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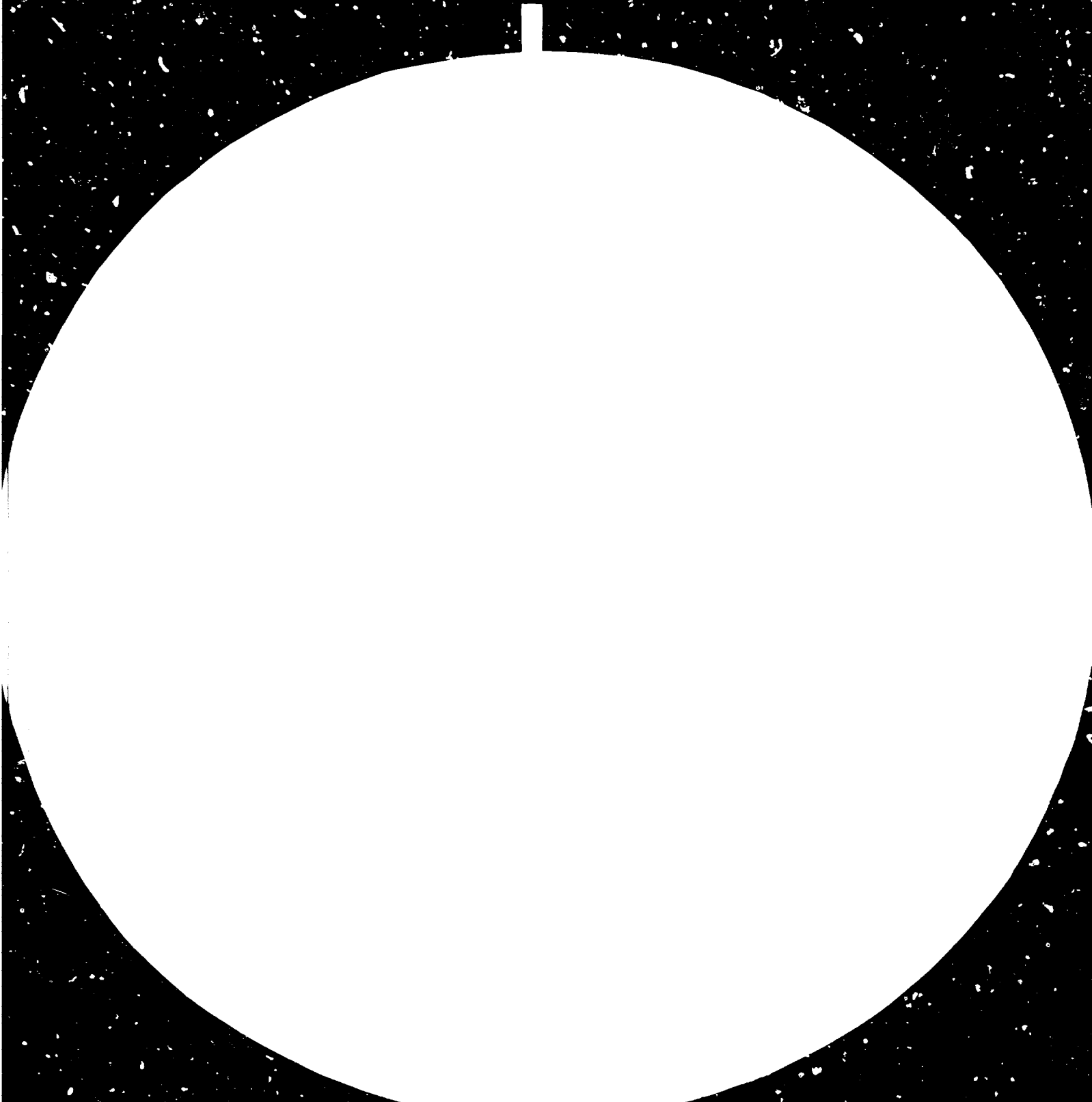

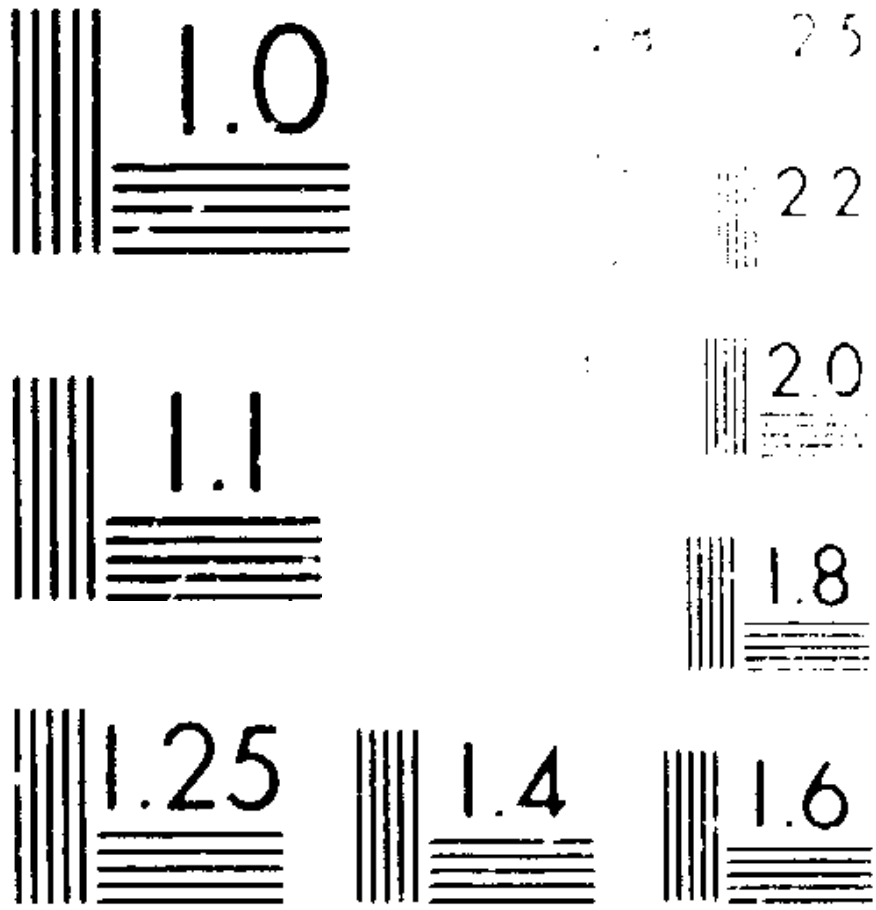
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EXCHANGE OF VIEWS WITH EXPERTS ON THE IMPLICATIONS OF TECHNOLOGICAL ADVANCES IN MICROELECTRONICS FOR DEVELOPING COUNTRIES

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MICRO-ELECTRONICS AND EMPLOYMENT

by

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MICROELECTRONICS AND EMPLOYMENT

BY

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At the risk of making myself extremely unpopular with the present audience, I shall argue that we have no option but to accept modern microelectronics. What options we have arise out of how we use microelectronics, not out of whether we use it. There are two main reasons for my somewhat harsh and categoric assertions. The first reason is that under pressure of international competition British industry must do everything to raise productivity to the level of its competitors, unless a deliberate and unlikely political decision is made to leave the ranks of the industrialised countries. The second reason for believing that we must accept microelectronics is that I do not think that a majority of people will accept the penalties involved in opting out of the microelectronic revolution. People will not choose to do things the hard way when there is an easy way - and microelectronics is one of the great advances towards an easy way of doing things.

The vision of a return to labour intensive craft-based industries is beautiful, but it is not likely to be acceptable on a large scale. We have become accustomed to owning and using a considerable array of goods which either could not be produced at all on a craft basis, e.g. electronic equipment of all kinds, or would be extremely expensive if produced on that basis. It is salutary to think that crafts products are, generally speaking, accessible only to those whose incomes are considerably above the incomes of the craftsmen. Only the relatively low earnings of craftsmen make it possible for their patrons to buy enough of their time. If all people earned the same wages per hour, and we ignored for a moment payments for scarcity values, then each of us could have the full-time services of one other person - averaged out over the years and over the part-time services of a great many people. The widespread availability of goods is made possible only by the amplification of each working person's efforts by machines - and this is the essence of the industrial revolution. Relying on the manual output of a single person for one's entire consumption means subsistence indeed.

The essence of the second industrial revolution, the revolution in miniature, is that all logic and memory functions have become extremely cheap, so cheap as to compete effectively with man's own logic and man's own memory. This does not mean to say that computers can now compete effectively with everything man does; but it does mean that many tasks involving simple decisions and a small amount of knowledge are now carried out by electronics more cheaply, faster and more reliably than either by people or by mechanical or electro-mechanical devices.

We are faced with a situation which may look threatening or beneficial, depending entirely upon our point of view. We may think of microelectronics as a further great extension of man's ability to manufacture goods for his enjoyment. Alternatively we may think of microelectronics as the great destroyer of jobs.

Inherently, a new technology can only create opportunities - generally speaking opportunities either for destruction, such as in the case of new weapons; or opportunities for new or cheaper goods and services. Technology cannot generally create poverty; only opportunity for wealth. If we fear microprocessors as destroyers of jobs and therefore creators of the spectre of poverty for the unemployed, we do not truly fear microprocessors but our inability to cope with their political consequences.

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Ignoring the military potential of microelectronics, its main abilities lie in three directions: the opportunity to create entirely new or improved goods for the satisfaction of new and old needs; the opportunity to do many routine or dangerous tasks by machine instead of by people; the opportunity to increase the efficiency of many services.

The opportunity to create new or improved products is clearly a positive thing as long as we use reasonable criteria in our selection of new products. In addition to our normal commercial set of selection criteria, we might think of more controversial ones, such as:

suitable for designed use
of reasonable quality
no health or safety hazard
not wasteful of scarce resources
not wasteful of energy
no pollution hazard

or even more ambitious criteria of a more controversial and value-laden nature:

leads to more equality of opportunity
causes problems of interference of users
alleviates suffering
improves opportunities of groups or
individuals lacking in adequate purchasing power
increases co-operation
gives creative opportunities
improves health
improves security
the production process gives good and
satisfying employment opportunities
helps the national economy.

If we grasp the opportunity to manufacture new 'good' products instead of waiting to buy them from the Japanese or whoever, we certainly have one way of using microelectronics to stimulate economic activity and to satisfy human needs.

The opportunity of replacing people in some production tasks by machines is more problematic. No doubt it is good to be able to remove people from dangerous and unpleasant environments. No doubt it is also good to be able to relieve people of exhausting and extremely tedious tasks. In principle it is also good to enable people to achieve higher productivity; to make more with less effort. There are, however, two major problems associated with these euphoric 'considerations in principle'. First of all, there is considerable doubt, to put it mildly, as to whether we ought to produce larger quantities of goods. Certainly the market for goods, at least in the developed world, can be saturated and the supply of raw materials and energy can be exhausted or severely strained. Secondly, the people displaced by machines in the manufacture of goods often become, under our present arrangements, unemployed, and this is an intolerable position.

Before considering the problem of unemployment any further, let us look at the third opportunity created by microelectronics: increased efficiency in services. Unlike the demand for some consumer goods, the demand for services does not readily saturate and, more importantly, the provision of services does not necessarily make excessive demands on natural resources. At present, services are often too expensive and therefore not widely accessible. There are a variety of reasons for this, of which I shall name but a few: some providers of services expect excessive earnings; some services use or create so-called positional goods* which command the

*positional goods are those of high scarcity value, e.g. masterpieces of art or houses in desirable areas

highest price the best-off sector of the community can pay; many services are extremely labour-intensive. Microelectronics can do little or nothing about the first two causes, but it can do a great deal about the third. By using computers for data storage and retrieval, using advanced methods of communication, using word-processors and other machinery, the efficiency in the service industry can be greatly enhanced.

Even now services play a dominant role in the economy. It is a complete fallacy to think that wealth is created only by the manufacture of goods - as much of a fallacy as the older thoughts that wealth resided only in agriculture and land or that value was given only by gold. At present, manufacturing industry accounts for only about one third of total employment and the two thirds of the population employed elsewhere are not all parasites. Even within manufacturing industry services account for a large proportion of the work done and it is probable that only about 10% of the total workforce are engaged in actually making 'things'.

We need not worry about reducing the number of people making things even further. As long as we manufacture competitively and hold our own in international markets; i.e. as long as we keep our balance of payments under reasonable control, we need not worry about shifting people into services. Various political and economic constraints prevent us, at the moment, from having many more of the services we need and the microprocessor could, if properly used, create golden opportunities. If we can shift people from manufacture into services and can make services more efficient, then the abundant provision of serivces becomes a real economic possibility. We could have all the education we want, all the arts and other leisure opportunities, all the health services, decent housing, decent social provisions, decent transport, clean cities, and we need not be short of people to provide all these things.

What do we need to do to achieve this sort of millennium instead of facing the haunting spectre of unemployment and poverty? It has been suggested that we should abandon the concept of work altogether and let people move freely between leisure occupations and more traditional occupations. In this way people could spend a small proportion of their 'working life' at 'work' and the distinction between this and leisure would become blurred. I do not believe that this concept has much to commend it. In my view, work, as presently constituted, fulfils several indispensable functions. It makes possible the satisfaction of needs of individuals and society; it provides a framework for companionship and social relations; it provides a social seal of approval for activities and individuals. Most people living in the present alienating cities and in nuclear families with their inadequate social contacts, would prefer to go out to work rather than obtain the same wage for doing nothing - finding something to do themselves. It is one thing to be idle rich, with plenty of money to spend on all kinds of activities and plenty of space to house such activities; but it is an entirely different matter to live on even 'the average wage' with nothing to do and only yourself to validate whatever you are doing.

I have no objection to paying everybody a basic wage irrespective of their activities, but I do think that on top of that opportunities for paid and socially useful work must be provided by some mechanism. At the moment it is difficult to think of suitable mechanisms which would be all that different from existing arrangements.

To summarise: I do think that there is scope for reducing the working week or working year or working life and I do not object to a basic social wage; but I do not think that work as we know it should be abandoned. I do think that much more employment can be shifted from 'making things' to providing services. Services can be

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provided by the private sector, but I believe the public sector to be vital and in need of strengthening. Safeguards against bureaucratic inefficiencies can and must, of course, be built into all activities, private or public.

One of the main political problems of the future, in my view, is the provision of an incomes policy. This is not only necessary to guard against inflation; it is also necessary to counteract the strong unegalitarian forces which modern technology unleashes. Market economics, left to its own devices, would highly remunerate those who design and operate highly sophisticated production machinery and would leave little bargaining power to some of those who provide services. Another serious difficulty to overcome is the matching of skills with requirements. Here I think we must introduce much more flexibility into the system, so that the matching of skills and requirements can become a continuous process without too many hindrances imposed by artificial barriers serving monopolistic purposes.

These are but some of the problems we have to grasp. The prize for success can be high, the price for failure excessive.