking its decisions. But, without some large-scale separating mechanism of the kind I am suggesting, problems like workers control will always get bogged down simply because of the *enormous number* of potentially mechanisable decisions that are required to keep any complex modern enterprise going. The first step is some such separation of the important from the unimportant.

An obvious drawback to any mechanical method of reaching decisions would be that anyone who accepted the goals and permitted methods that were submitted to the machine would be committed to accepting its answers, or decisions, as well. Unless, that is, there was also some procedure for reneging on those decisions if one really couldn't face the consequences of what it came up with. To take an absurd example, if the now notorious "Pentagon computers" were to come up with the suggestion that in the interest of world security nuclear weapons should be given to state X, then one might want to give up some premise of their analysis pretty smartly.

One *psychological* result of this way of going about things is that it would reduce, or eliminate, the present ability of those in power to rationalise their decisions; that is their ability to produce *some* reason for whatever course of action they had already decided upon. That kind of *ex post facto* justification would become irrelevant, and we would have to face up to bald decisions together with an invitation to inspect the premises, the program and the works.

But that situation would not be in any way a jeopardization or diminution of democracy. On the contrary, the fact that the real goals of any decision system would have to be clear enough and

public enough for a machine to operate them, would allow of greater democratic access to a notoriously murky area of British public life. Since the publication of Hewart's *The New Despotism* in 1926 there has been a slow but real erosion of the doctrine of Crown Privilege – the non-production in public of any of the facts that enter into a decision by a Minister or officials. This is shown in the Donoughmore Report, the Franks Committee's recommendations on tribunals, and the report in 1968 of the Select Committee. The automation of the bureaucracy could only assist in this trend, for the principles on which a machine works are always more accessible to judicial and democratic control than the unexamined principles of officials. Principles for an electronic bureaucrat must, and always will of course, have to be chosen by human beings by whatever political means are thought proper. And again, there will always have to be tribunals, and other human decision procedures, for the border line cases that are bound to arise in any field, where no automatic system would be competent to take a decision. But for the rest, there would then be a perfectly clear record of exactly what facts were and were not taken account of in the case of any particular decision. The printing out of reasons for decisions would then be not an occult but a routine matter. For, as Lord Denning put the matter recently *à propos* of legal decisions, if the reasons for decisions are not given the decisions may be thought unreasonable.

In making a case in very general terms I have conflated together the notions of bureaucracy and management: their growth seems to be a single phenomenon, witnessed to in East and West by James Burnham, C. Wright Mills, William Whyte and Milovan Djilas among others. The difference in their relative sizes in different countries is less important for this argument than their qualitative similarities. In this country it has always been Labour Governments that have been blamed for increasing the number of civil servants faster than ever before. And this criticism is both right and wrong. It is wrong in that socialist policies always require more *administration*, however little actual redistribution they involve. But the criticism is right in that the last Labour Government gave little sign that it understood the real nature of the automation problem. Indeed modern legislation carried through by any party requires so much detailed information and precise operation of rules for its application that it is not clear that it will always be

possible to execute it, as we do now, even with an infinite army of civil servants.

But one ought not to look at such a policy or situation primarily from the point of view of a civil servant or manager operating it, but rather from that of a member of the public, or employee, on the receiving end. The great restriction on the freedom of such a person is that he is subject to the mistakes, and above all the arbitrary decisions, of the official, where by "arbitrary" I mean decisions not taken in accordance with some rule. It is well-known that the rules for taking such difficult, but rule-governed, decisions as tax calculations are often not obeyed for a number of reasons: complexity, tiredness and sheer bloody-mindedness among them.

Those reasons should be thought about carefully by those who react automatically at this point in the argument and say that nothing should be done to diminish personal relationships. I do not honestly believe that many welfare recipients would miss the humanity of the foghorn system, the loudspeaker that calls applicants over to a desk to talk to an official of the Ministry of Social Security. Moreover, there is always in these encounters an "adversary" element: an implicit struggle between two people, one of whose aims is to get what he can, while the other's is to safeguard and husband precious resources. I am sure many welfare recipients, to name only one important class of user, would welcome any change to a situation where this element was removed. An electronic bureaucrat could, or rather need, have no aims other than to pay those who satisfied the requirements, unlike many of those who administer the present system. People might well grow to welcome the increased fairness of an electronic bureaucrat in just the way that they usually prefer automatically controlled traffic lights to a policeman standing in the middle of a road junction.

At this stage it might be thought that I am relishing the thought of more laws and a society wholly in the hands of machines, and conclude that, since that would indeed be an Orwellian nightmare, there is no point in reading on. Such thinking is a mistake in that it ignores, or forgets the *Kafka* nightmare: modern man struggling from one to another of an infinite series of officials and forms. Anyone who remembers the shots in the film *Black Orpheus* of Orpheus searching the derelict, draughty warehouse-cum-ministry will know what I mean. Part of the terror of Kafka's *Trial* is its sheer time-consuming tediousness, not simply the subjection to the

whims of officials, and their universal passing of the buck to officials ever-so-slightly higher up. That sort of thing is one of the real nightmares of our times, as most citizens know by now. It is by comparison with this that any serious attempt to mechanise, and so reduce, the bureaucracy could bring more freedom to the general public. That assumes, as I pointed out earlier, that computers themselves are disciplined so as not to contribute to a Kafkaesque Everest of paper, and not to refer their users on to other machines. The last possibility is highly unlikely, since one clear advantage of machines that is being increasingly exploited is their ability to communicate with each other without the intervening sources of confusion that human beings are subject to, such as noisy phone lines and the mail service. A computer connected to another directly or by land line cannot distinguish the other from part of itself, and so all dialogue becomes internal, which fact is already being used by banks transferring credits to each other without the use of the mail, and by firms which simply order goods direct by means of communication between their respective computers.

It is important to say again that the radical automation described here does not imply control of our lives by machines, in any serious sense. On the contrary, its implementation is a condition of freedom in the world into which we are moving, freedom, that is, from an infinitely large and complicated human bureaucracy. Anything that mechanical bureaucrats can do is both surveyable and checkable principally because they can be communicated with in languages as close to English as need be, and can be checked against each other. Suppose that someone disagrees with a machine's decision about himself, let's say it refuses him a passport. The simplest thing for him to do would be to try the application again on another machine; that is, to put it through again. Compare that with the almost impossible persistence needed to put an enquiry through the Civil Service twice! It is always possible that a machine could make a mistake – a chance of, say, a million to one. The chances of *two* such machines making the same mistake is then a million million to one – as near impossibility as makes no difference.

P. M. Blau[16] has argued that the challenge of bureaucracy is met if citizens "are motivated to devote time to decision making which has repercussions in the society as a whole". That is all very well, but unless the suggestion is accompanied by technological sugges-tions it seems pretty empty, because it misses entirely the point,

[16] P. M. Blau "Bureaucracy in modern society", p. 118, New York 1956.

analogous to the one I made earlier about workers' control, that there are *so many* decisions to be made in a modern society that no one has much idea what it would be like to implement such a sentiment. The only alternative, it seems to me, is to hand over much of the decision making to the machine, *thus leaving it clear which are the important decisions*. There are dangers in any kind of delegation of social power, of course: the danger of a new priest class of programmers and systems analysts; the danger of what M. Dubarle called the "machine à gouverner"[17] but what road to freedom does not have its peculiar dangers? The point is to see them for what they are and control them.

There would, naturally enough, be considerable resistance to any or all the suggestions here. There is the universal resistance, diagnosed in detail by Weber, of any bureaucracy to any diminution of its power. There is also a perfectly understandable resistance on the part of the Civil Service to any cut back in the number of established posts. But there is also an enormous fund of public goodwill for such measures, at least if a recent poll is correct[18] in putting "reducing the size of Civil Service" at the top of the public's list of priorities for Government. But it would have to be generally seen that measures of the sort described here lead to simplicity and ease in everyday contact with officialdom: that life without tax forms was a good thing.

What is astonishing is that the prospect of the Kafka nightmare does not arouse more horror. Perhaps it is all part of a wider hallucination that every thing must be *run* and that nothing works by itself[19]; that without drugs bodies would stop functioning, just as without a Government and its bureaucracy continually controlling and cajoling us we would all stop doing anything, and the public body would die. But there is no reason to believe any of this: it might continue to run quite happily with the aid of electronic bureaucrats, but with human beings taking the important decisions.

The real resistance comes from those who, in the end, fear the Orwellian nightmare more than Kafka's; who suffer from an

[17] *Le Monde* 28 December, 1948.

[18] *The Times*, 27 August, 1970.

[19] These notions are explored in the works of Paul Goodman: see particularly *Persons or Personnel: decentralizing and the mixed system,* New York 1965.

extreme form of what Eric Moonman calls "computer fright". When looked at calmly and in detail, most aspects of this fear are seen to be unreal, or to spring from the society from which the examples are drawn rather than the use of machines.

The control of an electronic bureaucrat may not turn out to be a simple matter, but it must be possible. What will never be possible will be popular control over proliferating Orwellian, and all-too human, Ministries of Peace, Love and Truth.