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Preface

It is hard to realize that the time has come, for the third time, to offer our readers a collection of papers. The first three, by Messrs. Simmons, Buchanan and Morice, were read at a meeting on the teaching of the history of technology held at Imperial College on 19 March 1977. The remaining papers consider a variety of rather unusual themes ranging from Roman aqueducts to the problem of urban-railway smoke-pollution.

We are pleased to welcome two contributions from the United States of America in this issue, but sadly we have to report the death of Frank D. Prager in June 1978, just before the volume went to press. As before, correspondence concerning publication in this series may be addressed to the editors at the Department of History of Science and Technology, Sherfield Building, Imperial College, London SW7 2AZ.

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Technology in History

JACK SIMMONS

My purpose is to say something about the part that the study of technology can play in the study of history as a whole. How far are technological explanations useful, relevant, necessary, even essential to an understanding of the way things went in the past, and of the lives that people lived? Here at once let me make a distinction. It must I think be perfectly clear that to understand *lives*, the ordinary activities of human beings in ages other than our own, it is indispensable to consider the technologies that served them, for they formed in many respects the very framework of those lives themselves. They may have been, to our way of thinking, very simple technologies. But the simplicity is relative to experience, to what went before: the advance to the wheel, whether on the ground or in the potter's hands, cannot be considered a less striking achievement than the development of the telephone or the radio in the past hundred years. The changes that new technologies wrought in the lives of those who could make use of them are evidently great, perhaps here and there fundamental. If we wish to see those people in the past, remote or near, clearly and fully we must investigate the apparatus with which their lives were lived: surely one of the things that suggested itself in looking at what survives of Pompeii.

I am not going to say much on this theme in this paper, for I take it we shall all understand its importance. I want rather to look at something a little less obvious, certainly something that has been less attended to: namely the importance of technological development and change in some broad historical processes. For I think these things have often been forgotten, or insufficiently remembered, at many points ignored or misunderstood. Although I shall range fairly widely here and there, it may help if I keep to a single central theme: the subject of communications, using that word in its broadest sense to mean not transport alone but all forms of communication down to the telecommunications of the modern world.

Anyone who has studied political history, the history of government and states, or tried to teach it, needs to recognize at the outset and never forget one axiom: that what really happened was not necessarily the same thing as was intended to happen, that laws might be passed and be imperfectly obeyed or even be dead from the moment they went into force. The gulf between theory and practice is often enormous. It is clear beyond any argument, for example, that certain Acts were passed in London between 1530 and 1560 ordaining changes in religious observance: the destruction of roods and rood screens and of pictures in churches and so on, then their restoration under Mary, and their destruction again under Elizabeth. But how far were these measures enforced? What are we to make of the survivals, still to be seen now, of some of these things in the remoter parts of the country, on the Welsh border and in the North? It is perfectly plain that the government in London could not ensure that its decrees were obeyed; it had no means of knowing, directly or immediately, that they had been carried out. It was the better part of a week's journey from London to the wilder parts of Herefordshire — a fortnight there and back, allowing a little time for investigation on the spot. Think of what that meant, in terms of the quality of government: the inability — so far from what we now take for granted — to know, by any instant means, that the order has arrived and is being obeyed.

The passing of laws fills the books concerned with political history. It has its own interest as a reflection of policy and intention, of thinking. It may be far less interesting than the consideration of the ways in which they were or were not implemented. The first thing needed is a firm grasp of the means of communication at the disposal of those whose job it was to see that the laws were carried out. For anyone who sets himself to study the history of a state, of France or Russia or the emergent United States in the nineteenth century, it ought to be an immediate task to discover how long it took to communicate between the capital and the different parts of the country and what the means of communication were. Were they, for instance, liable to interruption in the winter?

Let me pursue that last question for a moment, with one case in mind. The British colonies in North America, the nucleus of what we call Canada today, were politically troubled in the 1830s; troubled in their relations with one another and with the distant government in London. A minor rebellion was the result in 1837, and in the following year Lord Durham was dispatched to investigate what was wrong: an able, awkward man who asked searching questions and did not mind if the answers he found to them were disagreeable. When he set out, he had in mind one main political solution: a federal union of all the five separate colonies. It was an intelligent idea that suggested itself naturally and was eventually realized. But when Durham looked into things on the spot he changed his mind and rejected it. One of the chief obstacles to any such plan was that the St Lawrence was frozen over for half the year, which cut off the colonies near its mouth — Prince Edward Island, New Brunswick, and Nova Scotia — from the rest, from the old French colony of Canada and its western offshoot in what we now call Ontario. As early as 1838 Durham perceived that a political union would not work satisfactorily until a railway had been built linking the colonies together — a railway that could be kept open all through the year and provide the continuous communication that any kind of united government required.[1] This idea showed real prescience, the imagination of a truly forward-looking mind, for when Durham left

England the first trunk railway, the Grand Junction, had been open less than a year and the London & Birmingham was six months from completion. But he saw and said in the famous report published in 1839 that the construction of a railway was an essential element in a most desirable political change. He was right. The railway was built slowly and painfully over the next forty years. The federal idea came up again in the 1850s. With railways actually under construction west of Montreal and a bridge being built across the Saint Lawrence there, it became realistic to talk once again about union. After much discussion and some wrangling the federation was achieved in 1867. The last section of the railway was completed nine years later. Here we see politics influenced and in part determined by technology, and here is a politician recognizing that a technology only just emerging will be a powerful force in a development he advocates for the future.

Let us now look at another kind of government, one of vast scale stretching over half the world, one that was profoundly affected — certainly at one point radically changed — by technological development. I mean British rule in India: by the government and the East India Company in partnership from 1784 to 1858, and then by the government alone. In the late eighteenth and the early nineteenth centuries, could it really be said that British India was governed from Britain at all? By ships sailing round the Cape of Good Hope — the East Indiamen, majestic and slow — the voyage lasted at least four months and often six. It regularly took a year or more to receive the reply to a letter sent to India from London. In those conditions no order, however peremptory, could be enforced. It was inevitable, in the nature of the case, that the Governor-General and his colleagues at Calcutta should decide what ought to be done in the shifting conditions of Indian politics and justify it to the home authorities afterwards. If they disagreed they could only say so in another slow exchange of correspondence, or in an extreme case like that of Lord Ellenborough in 1844, recall the offender to England and dismiss him. But that was a retrospective punishment.

By the time of the Ellenborough incident, Britain and India were being brought closer in time through new developments in transport. The Overland Route, by way of the Mediterranean, was already in use: P. & O. steamship from Southampton to Alexandria, across the Isthmus of Suez, then by steamer again down the Red Sea, or of course after 1869 through the Suez Canal. This reduced the time taken on the journey to a minimum of about six weeks. But even so, three months had to go by at least before an answer could be received to a letter written in London; the separation of real power between the home government and its representatives in India was still dangerously great. How dangerously became clear in 1857 when the news of the Mutiny arrived home, and the very continuance of the British Raj in India was at risk until military reinforcements could get there. The East India Company was wound up in the following year, and its power transferred wholly to the government; but that did nothing to solve the problem of communication.

The way forward was already being shown. Submarine cables from Britain to France and Ireland were brought into use successfully in 1852-3. A company was registered to carry a cable under the Atlantic to America in 1856 and in the very year of the Indian Mutiny work on it began. It took nine years to complete the task, years that included the American Civil War. When the triumph was complete in 1866 it initiated the rapid development of a network crossing the world. The cable reached Bombay in 1870, and it brought a political revolution in its train. Now at last the government in London could really control the government of India. Quite soon a great change in the whole style of the régime there came to be noticed. The Governor-General, though he could still be in ordinary times one of the most powerful men in the world, was clearly subject to the decisions of the British Cabinet. In one field after another it became plain that the grip of Britain on India was being tightened: in frontier policy, and in economic affairs where the interests of the cotton industry seemed to be more and more subordinated to those of Lancashire. Before 1870 such policies could have been laid down on paper, yet not implemented. In 1870 direct rule had become possible.

We must not pursue the consequences further. They stretch very far. The nationalist movement of the 1880s must be seen as, in part, a protest against an increasingly rigid foreign control. But it was not any decree of government, it was the capitalists, engineers and servants of the cable company whose labours had brought that about.

The political and economic changes wrought by telecommunications have been profound — from the early developments of the electric telegraph in Britain, sensationally floodlit in 1845 by the arrest of a murderer at Paddington station.[2] There is a whole literature, of course, dealing with the techniques involved and their successive development. We have one useful study concerned largely with the attitude of the state towards the telegraph; its purchase of the private companies from 1868 onwards may be taken as the first measure of nationalization in the form that is familar to us now in this country.[3] But nobody has thought to write a comprehensive study of the effects of this great development, of telecommunication in history.

Here, as always, we must be careful not to exaggerate. Even with the aid of the telegraph and the telephone and their still more sophisticated successors, governments are not always in control of the people and the forces they pretend to guide, that is only too evident. The development of the means of control does not ensure that it shall be used effectively. It can indeed be argued, and I think very cogently, that the multiplication and improvement of the technologies placed in the hands of politicians, administrators, and business men have made their task harder by increasing the range of choice in front of them. Although that is not the theme of this paper, it needs to be mentioned in passing. All I am trying to do is to indicate a few points at which technological development opened up new opportunities to men in power, enlarged that range of choice; and I want now, pursuing this further, to look at three other cases of different sorts. The first involves economic power. In the second not one but a succession of these developments played a considerable part in the relations between three states and eventually between one of them especially — Great Britain — and the rest of the world. The third is a chapter both of political and of medical history.

In Britain we are familiar with the troubles that beset agriculture in the 1870s, and we attribute them largely to the export of grain from the North American continent and from Russia, which flooded Europe and damaged Britain particularly because she refused to reimpose tariffs to shut out the wheat from abroad. The threat materialized just then, as we can see, through the opening up of central and western Canada and of the great plains of Russia by the building of railways. But what about the United States? Railways had criss-crossed the grain-growing States of Indiana and Illinois in the 1850s, and they were already stretching out fast into Iowa and Wisconsin. Why did this export not reach its 'flood' for another twenty years? In large measure because the railway system, which looked continuous on paper, was interrupted by numberless breaks of gauge; the bulk of the grain still moved eastwards slowly by water. But water transport could not handle all the traffic, even with the assistance of the railways — not more than two-thirds of the traffic, at a maximum, at the end of the Civil War. A revolution followed, which was purely technological in character. The railway system of the West and North was physically unified by the removal of breaks of gauge; and then it became possible to move an ever-increasing quantity of grain quickly and cheaply to the eastern seaports. The American invasion of the markets of Europe could begin, now and not before; and this technological advance was the reason.[4]

My second case is of a different sort. The naval supremacy that Britain forged for herself in the Napoleonic wars did not arise in any large measure from superior skill in the techniques of building or equipping her ships; the superiority appeared in the handling of them. Before those wars ended steam propulsion was being applied to commercial ships with success. By 1830 steamships were a familiar sight on the Thames and in the English Channel. But the new power was extended to warships very tentatively. Marc Brunel persuaded the Admiralty to build a steam warship in 1822, but it and its early successors were regarded in the Navy with widespread distrust and contempt. Special difficulties presented themselves, it must be allowed: all steamships were extravagantly expensive in service until the development of the compound engine in the 1860s drastically reduced the deadweight of fuel they had to carry in order to operate over long distances. Moreover, the paddle steamer was clearly vulnerable in war, its power concentrated at a single point that provided a large and easy target to other ships' guns.

When the politicians and naval administrators looked into these developments they acted quite rapidly on one, but not on the other. The adoption of screw propulsion followed fast on the first experiments, which were made in 1837. In 1843 — the year in which I.K. Brunel's *Great Britain* made its memorable first crossing of the Atlantic — the Admiralty commissioned H.M.S. *Rattler*, the first naval vessel in Europe to be propelled by a screw. Successive improvements followed over the next five years, in the warships *Amphion* and *Ajax*, and thereafter the British Admiralty abandoned the paddle-steamer altogether. Here was a quick apprehension of a technological change, promptly acted on.

But, in warships as in the merchant navy, the transition from sail to steam was much less rapid than we are apt to suppose, for which there were a number of explanations. The capital cost of abandoning the whole British fleet and turning to new ships was too great for the politicans to contemplate. The steamship was expensive and cumbrous and it required a chain of reliable coaling stations across the world, which was achieved gradually; hence, for example, the government's willingness to accept control of Aden in 1839. (Its very origins as a British colony are, or were until very lately, commemorated by the name of the headland there, Steamer Point.) From henceforth this was a distinct thread in the colonial policy of Britain throughout the nineteenth century. Successive governments desired to avoid the expansion of the Empire, or to keep it down to the minimum. They found themselves forced nevertheless to increase their responsibilities, and one reason lies in the voracious consumption of coal by the steamships they had to provide for — their own, in the Navy, and those of British traders who looked to them for assistance. From this point of view the economies in the consumption of fuel effected by triple and quadruple expansion from 1874 onwards were of political, as well as economic and technical importance.

In the history of warships there is a direct and clear line of development over the seventy years from 1843 to the First World War. Here are a few of its most conspicuous landmarks: the adoption of armour plating around 1860, followed quickly by a great increase in the firing power of naval guns, leading to a 'race between ordnance and armour plate';[5] the change-over from iron to steel, heralded by blockade-runners in the American Civil War and accepted by the British Admiralty in 1877; the grouping of guns in a turret and the development of the torpedo, both again taking their origins in the American war and applied in Europe subsequently; the triumphant appearance of the steam turbine in 1895, installed almost at once in British torpedo boats; and the final combination of all these changes in H.M.S. *Dreadnought* in 1906.

In nearly every one of these instances, if the new development was not British in origin, it was taken up and made effective as a force in the naval policies of the world by the British Admiralty. But at what cost! — a very obvious cost in one sense, a concealed and even more important one in another. In 1852 the country's expenditure on the Navy was £5 million. In the years 1860-84 it stood fairly steadily at about twice that amount. Then began a staggering rise. The cost of the Navy in 1913 was over four times what it had been thirty years before. Or, to look at it differently, whereas in 1883 an eighth of the entire revenue of the state was spent on the Navy, by 1913 that proportion had almost doubled, to twenty-four per cent.[6]

Not all this increase is attributable to new, more elaborate and costly equipment; much of it arose from the mere enlargement of the Navy to meet fresh dangers, above all after 1898 when the fatal race with Germany began. But never at any time before I think had technical changes forced so great an increase of expenditure on a government to be incurred so quickly.

The hidden consequence was subtler, and to those few politicians who understood it more alarming still. Though Britain, with some setbacks and stupidites and follies, managed to keep as a rule the lead in this fearful rivalry — superbly demonstrated in *Turbinia* and *Dreadnought* — she was in a sense exposing herself to new dangers each time she committed herself to a new technique or device. The French seized the initiative for a moment in 1859 with their battleship *La Gloire*, with an armour-plated wooden hull. Britain went one better in 1860 with H.M.S. *Warrior*, in which the entire hull was of iron. But the French, or any other power, could play at that game too if they chose. Each time one of these decisive advances occurred even if Britain pioneered them, her whole existing navy was placed at risk; and as it was much the largest navy in the world and she was more dependent on it for her power than any other state, her risk was greater. When it came to the most critical stage of all in the fifteen years preceding the first war with Germany, the Admiralty made relentless demands on the Treasury, and they became fiercest of all when the Germans began to build *Dreadnoughts* of their own: for ships of that kind had made all other extent battleships obsolete. Here is one of the vital elements in the Parliamentary crisis of 1909. Lloyd George did not frame his famous budget of that year simply in order to provoke the House of Lords into attacking it. He began, as Chancellor of the Exchequer, with the need to find vast new sums for more *Dreadnoughts* (summed up in the jingoist cry, 'We want eight and we won't wait'), not to mention submarines and other equipment of new types. In the three years 1909-12 alone Britain's naval expenditure leapt up by a third. And in the end, when the test came, the margin of safety was very narrow indeed. The Germans might well have won the Battle of Jutland in 1916; in 1917 their submarines reduced Britain, as the Cabinet knew, to a prospect of starvation within six weeks.

And now for the last of these cases — quite unlike the other two. It takes us to West Africa. From the fifteenth century to the nineteenth Europeans had always found it difficult, often impossible, to work there on account of the climate and the diseases that attacked them. In spite of that the British Government persisted in its determination to destroy the slave trade on that coast (at a very considerable price in British lives in the end, if that could ever be reckoned up). This resolution involved two actions which were complementary. The first was the policing of the coast, based here and there on political control. The second was the penetration of the interior, towards the sources from which the slaves were drawn, with a view to developing gradually new trades to take the place of the one that was to be destroyed. The first of these objectives was proclaimed when the British Government entered on a protectorate over Lagos in 1851, which became complete control ten years later. That was a political decision, and it is in all the textbooks. But it was hardly, in the long run, more important than something else, which took place at the same time and figures, so far as I know, in no textbooks at all. An exploring voyage was made up the River Niger in a small steamship, *Pleiad*, in 1854-6, under the command of a young Orkney surgeon, W.B. Baikie. It penetrated 250 miles further up the river than any Europeans had done before and accumulated much useful knowledge of the country. One piece of knowledge was more valuable than all the rest. Baikie insisted firmly that every man on board should take regular doses of quinine, as a prophylactic against malaria, and not one of them died of the disease during the whole expedition. Baikie had proved that it was possible for Europeans to survive even on pestilential West African rivers.[7] He went on to demonstrate that possibility again on a second expedition. Baikie had in fact gone a long way towards solving one of the most crucial of all the problems in the penetration of the Tropics. Not the whole way — much more was to be done by Manson and Ross, and by other workers in the next generation — but a long way. Baikie was a quiet man without the slightest touch of bombast or self-advertisement. Perhaps in a way, *too* quiet, for his achievement passed with very little recognition at the time and the lessons to be drawn from it were not sufficiently learnt. But looking back now we may well feel that his application of a technique in combating disease was as significant as the annexation of Lagos, the political act that stands out in history, conventionally told.

These then are a few cases — a few out of very many that could be adduced, confined to the nineteenth and twentieth centuries and almost wholly to the field of communications — cases in which, it seems to me, technological explanations are required by the intelligent student of history if he is to get his study right. I am not of course suggesting that these explanations have never been given before, or that my points are in any way original. I *am* suggesting that they have not, as a rule, received the prominence or the clarity of treatment that they deserve, and that (especially in the example I drew from naval practice) the clear chain of causes and consequences has not been satisfactorily shown as such by some of the historians who are concerned to explain national policies.

I also think that many students of technology have regarded their piece of technology as a study on its own, have failed to see it in its true historical context, and so sometimes have missed part of what is most interesting and profoundly important in the technology itself. I speak from the historians' side of the fence; I have neither training nore expertise in any kind of technology. But I have long been aware of the need to search for explanations, in engineering or in some other branch of science, where there is a chance that they may help me; and I am sure that those explanations have often, if I have understood them, enabled me to grasp more adequately the political or economic or social matters I was examining.

I suggest the key to much profitable exploration is to persist in asking one question, not merely 'What happened?' nor 'How was it made to happen?', but 'What were its effects?' It constantly surprises me that people are so incurious in that matter. They are perhaps carried away by the sudden appearance of a new machine, a new device, a new invention as it is commonly called. They fall to asking 'Who produced this, and how did he produce it?' — natural questions and good ones, but not the only ones that need asking. Sometimes, really, not the questions that matter most, but less important, if you think about it, than discovering the differences that the new development made in appearance or reality. I look at machines in museums. I am often told a great deal there, and it may be fascinating,about the process of thought and experiment that produced them. But I am seldom informed of the changes that they wrought: what they cost to build and run as compared with their predecessors, their productivity, the effects they had on employment, the side-effects they sometimes entailed in local or national politics, in the relations between states. Without the consideration of those effects, the whole exposition is diminished; the machine one is looking at becomes a curiosity, an antiquity, no more. It lacks a place in history, a place in life.

The mere fact that some technique or some machine was the first of its kind may not of itself mean very much; or rather, what it means changes according to one's point of view. We shall always be tantalized by knowing so little about Trevithick's Penydarren locomotive, for it represented a feat of original genius and its fame reached out beyond South Wales. But one of the things we do know about it is that it broke the light track it ran on and was abandoned in consequence. It represented a brilliant idea, imperfectly executed (presupposing, among other things, the further development of the iron rail) and it came to a dead stop. The real breakthrough to the locomotive able to run smoothly on its track at high speeds came with *Rocket* and its immediate successors twenty-five years later. Trevithick's thinking was taken up and developed elsewhere, as the basis for further experiment; the full realization of the idea, the turning of it into effect, is the province of the Stephensons. It is in 1829-30 that the locomotive is seen to have become efficient, versatile, dependable, still capable of much further improvement, indeed, but now ready for work. When all has been said in justice to the early pioneers, this is the point of take-off — the point at which investors and commercial men, even governments, begin to feel they must take the railway seriously. It is so because it is the point at which the locomotive and the railway begin to have evident, discoverable, and far-reaching effects. Those are the moments in which the student of history is bound to be most interested, whether he is a student of technology or of economic or political life, the significant moments when development goes forward in a new direction.

To pursue this subject a little further for a moment: if I am shown a locomotive in a museum, at York or Hamar or Nuremberg or Baltimore, I want to learn a number of things about it. I want of course a technical description; and if the machine was demonstrably bigger or faster or in some significant way more sophisticated, as a machine, than its predecessors, I want to be told that too. I then want an answer to the question: why is this machine here? What is its place in the complex of evolution of the locomotive, in Britain or Europe or the world? It may of course have come to be in the museum almost by accident, as the gift of some kind benefactor or an example of local industry, not in itself of any wider significance. Or it may be there as a really important machine in its own right, demonstrating a stage of technological development that cannot now be seen anywhere else in the round: like *Lion* at Liverpool or *Coppernob* at York or the Metropolitan Railway steam locomotive at Syon Park. Or again it may be there (and this can very well justify its preservation) not as any kind of pioneer but for the opposite reason: because it was characteristic of its time, not exceptional — the temptation is always to cherish the rarity, anything curious, and to neglect what is typical, what ordinary people commonly knew and used. These things particularly need to be watched for and kept: the Dean Goods engine at Swindon, the South Wales coal tank engine now at Caerphilly.

Here these things are in museums and they are there for reasons such as those I have given. But the reasons are seldom indicated. And other very elementary things are commonly missing in the technical accounts of them offered to the visitor. Let me use one as a general illustration. We are hardly ever told what a locomotive cost, to build and to run. True, that may be difficult or perhaps impossible, to find out. In Britain most of the larger railway companies built most, or many, of their locomotives for themselves in their own works, at Crewe or Swindon or Doncaster. The companies' own records do not always allow us to see what the capital cost of those machines was, and if they do it is impossible to attach a really satisfactory figure to an individual machine: it may have been part of a concealed development cost, if the engine is a prototype or comes early in the evolution of a design; it certainly owes a good deal to the very fact that it was built in premises maintained and equipped by the railway company and by staff in its permanent service. If the machine was built by a private manufacturing firm, we shall be lucky to find its records extant; luckier still if they indicate the cost price attributable to the machine and the profit that accrued from making it.

Still, all that said, it is extraordinary how seldom we are told in books or on museum labels how much a locomotive cost. A few people have shown some interest in this matter, notably Professor Saul and Mr Brian Reed, but very few.[8] This is, one might have thought, a basic piece of information about any machine; for machines, after all, are the devices of an economy. The interpretation of the figure, if one has it, may be difficult, but let us at least know what it is.

Similarly are running costs rarely provided: not easy to extract, often impossible, from surviving records, but surely of cardinal importance. If the machine was more economical than its predecessors, that is really worth knowing: a link in a chain of development, perhaps an explanation of what may otherwise be unintelligible such as the continued use of the machine when it was obsolete or inadequate, on the face of it, to its work. So, to take an exceptional instance but a very clear one, the Midland Railway's beautiful express engines with single driving wheels, being notably economical in fuel, were suddenly reinstated in first-class service during the Coal Strike of 1912.

My contention is a simple one, and you can extend it from locomotives to stationary engines or steam hammers or electric cookers if you like. We always need to know as much as we can of the economics of using it. If you think I am labouring something that is obvious, put what I have said to the test. You will probably be surprised by the paucity of the information you are given, until you start to try digging it out for yourself.

A great deal of valuable work has been undertaken on the history of technology, especially since the end of the Second War. We are beginning to see some parts of it much more clearly, to get perspectives and to detect relationships that were hitherto unobserved. The contributions of industrial archaeology and of the new and rapidly multiplied museums I have referred to have been invaluable. To take stock of all this new knowledge and to get the best out of it, we need to do something more than accumulate further knowledge; we need to be confident that we are ceaselessly asking questions arising from it, and that we are getting the right questions. I have suggested one or two, concerned with time and with money. Just as evidently — I am inclined to think more so — the historians must ask themselves questions too, for the government of men and the societies in which they have been grouped are influenced, even regulated, by the technical resources that are available.

We have often been told — though I do not know who coined the phrase — that politics is the art of the possible. That may be truer than we realise. Human beings need management, and the politician has to pay strict attention to what he can and cannot do in that way. He also has to accept limitations on what he can do in a physical or economic