the computer and society

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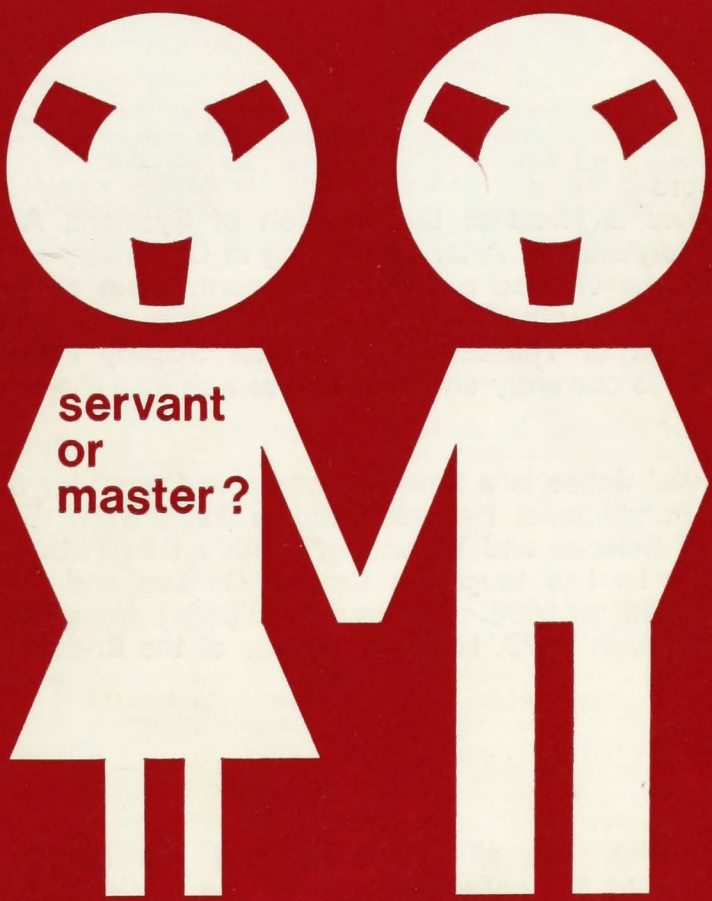
fabian tract 457 50p



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Fabian Society, 11 Dartmouth Street, London SW1H 9BN.
July 1978 ISSN 0307 7535 ISBN 7163 0457 0

1. introduction

Bernard Shaw took an early interest in the automation of complex tasks. In 1918 he wrote: "In the clinics and hospitals of the near future we may reasonably expect that the doctors will delegate all the preliminary work of diagnosis to machine operators as they now leave the taking of a temperature to a nurse. Such machine work may be only a registration of symptoms; but I can conceive of machines which would sort out combinations of symptoms and deliver a card stating the diagnosis and treatment according to rule" (*The New Review,* 1918).

The machine which has made this prediction fact—the electronic digital computer—has been with us for three decades. Its thirtieth birthday was celebrated in the press in 1976 and a computer gallery dedicated to the history of computing was opened in the Science Museum in South Kensington. The computer has achieved a certain respectability; now is a good time to question its social impact.

the impact on the social structure

The computer is at last looked on as a machine which can change social structure and the organisation of society. Politicians and lawyers are concerned about its powers in collecting and organising a vast quantity of information and the first laws are being enacted to control its use. Society has difficult and complex decisions to make if it is to reach an harmonious and beneficial relationship with this ultimate machine. Man must not allow the computer, by default, to define its own role. "The power of custom is enormous, and so gradual will be the change, that . . . our bondage will steal upon us noiselessly and by imperceptible approaches" (Samuel Butler, *Erehwon,* 1872).

The impact that the computer, in its first 30 years, has made on the way we live is trivial when compared with its potential. The vision of its frightening power is there: "The Machine feeds us and clothes us and houses us; through it we speak to one another, through it we see one another, in it we have our being. The Machine is the friend of ideas and the enemy of superstition. The Machine is omnipotent, eternal: blessed is the Machine (E M Forster, *When the Machine Stops,* 1909).

The choice then is to surrender to the developing power and control of the computer, to opt for the condition of happy slavery or to attempt to control its use in a more rational society. But before we can use it for our benefit we must understand it better than we do now.

At the moment the public attitude towards computer technology is jaundiced; the initial eager aspirations of computer scientists have not been realised and people enjoy the recital of anecdotes showing up the computer as being more inconvenient than it was worth. The computer cartoon has become a genre. Reports abound of the clumsy application of the computer; of computers being more inefficient and costly than the human beings they replace.

It would be extremely foolish to take comfort in these early failures and sit back in the belief that computers will never amount to anything. As the American computer scientist, John McCarthy, wrote ten years ago "The computer gives signs of becoming the contemporary counterpart of the steam engine which brought on the industrial revolution. The computer is an information machine. Information is a commodity no less intangible than energy; if anything, it is more persuasive in human affairs. The command of information made possible by the computer should make it possible to reverse the trends towards mass produced uniformity started by the industrial revolution. Taking advantage of this opportunity may present the most urgent engineering, social and political question of the next generation" quoted by W J Freeman (*Information,* 1966).

The computer engineer has responded with enthusiasm to McCarthy's call. He has perfected systems which have enabled men to go to the moon and back.

In the wider field of the social and political implications of computing the issues are less clear cut, the goals less obvious and the implications less easily understood.

Discussion has been sporadic: certain issues—such as Computers and Privacy —have been debated but wider concerns have gone unexplored. There is little indication that society has responded to John McCarthy's words; far from the computer being used to reverse the trend of mass produced uniformity it is being used to strengthen the grip of mindless technology.

Recent advances in the use of computers to process information have resulted in the development of the technology of control. This more sophisticated control technology can be used in two ways— to chain industrial man to his machines or to promote the coming of a saner and less uniform post-industrial society.

We have seen in our lifetimes the enormous impact of technology: the car in our cities, medical drugs on world populations, the jet aircraft on intercontinental transport. The computer is poised to effect a major transformation of the fabric of our society.

the need for debate

This pamphlet argues that the current image of the computer as an insensitive number cruncher needs to be corrected and that the recent developments which have enhanced its power and capabilities needs to be understood not just by the specialists in contact with the machine but by every well informed person.

The way that computers have taken over many of our routine clerical tasks in organisations is illustrated: and the next stage is examined, when some of the traditional tasks of management can be machine controlled.

This pamphlet also discusses the difficult decisions which need to be taken now and which will determine whether computers will grow around us symbiotically or parasitically. It then argues that computer scientists must not just play enthusiastically with the new toy they are building; that they must develop a professional attitude to the power they control. It calls for cooperation between computer scientists and politicians, lawyers and leaders of commerce, industry and trade unions in making a positive effort to harness the computer in the service of man. To do this it is necessary to have a methodology. This pamphlet argues for an approach in which every innovation is carefully tested and rejected if found to be false. It asserts that such a Popperian approach is vital.

The aim is an open society where men are given means to increase their stature rather than be degraded into a new proletariat bullied by the tyrant technology.

People must be better educated to the possibilities that are available to them in society. There must be open debate and hypotheses about our future developments must be tested. The Popperian approach, while it might slow down certain advances, gives us the best underlying philosophy for forging our future.

A socialism without a strategy to tame the computer and press it into the service of mankind will lose by default. Without controls it will be used by companies and governments to maximise their objectives regardless of the adverse social consequences.

This pamphlet gives guidelines for the control of the computer and argues strongly that it is unsatisfactory for a government (a major user of computer power and a massive manipulator of information) to be the sole arbiter of computer usage.

2. computers today

The computer was born in an era of technological optimism; man was solving more and more problems using technology, progressively harnessing its seemingly unlimited power to develop sophisticated drugs, atomic energy, the jet engine and other powerful supports of life in the latter half of the twentieth century. But disillusionment has set in; unlimited growth and the use of precious resources have been questioned. Pollution, the seemingly inevitable partner of uncontrolled technology, has been recognised as a problem. From now on it will never be so simple, for technology is seen as a threat.

The computer in those optimistic decades was regarded as a bright new invention with enormous potential. It is now seen as part of the technological threat. It has been seen to fail in fulfilling its initial expectations and is regarded as a clumsy calculator with the proclivity to make stupid mistakes. Only by a few is it seen as a powerful aid for man in the management of his complex technological society. Nevertheless computers can be a threat to society and the nature of this threat should be examined. A public which is turning away from technology will remain largely ignorant of the enormous development of computers in the last decade. The arrested image of the computer is of a fast calculator that's capable of sending a bill for nil pence.

Meanwhile the computer has made real and steady progress; for instance the traveller can now book US domestic airline tickets in London and at the same time request special diet meals. Similar progress has been made in many areas directly impinging on but less obvious to the public, ranging from the very fast calculations and decisions that control the use of power stations as demand fluctuates to the presentation of accurate data on vacant beds in hospitals. Indeed without computers the banks could not handle their daily quota of cheques. These developments will so shape our everyday lives that it is desirable for the political well being of a community that it has an informed view of such progress and it is able to understand the threats and the promises inherent in computer technology.

In the public mind, the compueter has thus been assigned to menial administrative tasks. The public disliked it for its inflexibility (which demonstrates its stupidity) and its ability to serve as an excuse for changes for the worse in the way things are organised.

The media reinforce this image with continued reports of the failure of computer systems, such as the new centralised vehicle registration system at Swansea designed to replace the manually kept records of local authorities. A computer system success is seldom reported. Naturally, a successful vehicle registration system would hardly be a good news story ! The public cannot be blamed for a lack of interest in the clerical processess which are the normal fare of the computers.

What should have been reported and debated by the public at large is the creation by the government of a large centralised data bank of vehicle owners at Swansea, which can be used for purposes other than collection of car tax. What has been created at Swansea, as a bi-product to the business of licensing vehicles, is a large central bank of readily accessable data which contains information about people. This data bank can be made available to the police, customs or tax authorities; it could eventually be linked with other larger data banks being developed and be the first step to putting on record for immediate retrieval detailed profiles of the individuals who live in this country. This might be good or it might be bad but it is of more importance to discuss this issue than to laugh at the inefficiency of the central licensing system.

There is a potential threat in the development of large data banks readily interrogated and up-dated by means of terminals. Paul Armour, a computer scientist, is particularly concerned with the coming of Electronic Funds Transfer Systems which credit card organisations such as Barclaycard are moving towards.

(This system would allow a purchase in a store to be immediately debited to a bank account, via a computer terminal. This would be a " real-time " operation, in that a bank balance would be adjusted at the moment of purchase.) Armour has written " Several years ago I was a member of a team which was given the assignment of assuming we were data processing advisers to the Russian secret police, the KGB, and that we were to design a system to maintain surveillance of all Soviet citizens and foreigners within the USSR boundaries. After some study we decided that the easiest and cheapest way to do it was to install a real-time Electronic Funds Transfer System. Such a system knows where a person is in real-time as well as what he is buying every time he makes a financial transaction. A system that knows where each individual is represents, to me, a great surveillance system for would be tyrants " (*Computers and Public Policy,* Information Cassets Inc, 1976). The privacy we enjoy at present is due at least partly to the fact that manual searches of the files would prove too expensive. Paul Armour expresses misgivings as to whether certain data should be allowed to be on file at all. Records about Jews in certain European countries were used to lethal effect when "inherited" by the Nazis.

Adverse publicity has in no way stopped the growth in the use of computers which takes place out of public gaze and requires no planning authority. Computer technology, free from publicity, has been able to make steady progress. Like some alien force, it has gradually digested a major part of our manual records, transferring them onto magnetic storage which now becomes available for easy manipulation.

computers in organisations

The computer has taken on more tasks within organisations which has resulted in a significant, but almost unnoticed, change in its role. Management is now able to use the computer not only to provide an information system but to assist in the control of an organisation. The model used in management science for an organisation (business, government agencies, hospitals) is hierarchial. The directors are responsible for determining the strategies and policing of the organisation. The controllers are responsible for the implementation of the policies and for the management of exceptions arising from operations. The operators perform repetitive programmable tasks in the day to day operation of the organisation.

It is in the area of operations that the computer has made most progress. In what has been essentially a process of automation, these repetitive, programmable tasks have been ideal breeding ground for the early generations of computers. Typical examples of these earlier applications are payroll work, stock reporting and sales ledger and bought ledger entries. Later applications have been message switching, production control, order processing and passenger reservation; here the computer operation has been extended from a purely clerical or bookkeeping role to an operational function.

Each time a computer takes over a repetitive task, it creates a large pool of data related to that task; for example the bi-product of an invoicing operation (where invoices are printed by computer and sales accounts updated) is a large computer file with customers' names and addresses with other pertinent detail and another large file giving the detailed history of transactions with the organisation. The data bank that results as more and more applications are computerised is now seen as a valuable asset to the organisation. An example of the use of such data is where the Automobile Association sells information about its members to *Readers Digest* who use it as a basis of a mailing list.

The computer, having automated the operational tasks and stored the organisation's information in a readily accessible form on a data basis, is able to move into the area of the controllers.

3. recent developments and control technology

30 years on, the computer has developed some of the capacity that was originally envisaged by Bernard Shaw in 1918. We look here at the recent technical advances that have given the computer the capability and potential that was hoped for in the early days.

The first and perhaps the most dramatic of these is the development of silicon chips. A microprocessor, the central unit of a computer, is shrunk into a single silicon chip one quarter of an inch square. A powerful computer system that would, at one time, have filled rooms with thermionic valves can now be accommodated within the space of this page. The silicon chip, cheap (£5), fast and easy to manufacture can carry the computer into our daily life. At present such chips are used for pocket calculators, wrist watches and TV games but soon they will be remembering, regulating and executing.

A second parallel development has been in the growth of the power and capacity of computers. Computers are now being developed and researched that can manipulate one million million bits of data, enough information for ten thousand hospitals with one thousand patients each. While most other costs are rising the cost of information processing is falling. Its cheapness puts computer technology well within the reach of most businesses and makes personal computing possible.

Thirdly, the computer programs that "tell" the computer what to do (the software) have been developed to match the more sophisticated demands of managers. Operational research techniques involving millions of sophisticated calculations are no trouble to a modern computer. Thus, forecasting models, financial decision models and programing of complex tasks are all done nowadays with the help of the computer.

Already as more and more programs are made to work together it is becoming increasingly difficult for the underlying assumptions to be fully understood by managers who rely upon the decisions. The danger is that the computer will do what you tell it to do, but that may be different from what you intended. So who becomes the servant and who the master?

Fourthly network techniques using communication technology and message switching programs make it possible to connect computers and people around the globe. Computer time hired in London could well use computers actually located in Holland or the United States. Academics doing research in London find it convenient to use facilities provided *via* the ARPA (the Advanced Research Projects Agency) network in the United States. Not only does this make available data and programs they want to use but also the eight hour time zone difference means that a computer on the west coast of the United States can be used for real time computations at night by European customers.

Finally there are the attempts that are being made to get computers to perform tasks that have until now been the preserve of man. Artificial Intelligence is the branch of computing which is trying to get a machine to imitate human thought processes. Its workers build robots and program computers to play chess or music, recognise human speech and perform question and answer routines in English.

Artificial Intelligence techniques are now becoming available for practical activities. The thought processes essential to chess have been programmed and can be developed for use in organisations — potentially a powerful servant for management.

What is there to fear? It would surely be irrational to be complacent when mankind is faced by so much power of a new and potent nature. Civilisation has always changed when a new means of communication has been perfected—the book, the steam engine, the telephone and television. Computer technology must change society.

The growing power of computers must have an enormous effect on our society.

But the one development that should be watched with interest is where computer power is able to partner the control process—control technology.

control technology

Sophisticated techniques using control technology have long existed in industry to control manufacturing processes. (Indeed the domestic central heating system has its control unit.) With silicon chip microprocessors readily available the decisions taken can be more and more sophisticated. *The Chips are Down* discussion paper published by Earth Resources Research Ltd in 1978 highlights this problem and cites the example of where National Cash Register reduced its work force in manufacturing by more than 50 per cent from 37,000 to 18,000. Modern aircraft depend on computers for navigation, communication, passenger comfort and safety, engine control and control of aerodynamic surfaces. A logical extension of these decision processes is to program a computer to make social decisions; a computer could be programmed to allocate social security benefits. This trend can be seen in the computerisation of our tax system which has already started in Scotland.

This advance of technology has altered the way in which man thinks of himself. Today technology performs many of the tasks we no longer wish to do ourselves —tasks we would often describe as inhuman. Few of us would wish to replace the farm tractor. It is in the area of control that man considers he plays a more essential role, essential to his understanding of himself as a human; so much so that the exercise of control has traditionally been associated with superior status. As the computer moves into the area of control it is not only taking over essential human tasks but it can dehumanise the resulting decisions. The role of management will change. This trend will have many ramifications and it will be useful to explore some of them.

More Efficient Managers. The computer can play two direct roles. One is where it aids the manager and makes him more efficient. The other is where the computer replaces management and decisions are a result of computer programs. The controllers (managers, tax collectors, teachers, civil servants) will become much more powerful with ready access to detailed information. This could be wholly beneficial with managers able to be more efficient, doctors able to seek expert advice and thus make better diagnoses, civil servants able to respond more quickly to queries and demands made upon them. However there are many who would claim that our current freedoms are to some extent a result of having not very efficient managers and that better management would be a mixed blessing.

Programed Decisions. Many of the day to day decisions made by the managers could be programed into a computer. An example of this is where a stock control manager can program the computer to automatically reorder material from the supplier when the stock level falls below a level he has set. This can be taken a stage further when, based upon the past history, the computer makes a forecast and "decides" when and how much to order. This uses fairly standard operational research techniques.

There is no reason why for example the complexities of the law should not be computerised. A program called LEGOL has been developed at the LSE for doing just this. Although its use to program laws may be challenged it would be a useful tool to check parliamentary draughtsmanship and ensure that laws are at least logical and consistent. This could be helpful with social security. A computer could readily make the calculations of the benefits due to an individual case without individual clerks needing to know all the complexities of the law and having to work out the payment due. This could be very helpful but there is a danger that as more and more decisions are programmed in the computer, the managers do not fully understand the decision process or the underlying assumptions built into the program or use the computer as an excuse or alibi

for decisions properly their responsibility. We know of a program which applied quantity discounts to orders, but with a "switch" written into the program that allowed the manager to assign any discount he wished. At first the sales manager used the computer to discipline his sales force, explaining to them that the computer could not handle non-standard discounts. The computer was made to appear more rigid than it actually was. More disturbingly, two years later a new sales manager did not even know of the existence of the over-ride switch. A computer programed as a servant had become the master.

As management decisions are explicitly or implicitly written into programs and as more and more jobs are put on computer, it can become a major task to change the decision program.

Automated computer systems tend to be more rigid than the corresponding human ones. Even if computers are not more rigid there tends to be a feeling of helplessness in the face of obdurate technology. Senior managers who are able to "fix" most situations when dealing with human systems, feel insecure about using their power when faced with a computer system.

Centralisation versus Decentralisation. Another issue that will be affected will be that of centralisation versus decentralisation. Without putting forward any particular theory to relate information to power, it is reasonable to postulate that the availability of information is closely related to the location of power. In the past this issue has often been decided by the quality of the available communication. The reduced roles of ambassadors and the phenomenon of Henry Kissinger owes more to the jet plane and the telephone than to the talent of one man. Now, with the efficient access of information wherever it is located the issue of centralisation is open. The computer is neutral; it can make efficient centralisation possible (and therefore surely tempting even where operational considerations might favour otherwise); or it can equally make for efficient decentralisation to take place making available to all locations the appropriate information required for decisions.

Home based Terminals. It is interesting, having witnessed the way everyday life has been affected by the invention of the motor car, to speculate on the effect this improvement in communication and mobility of information will have on the role of urban centres. One could speculate, for example, on the effect of home based terminals. It is conceivable that with such facilities many of the managers concerned with the control of organisations do not need to commute to the urban centres. What effect will this have upon our cities? Already lecturers can set course work and mark it from a terminal in their own homes.

Industrial Democracy. The current groping trends towards some sort of industrial democracy, which should be concerned with the sharing of power and decisions. could be frustrated if power has moved from the "seat on the board" by the time it has been achieved. As the control functions of organisations are programmed in computers, it might be better for workers interested in the sharing of power to concern themselves with the design of the information systems.

Employment. The trade union movement is rightly showing concern over the possible unemployment caused by the introduction of chip technology. Are the individuals displaced by the automation of industrial processes to be put on the dole or is the extra wealth created going to be used to create new jobs in socially desirable activities: health, welfare and education? Vast industries have been set up in America, Japan and West Germany to manufacture silicon chips. Britain, late into this particular field, will find it difficult to compete in this production; her contribution is probably better concentrated on the development of "software" to control the chips and to devise new uses for them.

4. change and its origins

With the computer, we are not at a stage of clear solutions or easy prescriptions. Rather we are in an age of strategy, not tactics. Unfortunately western society is losing its faith in science and is no longer looking to the products of technology to advance it towards the good life but rather for alternatives to growth. A new development in electronic computing is treated by the public with boredom. But the computer has now reached a stage when it is capable of realising its potential. It has the power and the experience to transform society. It would be a grave error for intellectuals to look with disdain at its activities or stand aloof from its encroachments.

When Charles Babbage, Lucasian Professor of Mathematics at Cambridge University, announced his grand design for the Analytical Engine (in conception a computer) he seized the imagination of the intellectuals of the day. Lady Lovelace (Lord Byron's daughter) sold her jewels to help his work. The Government poured money into a project which was doomed to failure. What Babbage tried to do was not possible with the technology which was at his disposal. The parts of his machine that he succeeded in building are displayed today in the computing galleries at the Science Museum, relics of a more optimistic age.

Today the computer scientist works in his own closed society insulated from the rest of the community. The computer pioneers of today have at their disposal the necessary technology; they are advancing into a new world. How brave this new world will be will depend on how responsible the new powers of control are harnessed, control of data, control of the economy and control of society. The current efforts of socialists to change society could be completely overwhelmed by developments brought about by these technological forces. The barrier between the computer and society must be broken down if there is to be a move towards a more just society. A partnership must be forged between computer technologists and the leaders of society to harness together the machine in the service of man. Computing is too serious a business to be left to computer scientists. Therefore society and its political leaders need to be educated on the potential power of the computer and its increasing ability to handle complex tasks, the social implications of the computer take-over of management functions, the threat of uncontrolled computer developments to a free society, the benefits the computer could bring if it were used to open out society rather than to close it in and the controls that are needed to be built into a democratic society to defend minorities and individuals against the computer.

the roots of change

The computer must not be looked at complacently as yet another artifact to aid the organisations of civilised man. It is now aiding the collection and retrieval of data for large organisations and when it does this successfully it can bring positive benefits.

What could be more benign than a machine which takes the chore out of filing and retrieving the information needed to run an organisation ? It would be fine if our use of the computer were to end there but it is not going to. It is increasingly to be used in the manipulation and control of data. The computer could end by running the organisation.

As the major impact of computers will be sociological, how can the rational scientific tradition of socialism help us to digest the technical advances made by computers within the fabric of our society and guide us in the development of a strategy ? What rational framework can we use to monitor the progress of the computer to harmonise its inevitable social impact with what we would consider civilised political ideals ? The control and direction of this sociological bomb must be central to our political concern, as is already the case with economics.

In his book *One Dimensional Man* which was first published in 1966 Marcuse wrote of his concern that man is now subject to

a new tyrany preventing him realising his full human potential. His enemy is technology. He writes that " its sweeping rationality which propels efficiency and growth is itself irrational ". He warns against " using the scientific conquest of nature for the scientific conquest of man ". " Technological rationality ", he claims, "has become a political reality".

Mesmerised by the struggle between capitalism and communism, Marcuse sees technology as but a tool in this struggle. He fails to see that technology itself is the threat. The worker in a large modern car plant is much more the product of that technology than of three thousand years of civilisation with its roots in Greece and Rome. But the dangers are real: the tyranny of technology controlled by a complex network of computer processes which destroys man as a decision making animal.

There is something inherently undemocratic in the way a computer system is designed today. It is a confidential process carried out to meet the needs of management. It is not subject to any outside control. The only criterion asked of a computer system is "does it work?"

Large changes are taking place in our society without the benefit of public debate. Do the " experts " know best? Their only qualification is a detailed knowledge of the technology they handle. They may be completely insensitive to its social impact.

A systems analyist, the technologist who designs computer systems, normally works for a client—his boss. He is subject to conventional professional middle class confidentiality. The resulting design is written in a recondite language which often precludes further participation by the client. Alternative designs are very seldom considered and evaluated. It is usually just a case of finding a method which works and then selling it to the managers.

Yet there is an approach available to a democratic socialist that addresses itself to this problem. Politicians of the social democratic left have seized on Karl Popper as giving them a theoretical basis on which to work and it is customary for politicians of the centre left to claim to have been influenced by him. The most accessible of his political works is *The Open Society and its Enemies* which he wrote while a refugee in wartime New Zealand and which he regarded as his war effort.

In his masterpiece *The Logic of Scientific Discovery* (1950) he developed an understanding of how a scientific hypothesis is formulated and then attacked, thus to be refined or rejected. In this, Popper claims to have solved the problem of induction. The idea of " falsifiability ", that the way to progress in science is to attempt to refute an established principle, he carries on in his other works. He is against " Utopian social engineering ", final solutions which are imposed in the conviction that they are right for society, whether these systems come from Plato, Marx or Hitler. Yet " Utopian social engineering " is the very nature of most computer systems design. What he is for is " piecemeal social engineering " where a political theory or social advance which is consciously applied to a part of a system is regarded in the same way as a scientific hypothesis as being in need of attack. It can then be held to be of provisional use until it is falsified.

For him the success of western civilisation is its open nature—openess to debate, openess to ideas. This lack of " order " in the west, where different ideas are allowed to fail or succeed and where opposition and debate are part of our political scene, provides a setting for the testing of social hypothesis and allows for an orderly political evolution.

For a Popperian view of society to prevail, a social advance must be presented as a hypothesis. It may be held only as long as it has not been falsified. This process can only take place in an open society where debate is encouraged and the results of successful experiment (that is, one which falsifies the current hypothesis) are acted upon. Open debate together with the strong belief that the

theories of the expert must be tested is the essence of Popperianism.

There are many ways in which the growth of technology and the build up of large conglomerations (both public and private) lead to difficulties in maintaining an open society. There are three particular ways in which the establishment of a large computerised system for an organisation of the state—a data bank society—can make an open society unrealisable: first, administration is left to the experts and trained systems analysts, second, computer systems are tested to see if they work without errors, fulfilling the objectives defined at each design stage, but the process of design cannot be perfect and the final system is never tested to see if it fails because the original objectives or the perception of the problem have been deficient, and third, such systems are so complex after once having been established they are very resistent to change and modification.

In our western society, much of man's freedom in day-to-day activities is based on the inefficiency of the controls exerted upon him rather than the tolerence of the people exercising those controls. His dossier is sketchy, its pages hard to examine. Bureaucracy chases the butterfly freedom with a tattered net. Computerisation will provide a bigger and finer meshed net for the man in charge. For society to remain open, every proposed advance must be subject to attack in the Popperian sense. The ways to achieve this will be discussed later. By default we could easily become a society where things are done for our good for reasons which we do not understand. We could be well off materially and carefully organised into non-conflicting groups. But we will have lost our spirit. We will have become a conforming society.

professionalism

A previous chapter discussed the way in which computer specialists design systems. There are two points which arise which concern the work of the professional. The Popperian thesis of an open society needing open debate is not only a philosophical basis for social democracy, it is also a very sound method of design. An open society is not just nice because there is free debate, it is also more successful. Systems analyists, to design successful systems, must find means of breaking through the tradition of professional confidence and of involving all those affected in its design. There will be a reluctance to do this because it is a messy process. It is tidier and less demanding to be the bureaucrat and work in private. However a better design is achieved as a result of debate. The profession should be responsible for developing a methodology that stimulates debate, a methodology where the computer professionals cease regarding a design that works as complete. Not only should the design be challenged but also its objectives.

A second point is the extent to which we are dependent on the professional in the technical task of manipulating data. To protect us and the profession, we need the equivalent of the Hipocratic oath. This would mean that, whoever the programer or analyst is working for, he has, together with a responsibility to his client, a higher responsibility to a code of ethics. The reasonable use of data may in the end be a matter of judgment, the professional should in any circumstances have the firm guidance of a professional code of ethics, such as for example, that proposed by the British Computer Society.

5. current and future policies

Most of the political and legislative activity that has taken place has not considered the broader issue of the impact of computers on society but has focussed on the specific issue of privacy and the storage of and access to personal data files.

There has always been, if not fear, then distinct unease in the attitude of laymen towards the computer. The modest performance of the computer in the earlier years made such fears groundless. More recently as data storage and manipulation has been become more effective, this fear has arisen again and centred around the issue of privacy. There are specific examples of where computer stored data has been used as a basis of credit control. It has also been used by the US army to store information on political dissidents. These specific examples have caused the public to realise the awful potential of computers as manipulators of personal data. There is a strong political feeling that this process should be subject to control. With the constrictions of the UK Official Secrets Act, it would be reasonable to wonder uneasily whether similar developments have taken place here in Britain.

use and abuse

Recently *The Police Review* (21 April 1978) reported a Home Office sponsored experiment to index, collate and store all the information gathered by each collator throughout one large provincial force. Much of this information is valid criminal data. A substantial proportion is unchecked bunkum. Proud of their project, the Home Office invited two Americans to see it in action. These two Americans were horrified. "Such a system", they said, "would be totally unacceptable in the USA".

The need for an individual to be protected against the misuse of data about himself held on a data bank has been recognised for some time and a committee was set up under the chairmanship of Sir Kenneth Younger to enquire into the whole problem of privacy in Britain (*Report of the Commission of Privacy*, Cmd 5012, HMSO, 1972). At that time there were three bills before Parliament and two in draft (from the National Council for Civil Liberties and the "Justice" committee on privacy). Countries including Belgium, Austria, Canada and Holland have either prepared bills or set up committees to investigate privacy. Sweden has a comprehensive Data Act (1973) and the USA the Privacy Act (1974). The latter reflecting the political traditions of the country, covers the public sector but has no provision for the private or commercial sector. In addition two White Papers have been published (*Computers and Privacy*, Cmd 6353, 1972 and *Computers: Safeguards for Privacy*, Cmd 6354, 1975) proposing legislation on privacy and covering stores of information held in both the public and private sectors.

West Germany has now become the first EEC country to enact computer privacy legislation. This appears to be quite strict legislation, presumably as a result of their experience with a rather lax Act which applied in the State of Hesse only. It resorts to the use of an Ombudsman approach.

According to an article in the magazine *Computing* of 24 October 1974, a European privacy law has been drawn up and awaits ratification by the Council of Europe. There is also an EEC project getting under way to formulate computer privacy legislation recommendations for EEC member states. Cooperation between nations is proving very difficult in this area and much of the legislation does not take into account the multinational implications of data banks, although the EEC study will do this. A Canadian report has suggested the need for a United Nations role in producing legislation.

The table on page 12 is a summary of the current legislative position. It is clear from this table that nations have not been acting in concert and an important issue is being treated haphazardly.

The current position in the UK is that,

SUMMARY OF LEGISLATIVE ATTEMPTS TO CONTROL USE OF COMPUTER HELD INFORMATION IN BRITAIN AND OTHER COUNTRIES

country title of bill or act and date	Great Britain data surveillance bill 1969	Great Britain control of personal information bill 1971	West Germany data protection act 1970	United States privacy act 1974	Sweden data act 1973	Great Britain white paper 1975
is the law enacted in country?	no	no	State of Hesse only	yes	yes	no
type of data processing	automatic only	automatic and manual systems	automatic only	automatic and manual systems	automatic only	automatic only
is law of general application or terms specific to each data base?	general	specific (via licence)	specific	general	specific	specific
does the law cover both the public and private sectors?	both sectors	both sectors	public sector only	public sector only	both sectors	both sectors
is a data base register established?	yes	yes	no	yes	no	to be decided
can the public inspect the data base register?	yes	no	no	yes	no	to be decided
can the individual inspect any records concerning him?	yes	yes	no	yes	yes	yes
can he challenge the accuracy, relevance, etc of this data?	yes	yes	yes	yes	yes	yes
is a record of interrogations made to this personal data kept?	yes	yes	no	yes	yes	yes
are there provisions to avoid the storage of opinions?	yes	yes	no	yes	yes	yes
are there provisions to avoid the storage of out of date data?	yes	yes	no	yes	yes	yes
are there any penalties for failure to register?	yes	yes	no	yes	yes	to be decided
are there any provisions to enable claims for liability to be made?	yes	yes	yes	yes	yes	to be decided
are there any provisions for security measures?	no	yes	no	yes	yes	to be decided
is there any facility for appeals?	yes	yes	no	yes	yes	to be decided

source: Avison and Crowe, "Computors and Privacy", *Computer Bulletin,* March 1976.

following the publication of the White Paper *Computers and Privacy* (*op cit*) in December 1972, the Data Protection Committee was appointed in the summer of 1976 under the chairmanship of Sir Norman Lindop, Director of Hatfield Polytechnic. The aim is for the committee to advise the government on legislation and following the White Paper it is likely that it will govern the use of computer based data.

We will discuss later the vulnerable nature of this committee and its potential authority. It is worth noting that at this stage it is concerned only with the issue of privacy.

strategem

The main thesis of this pamplet is that the increased use of computers is not just yet another technique, neutral or positive in its impact. The very power of the computer presents us with a challenge. All sections of our society must be able to participate in the debate about the society that they want. There are three approaches to the problem that faces us.

First, the negative approach of inhibiting the growth and use of computers; second, the pragmatic approach of encouraging the positive and discouraging the negative aspects of computer technology, and third, the positive approach of harnessing the new force to effect social change in a desired direction.

The first of these has been taken up seriously in the technical journals where it has been suggested that a moratorium be placed on the development of information data banks. There are examples of many technical developments where such an approach would have been correct and entirely healthy. For example in 1943 the French correctly banned high alumina cement; we have also seen the horrifying consequences of the over enthusiastic prescription of drugs. This negative approach, although unattractive, might be after careful consideration a sane and logical approach to the problem. It also has the distinct advantage of not producing irreversible effects and it in no way prevents subsequent developments. Just how practical this is from a political point of view is another matter.

The pragmatic approach of encouraging the good and discouraging the bad is in intent the policy pursued by most countries that have done anything at all about the problem. The major criticism is that such an approach is uninformed by any basic strategy. We need therefore to study the impact of computers so that the wider public can be informed and the essential debate joined and to legislate as required. It is worth considering the approach that will be adopted by the Data Protection Committee.

Just what type of legislation will have the desired effect is open to discussion. What is certain, however, is that the provision of *ad hoc* rules and regulations will fail in the long term. Technologists with a powerful technology are well able to evade the intentions of written rules. But these same technologists are nervous of public debate; this could suggest a possible approach.

In the context of generating debate, the idea of a social auditor has its attractions. A financial auditor is required to check annually the financial transactions of an organisation and attest to their probity.

The device of a computer technician or systems analyst required to perform a social audit on a new or changed computer system could be effective. This would overcome the daunting problem of the extreme technical nature of some aspects of design. It would also overcome the practical problem of the cost of continuous involvement.

It is not practical to expect employees to monitor and debate every detailed change in a large scale business computer system. But once an auditor has drawn their attention to change that could affect them, then debate could be joined. The analogy of the two roles is a good one. The computer auditor's role would be to draw attention to significant

design or redesign in a neutral manner, leaving it to the protagonists to debate the issues involved.

The third and positive approach is where specialists who understand the role of the computer can harness it to useful ends to enhance humanity and advance the social aims of society. It is a sad reflection that entrepeneurs and capitalists are eager to use technology to make money and yet less exploitive organisations in society are reluctant to understand technology and to use it in a positive way.

These three approaches to the problem are not necessarily mutually exclusive. There are times when even after considerable research and in the face of pressing needs (as in the case of the derivation of energy by use of the fast breeder reactor) the sensible approach is to inhibit the exploitation of the technology.

prescription

It is reasonable, in a Fabian pamphlet, to expect that the exposition and analysis of a problem be followed by suggestive, prescriptive, political solutions. In some cases this can take the form of an explicit recommendations for legislative action.

The problem of the use of computers does not lend itself to this type of resolution. Such an approach with our present level of understanding would be facile in the extreme. There is, however, an urgent requirement for action.

Across the world governments at all levels are proving to be the major user of computer-based information. It is difficult to believe that governments will be as open, rigorous or as altruistic in controlling the use of computers as they should be. The uses and abuses of the Official Secrets Act by successive governments of both parties gives little cause for optimism.

It was a Labour government that set up the committee that produced the Younger Report (*ibid*) and it specifically prescribed the committee from examining the government use of computers. Of the two White Papers subsequently produced and already referred to the first, *Computers and Privacy,* followed directly on the publication of the Younger Committee's Report (*ibid*) whose terms of reference prevented it from looking at the actions of government itself. It concludes that computers, because of their speed of operation and capacity to store information, rather than that they carry out operations different in kind from traditional manual systems, do pose a number of questions with implications for individual privacy. The second White Paper, *Computers: Safeguards for Privacy* (*ibid*), was prepared in secret by an inter-departmental working party. It shows little understanding of the scope of the problem and is complacent to the dangers commenting " The working party therefore concluded that the introduction of computer systems would in no way increase the threat to privacy by *unauthorised* disclosure of personal information held in the system ". It does cause one to question the competence of the inter-departmental working party to understand and report on the problem. The italics are ours; a major cause for concern is the extent of " authorised " disclosure, which was not within the remit of the report.

The use of computers, and hence any problems associated with their use, is taking on an increasingly international character. This is facilitated by the development of effective computer networks. This exploitation of improved communications is happening as our system of government is becoming more complex. Gone are the days of autonomous national governments. In Britain some powers are devolved to local level and certain powers reside in Brussels. This makes questionable the level at which it is appropriate to control the use of computers. There is a danger that national legislation would be ineffective and, like so many of our problems (pollution, hi-jacking), effective action is only possible through international negotiation.

There is a final point that makes it unreasonable to rely on governments. This is the fact that at the heart of the problem there is the essential need for continuous debate. Governments can be sympathetic and helpful (particularly with funding) but governments and bureaucrats are not good at fostering debate and encouraging controversy.

These three factors: (government as a major user of computers, the international character of computer use, and the need for debate) point to the necessity of establishing institutions independent of government to monitor the evolving uses of the computer in our society.

There is a precedent for this. The following specialist agencies independent of governments have been established or evolved to monitor their appropriate areas: Club of Rome, the National Institute of Economic and Social Research and the International Institute for Strategic Studies.

It is accepted that there are areas where governments cannot be expected to be the sole arbiters when problems arise, particularly in areas where specialist technical information is demanded. In an increasingly sophisticated society, government would be without effective opposition in these areas if such agencies did not exist. The need arises because of the specialist knowledge and resarch that is required to question and debate issues. These agencies perform a function by sustaining the debate which is essential to an open society.

The dangers that could arise from government use of computers is true of any government whatever its nature and wherever it functioned. What in practical terms can be done now in the United Kingdom? There are three courses of action open to us that would have the effect of making society as a whole and the Government in particular accountable for its use of computers.

The first would be for the Government to accept the aims of the Freedom of Information Campaign which advocates legislation along the lines of the Freedom of Information Act in the United States and which has recently been endorsed by the National Executive of the Labour Party. The Labour Party's machinery of government sub-committee under the chairmanship of Eric Heffer has produced a draft Access to Information Bill (June 1978) which if accepted by the Party and enacted as legislation would allow open access to Government and other publicly held files. However files held on individuals would remain closed under the draft proposals—in contrast to practice in the United States and Sweden. This would have the effect of ameliorating the "big brother" threat since one would know what information exists and how it was being used.

The second course of action would be to extend the brief of the proposed Data Protection Authority to cover not only privacy but also the social impact of computer systems and to establish it in such a way that it is as independent of the executive as is, say, the judiciary. It should take into account the effect on unemployment of a proposed system or in other cases consider the dehumanising effect of the use of computers in a social context; for example schools, hospitals or social security.

Finally there is research and education that will enable us to understand what is happening to our society in this technical and complex area. The ideal here would be an independent agency that could promote research, sponsor conferences, produce a bulletin and publish reports to advise governments and call for specific legislation. Just how this should be done, the level at which it should operate nationally or internationally and how it should be funded is beyond the scope of this pamphlet.

In this country the Science Research Council funds just under £1 million of such research each year. This figure should be matched by an equivalent amount of expenditure by the Social Science Research Council on the social implications of advances in computer technology and use.

6. conclusion

Man has not been very successful in mastering the technologies which his intelligence has developed. Like the Sorcerer's Apprentice, he finds it easier to release forces than to control them. The true measure of man will not be in his technical skills in creating new technology but will be found in his social and political skills in harnessing the forces he releases for the service of mankind. We have reached a critical time in the development of computers when society must start to decide how it wants to use these manipulators of information. 30 years ago, it was too early to perceive the controls needed; in 30 years' time it will be too late. The post computer society will have already been shaped. We will have to live with either a social structure we have rationally planned or a computer based control system which has grown by our default. It must be the duty of a political party that is guided in its stewardship by an analysis of the way society should be organised, to understand the power and potential of the computer to shape society. The computer needs to be brought under control, to be used by the people to help the people have lives of variety and fulfilment. It must not be allowed to take over and impress on people a conformity of work and play. To help achieve this we need to stimulate informed debate on this issue so vital to our future. Since the main threat from the use of computers could come from government itself, any institution that sets out to analyse and report on this specialist area must be free from government.

A society which can control for the benefit of its members the power of the information processing machine will be able to promise an enlightened future.

At this stage in our history we have the choice: control or be controlled by our own invention; become the master or the servant. As Leo Stein said about the influence of Alice B Toklas on Gertrude Stein "Alice did everything to save Gertrude a movement—all the housekeeping, the typing, seeing people who called and getting rid of undesirables, answering letters—really providing all the motor force . . . and Gertrude was growing helpless and foolish from it and was less inclined to do anything herself". He observed he had "seen trees strangled by vines in the same way" (*The Charmed Circle*, Mellow Inc, 1974).

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the computer and society

Tom Crowe and John Hywel Jones argue that the computer, because of recent technical developments, is after thirty years, at a stage where it can have a massive impact on the social structure and organisation of society. They compare the potential impact with that of another technical development which transformed communications and industrial and social organisation — the steam engine. They believe that decisions on the design of computer systems and the purposes for which computers may be used must be made soon, and argue that now is the time for an informed debate by people from outside the group employed by the industry itself.

The authors raise a number of issues which need to be debated. They argue that computers can serve societies which are either highly centralised or decentralised in the way decisions are made and suggest that if the public is not vigilant computers will help the former to evolve. They also point out the implications for employment and industrial democracy and comment on the various attempts, through legislation, to protect personal privacy and otherwise control the role of these machines.

fabian society

The Fabian Society exists to further socialist education and research. It is affiliated to the Labour Party, both nationally and locally, and embraces all shades of socialist opinion within its ranks — left, right and centre. Since 1884 the Fabian Society has enrolled thoughtful socialists who are prepared to discuss the essential questions of democratic socialism and relate them to practical plans for building socialism in a changing world. Beyond this the Society has no collective policy. It puts forward no resolutions of a political character. The Society's members are active in their Labour parties, trade unions and co-operatives. They are representative of the labour movement, practical people concerned to study and discuss problems that matter.

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Enquiries about membership should be sent to the General Secretary, Fabian Sociey, 11 Dartmouth Street, London SW1H 9BN: telephone 01 930 3077 (01 222 8877 from Spring 1979).

Cover design by Dick Leadbetter. Printed by Civic Press Limited (TU), Civic Street, Glasgow G4 9RH ISBN 7163 0457 0 ISSN 0307 7535