It would have been suicidal for us in Great Britain to have contented ourselves simply with observing more or less passively the dynamism of automation throughout the world and to have shrugged our shoulders and let it develop in this country as best it could. By creating a Ministry of Technology the government has shown it realizes that time is not on our side. Until recently, it took a long time to catch up with a technological lead. It involved transplanting know-how and training and designing, manufacturing and purchasing the right kind of equipment. All this was a lengthy business and its very slowness favoured the status quo. So once a country had established a lead, through superior organization or superior inventiveness, it could reckon to hold on to it for a long time.

Today, on the other hand, through high-speed communications and world-wide training in science and technology, the time lag has been greatly reduced. Change is in the air and the gap between invention and its application all over the world is narrowing fast. It is political and social folly to shut one’s eyes to this. Furthermore, we have to face the fact that a number of other industrialized nations are adopting automation faster than we are, with all that it implies in terms of political power and the ability to compete in trade. The outstanding example, of course, is the United States, where mechanization and automation are advancing at such a rapid pace as to cause problems which are going to tax the ingenuity of even that very ingenious nation. And, in spite of their widely held belief that any government plan must necessarily be a bad one, they are being forced to consider not ways of stimulating automation, as we so desperately need to do, but ways of dealing with the problems of its rapid spread. In many cases they have redeployed their resources in completely new plants, in such new areas as California, Arizona, and Florida, and because of this, and because of the increased productivity that results from automation, they believe that in spite of their high cost of labour they will still be able to compete with European prices. Whether, in the long run, we shall be able to compete with them will depend on whether we, in Europe, manage to adopt automation as rapidly and on as broad a front as they are doing.

In the case of Russia we see a nation which is actually planning to use its political system in order to become a world industrial power, on the premise that it can adopt automation by edict and compulsion more rapidly than we in the West can by the process of democracy. I wonder how widely it is recognized that the Russian effort is not merely a triumph of wishful thinking. On the contrary, it is based on a carefully conceived and well executed piece of strategy. There seems little doubt that the U.S.S.R. has changed its idea of military competition to that of competition in the economic field. The Russians are determined to catch up with the higher standard of living enjoyed by the advanced Western nations, and they have decided that
automation is the most effective method of achieving this. No longer do they rely on the amount of electric current consumed as a sole yardstick of the progress they are making. In its place, the new mystique of automation has arisen in Russia. The economist Strumilin, in a statement to the Soviet Academy of Science, said that ‘if capitalism can be characterized as a classical period of the mechanization of work, communism will be seen to bring about a new era of total automation in production’.

This followed a speech by Mr Khrushchev in January 1959, when he launched the present seven-year plan. He said then that it would be possible to achieve the aims of the plan only by applying complete automation to production. He also emphasized that highly organized mass-production of modern equipment must take place, in order to automate all possible industrial activities, including chemical manufacture, oil refining, food, power, blast-furnaces, steel-works, rolling mills, and mechanical construction. He believed it was vital that Russia should progress with maximum speed from sporadic and experimental automation to the systematic application of automation that was going to be essential in the future throughout the whole of their economy.

The Russians see automation as their main hope. They want to apply it quickly to expanding industries to save labour and reduce production costs. The U.S.S.R., in fact, is not merely hoping for a second industrial revolution, it is systematically planning one. The present welcome degree of freedom from military threat is being used by the Russians to carry out the gigantic task of automating their industries. Programmes of space travel are based upon automation concepts, and this has given the Russians much expertise. The value of it is being felt throughout their science and economy. Already automation is beginning to transform their production of durable consumer goods, such as watches. They are still refining and developing their techniques, but already the Russians are assembling watches in about a quarter less time than it takes an average French manufacturer, and in about a third less time than is normal in Switzerland. It could well be that this early application of automation will affect the whole watch making industry of Europe. And this is only one example.

But if one compares motor vehicle production in the West with that in Russia, the Russian output so far is remarkably unimpressive. It is probably not much more than 800,000 vehicles a year, of which about a third are private cars. This contrasts markedly with the 16,000,000 to 18,000,000 cars produced by the Western world. It is said, however, that the Russians are planning to produce by 1975 something in the region of 10,000,000 cars a year. This estimate may be optimistic, but I wonder if it is altogether wild.

We must not forget, even so, that the task facing the Russians is a gigantic one. It will take them the best part of the balance of the century to carry it out. But the effects of the transformation of their industries which is now going on must sooner or later be felt in world markets. For us, the moral of all this is that if we fail to promote automation energetically here, we shall find ourselves eventually facing not only massive American competition but Russian competition too. We certainly have the skill and the technical ability to secure a worth-while position for this country in this international realignment of power—it is just that—but only if we act really vigorously and without delay. It is the speed with which we can adopt automation that is becoming our central problem.
All political parties are concerned with this problem. It is widely recognized that we must automate our industry or else we shall find ourselves unable to compete. But the technical changes in the field of automation are so rapid that it is difficult for anyone not directly involved to understand them and what they imply. One cannot reasonably expect the average Member of Parliament, mainly concerned as he is bound to be with the many day-to-day problems of his constituency, to go much more deeply into the subject than to examine the likely effect of automation upon employment, and therefore on voting in his area. Yet, fortunately, politics are not only the concern of politicians. It necessarily involves the general mass of citizens, and I believe that it is an urgent political task to educate the people as a whole to make them aware of the broad problems and the opportunities of automation.

With the support of public opinion we must strive for a national policy on this issue. One of the legs on which I believe such a policy ought to rest is an organization, maybe set up jointly by government, industry, and trade unions, which would unite sociologists, engineers, economists, experts on labour relations, and psychologists, and would engage in a vigorous drive to make people understand the full implications of automation. The information it issues must be factual and honest. It should aim at presenting a fair picture, so that the whole problem can be viewed in perspective, from the point of view of the individual, the community, and the nation. The man in the street must be given the opportunity to know what is happening, and why, and what part he should play in it.

The type of organization I have in mind would remind industrial workers, for instance, that the mechanized handling of materials has greatly reduced accidents and that ill-health can arise from contact with toxic substances; in other words that there are many processes more safely done by machines. But it would show that it was well aware of the human problems involved in replacing physical effort by increased responsibility. The fact that not all workers can accept the kind of responsibility which automation would place upon them should not be passed over. The organization would urge the necessity of careful selection of workers, to prevent nervous fatigue and possible breakdown. It would provide objective and well-informed long-term forecasts of the types of skill which were likely to be in increasing demand and those which were likely to wither away. It would use honest and believable information as its main weapon against hostile Luddite attitudes.

To accelerate the whole pace of modernization with the least possible disturbance to existing institutions and interests, I believe it is essential to have a Minister responsible for this specific task. The Minister should not, as in Russia, be a Minister of Automation, because much more than automation is involved. Perhaps he should be a Minister of Modernization, equal in status to, say, the Minister of Defence, highly placed in the Cabinet, with power to co-ordinate the policies of other departments in order to reach the main objective. One of the first organizations that such a Minister might set up would be the kind of institution to which I have just referred, in which a wide variety of experience and disciplines could be assembled. This would inevitably have to be a large body, but it could set up working groups with specific tasks. These might include, for instance, investigating the effect of technological changes on the working population and on the distribution of industry. It would be concerned with problems of re-training and re-education, and it would publish reliable and intelligent
information, so that the whole nation could be kept fully aware of the implications of what was happening.

We already have the outline of such an organization although in a very embryonic form, which is now initiating research aimed at discovering how far and how fast automation is spreading in Great Britain and what the effects on employment are likely to be. Its Council includes representatives of both industry and the trade unions, and there is reason to suppose that through its initiative some valuable information will be discovered and made available. It is, however, a private venture, and at the present time is without government backing. Research within roughly the same field is being planned by other bodies, but there is no doubt that the urgent need for effective action on a much bigger scale is being widely felt, if automation is to be introduced to Great Britain with a maximum of success and a minimum of suffering and disruption.

Much opposition to change comes from fear, fear of the inhuman and the unknown. In the case of automation nothing is more frightening than the widely believed science-fiction picture of a world ruled by robot-like machines, without compassion or human sympathy. People are understandably worried about the sinister possibility of machines developing minds of their own and taking over the functions of men, and this anxiety has resulted in a situation where some workers fear machines as enemies, instead of welcoming them as labour-saving friends. It is extremely important that these ghosts should be laid. With sympathy and patient explanation I think they could be shown to be no more than ghosts and superstitions. But it would be foolish for a Ministry of Modernization to attempt to brush them away as childish terrors. Its policy would be to encourage the introduction of the most modern and sophisticated ideas into every aspect of our lives, and at the same time to safeguard the human values which must remain paramount, and which are the sole justification for automation.

The Minister could foster research and development in existing and in new laboratories. He would require a body for co-ordinating the activities of the various research establishments and particularly of those concerned with radar, with electronics, with guidance systems, and other military techniques. The purpose of this would not only be to find ways and means of exploiting their research facilities and their inventiveness, but to have machinery for examining systematically the many ideas that emerge during the development of military weapons systems and of finding and encouraging civil applications for them. If it were made subordinate to the Ministry of Modernization, it could well be that the whole of the Ministry of Aviation could be transformed into a Ministry of Aviation and Technical Development. It might be worth while to charge that Ministry both with producing the complex weapons systems of today and with encouraging the civil applications of the technological ideas on which they are based. I do not think it is enough to rely on the wasteful method of technical fall-out, of just hoping for ideas to seep through. Technical fall-out is a hazardous and wasteful process. The amount of it that does occur is extremely limited, an accidental bonus. It could be much greater if a concentrated effort were made to take real advantage of the knowledge which Government military research projects produce.
The Government clearly wants to stimulate the adoption of modern technology throughout industry. I believe there is no alternative to powerful tax incentives for this. Unfortunately, it is not true that industry and commerce always know what is best for them and for society as a whole, and that they will adopt the most modern methods as and when they are ready. This may possibly have been the case when technology moved at the pace of most of the leaders of industry and commerce and within the limits of their knowledge, but it certainly is not so today. The majority of today’s industrial leaders were educated thirty years ago. So how can they be expected to understand fully the implications of advanced technology, even as applied to their own business? If modernization along sophisticated lines is to be speeded up, suitable tax incentives should be offered to make the purchase of automation equipment immediately attractive. This may seem like a costly exercise, but an expenditure of, perhaps, £100,000,000 a year would have a dramatic effect, and this money could quickly be saved by improved productivity.

A coordinating body within the Government
Within the Government itself there would need to be a co-ordinating body to bring together representatives of the Treasury, the Board of Trade, and the Ministries of Labour, Housing, Transport, and Aviation. Working committees would have to assess the interaction of decisions, and this could very well be done by computers, which would handle a great deal of detail without increasing the Civil Service. Computers could reveal where the real problems lay and what the results of any projected changes would be before the changes were in fact made. The work of government would be more effective and acceptable if its techniques could be refined in this way. Computers do not replace judgment, but they would arm administrators with so much detailed and up-to-date information that their judgments and decisions would be arrived at more accurately and wisely, and with a far greater knowledge of their likely effect.

The moment changes are anticipated, people ask: ‘How does this affect me, or my business, or my union, or my future? If it’s bad for me, it’s bad, and if it’s good for me, it’s good’. This attitude is a principal cause of the difficulties in which so many politicians find themselves, because they have to find policies which are not only good for the nation, but which are also popular: otherwise they are not re-elected. Consider, for instance, the situation facing the trade unions. Their more enlightened leaders have recognized that a Luddite attitude cannot safeguard their members’ interests. They know you cannot dam a flood with a few sandbags. They recognize, since automation is going to affect their members anyway, that it is far wiser to make themselves part of the new developing society, within which they have a valuable role to play. They want automation so directed that it serves the national good and produces greater wealth but they are demanding that their members shall have a fair share of this wealth and that any difficulties are dealt with humanely and constructively.

Hesitant business leaders
In industry there are many go-ahead and enlightened employers, but there are also some who are suspicious of automation, basically because it is still very new. One might imagine that, out of self-interest, every manufacturer and every business man
would rush to buy a computer or a computer control system as soon as it became available to him. Of course, some do, but many do not. The strongest reason for this, I think, is that the present generation of business leaders was educated in a period when automation was barely heard of, even in science-fiction, and automation compels them to re-think the whole structure of their industry and its processes. But their hesitation in many ways acts as a valuable cushion, spreading the introduction of automation over a period of time and making it easier to cope with the demand for equipment. But it is all a question of degree. Too much hesitation is dangerous for the whole nation. It is true that in industry and commerce, as in nature, those who lack adaptability for change, like dinosaurs, tend to die. But this applies to nations, too, and we must make sure that the foundations for automation, more particularly the human foundations, are laid quickly.

I have already pointed out that the Russian seven-year plan, launched in 1959, was based on automation. To make this possible, the educational system had to be re-shaped long before. In fact, in about 1948 there was a decision that they wanted to leap-frog the mechanical revolution, and with this in mind they introduced an educational programme directed at launching the automation seven-year plan some ten years later. Politically and economically, the Russians are bedevilled by over-centralization to much the same extent that the Americans are bedevilled in exactly the opposite direction. The Russian cure for everything is an all-knowing centralized government, whereas the American desire is to make sure that government interferes as little as possible. In Great Britain, we are probably rather better placed than either Russia or America in this respect because we do not adopt either of these two extreme positions. We have a good political machine, and an ability to use it intelligently, provided that we make up our minds. All I want is to urge a national policy aimed at rebuilding Britain on modern lines. I do not ask for a plan because I do not believe anyone can make a good one. But it would be sufficient to get a real decision on and definition of national direction and purpose, and to lay down a programme aimed at encouraging the nation to move in the right direction fast enough.

Not a Party Issue
This need not be a party issue. Whichever party is in power must understand that the age in which we live is a revolutionary and rapidly changing one. It must be conscious of what is happening in the rest of the world, and once there is agreement on the fundamental direction in which to move, our educational system, our export policy, our investment policy, would fall into place in the overall pattern. No policy can remain rigid. It has to allow for change. It must, in fact, follow the basic principles of automation itself, feedback and self-adjustment. But in politics, as in automation, one must first decide on one’s objectives.

In the last two years there has been evidence that all parties are beginning to come under pressure from their younger supporters, who have begun to demand modernization. They realize that we in Britain are not sufficiently ‘with it’. There is no political party in this country against automation. There is no violent disagreement about how it is to be achieved. On the contrary, there is some degree of common agreement that automation is vital for our survival, and we can even see the beginnings of a national policy. People are rightly determined that if they are moving into an age of automation they should safeguard themselves against possible hardship,
but, even so, they do want automation applied rapidly and intelligently. It is the state of public opinion which will ultimately decide the rate at which we automate and the safeguards we introduce. No one in a position of political power can ignore this, or for that matter what is happening in the United States, in Russia, or in France.

Unfortunately—and this has been widely commented upon we have few people in government with a scientific or engineering bent. For a long time we have been ruled to some extent by men who believe that only a good arts education matters, and that you can achieve everything else simply by using technical and scientific advisers and experts. Even in this technological era one symptom of this is that our technical universities are not quite so respectable as the great old-established seats of learning. In the minds of far too many people they represent something just a little less than the best. If television could create a sort of glamorous engineering Dr Kildare, this situation might change, and we might be well and truly launched into the age of automation.