Transport as a Factor in the History of Economic Development

Charles Wilson
University of Cambridge

I do not think that Friedrich List and Lord Macaulay ever met. If they had met, it is pretty certain that the prophet of German economic nationalism and the High Priest of Whig liberalism would have disagreed about almost everything. But about one thing they would have found themselves in cordial agreement — the mission, economic, social and political, of transport in general, and of railways in particular. In this mission they shared a belief amounting to semi-religious fervour. For List, the system of national economy he advocated as the salvation of Germany was unthinkable without the binding yet solvent force of a railway system. Railways plus *Zollverein* were List's formula. For Macaulay the English time-scale was different. By 1850, tariffs were no problem: but when he came to write the famous chapter on English economic progress since 1685 in his great *History of England* (1854)[1] a major part of his argument turned on railways.

Macaulay's picture of pre-railway England would not have appealed to Professor Fogel and those who think the importance of the railway has been overdone: it is a picture of unhappy

* This article is based on a paper delivered to the Istituto Internazionale di Storia Economica Francesco Datini at Prato on 10 May 1973.

[1] *History of England* by T. B. MACAULAY (1854), Vol. I, Ch. III.

travellers by road stuck in oceans of mud, lost in darkness, victims of « insufferably slow » stagecoaches or agonizingly uncomfortable diligences, terrifyingly vulnerable to robbers and highwaymen. Canals were few and inefficient. The cost of sending heavy goods by road was « enormous » — according to Macaulay fifteen times « what is now demanded by the railway companies ». Such costs formed a « prohibitory tax » on many necessities. Coal was therefore known only in the areas where it was produced or to which it could be carried by sea, as it was from Newcastle to London — hence the name 'sea-coal' by which it was generally known in England.[2]

The fact that a contemporary view of something is so strongly held as to become an orthodoxy should not protect it from subsequent criticism: neither should it expose it to ridicule. « I rejoice to see it » cried an eminent English Victorian of the railway train « and to think that feudality is gone for ever ». I only ask you for the moment to bear in mind — not necessarily accept — this nineteenth century euphoria, this *zeitgeist* about railways and their relation to the totality of change, their symbolism. For from this, in more sober, semi-calculated, duller, more respectable language, came the later view of railways as a *deus ex machina* of economic development. As economic history became a free-standing discipline in Western Europe, its teachings came to embody a view of the functions of transport which may have been a little more cautiously stated than those of List or Macaulay but was basically similar. So, after the Heroic Age of Railways was over, a later generation of diligent historians continued in its traditions, refining and modifying as they went. The relationship between transport innovations and economic development in the nineteenth century which emerges from the conventional accounts written in the twentieth century is well-known and I will only sketch it very briefly. In her survey of the European economy, for example, Professor L.C.A. Knowles describes how the railway made possible the exchange of heavy goods in large units over very long distances. Simultaneously, railways outstripped the effects of, and need for, tariffs in an

2 See also J. U. NEF, *Rise of the British Coal Industry* (1932), Vol. I, *passim*.

economy like that of Britain: for the fall in the cost of moving merchandize was more than equal to an all-round reduction of tariffs. The new forms of transport led therefore in the course of time to the dismantling of the whole apparatus of protection built up over the previous two centuries and ushered in the free trade movement.[3]

Even where a dam of high tariffs existed, as it did in France in the 1850's, it could not hold back the rising tide of trade and the era of high tariff and railways of the 1850's showed an increase in foreign trade as great as that in the succeeding era of the 1860's, when lower tariffs were conjoined with the effects of railways. The comparison, it is argued, shows that it was the growth of the rail network which gave the first great impetus to trade expansion in France.[4]

Turning to Germany, Professor Knowles descried in the 1850's the first evidences of an industrial revolution. Why? Because, contrary to what the antiquarian gild revivalists of 1848 believed, it was rail transport and the changes it brought from the 1840's onwards, rather than factory production *per se*, which shattered for ever the old localised structure of German industry. Supplies of every kind were now, for the first time, able to flood in upon town and village at ever cheaper prices. Thus the age of crafts and gilds, of small entrepreneurs, was swept away and the road to full industrialisation opened up.

These ideas are expanded and refined in M. Benaerts' account of the origins of German industry. M. Benaerts conveys as few historians have done the sense of the totality of the impact of railways and their general consequences for Germany. It was the railways which brought the middle classes of Germany[5] out of their economic and political apathy, stimulating them not only to invest their savings but to participate actively in the new economic order. Railways symbolised the very spirit of the new enterprise and represented the *élan* indispensable before the necessary phy-

[3] L.C.A. KNOWLES, *Economic Development in the Nineteenth Century* (1936), p. 18.
[4] KNOWLES, *op. cit.*, p. 145.
[5] P. BENAERTS, *Les Origines de la Grande Industrie Allemande* (1933), p. 631 et seq.

sical construction could acquire momentum. The rail network made possible the conquest of Germany's vast internal markets by the German people themselves. It modified the demographic patterns of German life, bringing to light the material riches of Germany through mining and metallurgy and establishing large-scale industry in areas hitherto the home of agriculture and workship industries. It is upon these psychological effects that Benaerts placed most emphasis... 'c'est surtout pour la nouvelle invention des chemins de fer que l'Allemagne *se passionna*'.[6]

This sense of totality is important: I will only say for the moment that I fear it is something that the econometric, counter-factual school of historians still needs to ponder.

Now let me ask how this all-pervading enthusiasm for the historical functions of transport, and of railways in particular, has been dissipated? Why and how has it been replaced by attitudes reflecting a certain disenchantment, especially in the United States? One part of the answer lies (I suspect) in the very success of Prof. Walt Rostow's *Stages of Economic Growth* (1960). I can still recall the almost breathless hush that fell upon the gathering of the Economic History Association at Stockholm in 1960 when the phrase 'take-off' was first uttered amongst us. An unaccustomed evangelical atmosphere, almost of revivalism, seemed abroad. And, of course, the inevitable backlash followed. No economic historian (it seemed) had the right to enjoy such an indecently enthusiastic reception.

It was a central feature of Prof. Rostow's historical scheme that industrialization was characterised, and partly explained, by the existence of 'leading sectors'. At one point he committed himself to the statement that railroads constituted 'the most powerful single initiator of take-offs'. In the United States, France, Germany, Canada and Russia they were (he declared) 'decisive'. In Sweden, Japan and other places they were 'extremely important'. They widened markets, lowered costs, promoted exports, developed coal, engineering and other basic industries. And so on.

---

6 BENAERTS, *ibid.*, p. 631

Now in retrospect it is not wholly clear that Rostow really said more than many of his precedessors. And in fairness to him it should be remembered (what has been often forgotten by his recent critics) that he added a qualifying argument to the statements I have quoted above: where the other pre-requisites of industrialization were lacking, as they were in some countries — and he quoted India, China, early Canada and Argentina as examples — railways might, and did, fail to launch an era of development.

In spite of hedging about his arguments in these ways, Rostow became a major target for attack by the 'new' economic historians, particularly Professor Fogel. Rostow thus pays the penalty for being the most recent, most purely economic and most specifically theoretic, of the analysts of transport economics in the past.[7]

I shall, for the moment, now leave this problem and return to it later, only lifting the veil to give you a glimpse of my personal belief that this apparent 'revolution' in attitudes is, after all, in danger of being exaggerated: that, like many revolutions, it is more like a high jump than a long jump: and that the competitors came down to earth in positions nearer to those from which they took off than is commonly supposed. But to this I will return later.

Next let us glance at two earlier and widely separated periods in the Ancient World and the world of Early Modern Europe. But before we can address ourselves to the relationships (if any) of transport and 'economy' in Greece and Rome, we must briefly survey the nature of economic life, thought and aspiration in the Ancient World.

For Greeks and Romans alike, agriculture was not only the factual but the moral basis of civilisation.[8]

Cities existed either because they were centres of agricultural regions or for non-economic military or administrative reasons. Traction and transport overland depended on the ox, or the mule or the donkey. The problem which was to be familiar to later

---

[7] See e.g. *The Reinterpretation of American Economic History* (1971) ed. by ROBERT FOGEL and S. L. ENGERMAN, pp. 149, 198, 201, 275.

[8] I am indebted to Professor M. I Finley of Cambridge for the opportunity to read an advance ms. of his forthcoming book *The Ancient Economy* (Berkeley and London, to be published 1973) to which the ideas above owe much.

mechanical ages as 'engine weight' in relation to freight burden was already painfully evident to Roman farmers. To cart corn fifty miles with an ox team put 50% on the price. This explains why local markets in Roman Britain had 'tributary areas' stretching not more than 5 miles in any direction. So while the state might be able to pay for moving temple columns of stone using 30 oxen for each stone 'drum', such freight costs were far beyond the resources of ordinary merchants. Corn, timber, metal, etc., were therefore moved commercially by water. Of water transport there was fortunately no lack in the Ancient World.[9] Triremes, quadriremes, quinqueremes with their banks of oarsmen were, with variations of size and design, common to the maritime states of the ancient world. But Rome especially developed great merchantmen, including giants of 1200 tons, to move the grain without which Rome would have starved. These were exceptionally large, it is true; not till the days of the East India Companies of the seventeenth and eighteenth centuries were such monsters to be seen again.

The question is — how far did these great ocean-going fleets originate in economic needs? What were their economic consequences? The answer seems to be: only to a very limited extent. For the most part the ancient economies served the demands of war, the state and luxurious consumption. The great ports grew out of military needs. The Piraeus throve on Themistocles' naval programme. The Carthaginian War stimulated the growth of Ostia. Only near water could a city grow without risking immediate vengeance from all the forces of Malthusian fate.

Nor did ancient cities grow on foundations of industry. Workshops were small and they worked for the most part for local needs. The Ancients remained nervous of overproduction and unemployment, of middlemen and credit. Men might be greedy for wealth, for luxuries, but of capital they knew little and cared less. Acquisition, not production or saving, was their aim. The big merchant remained less important than the big landowner.

---

[9] Lionel Casson, *The Ancient Mariners* (1959), pp. 215-220.

They were therefore little interested in the connection between technology, invention and production. The Alexandrians played with ideas of stored energy but their speculations never got beyond ingenious and quite useless machines. Vitruvius might ponder over problems of architecture, mathematics, machines, etc., but his interests were in the quality of expertise, not in the effects of applied science on economics. Power remained the power of muscle, animal or human. Sailors knew how to sail with the wind but, like everybody else, remained fundamentally uninterested in the objectives of our own world — technical progress, economic growth, productivity, efficiency and the like. Inventions might be used for war, or ostentation, or luxury. Great ships might bring the obelisks fetched by Caligula from Heliopolis to Rome. Occasionally, machinery could be put to civil purposes: flour mills at Arles were powered by waterwheels. But, in general, a plenitude of manpower made laboursaving devices unnecessary, indeed rendered them unpopular. In parallel with this, the general poverty that afflicted all but a minority held back production for anything but minority consumption.

Finally, the climate of opinion was unfavourable to economic change and its agents. The Greeks and Roman had no word for scientist or scientific researcher.[10] Seneca condemned technology, and all the philosophy that led to it, as injurious, shameful, rooted in a base desire for material gain. The carriages of the Emperor Commodus, so technically ingenious, were condemned as mere indulgences of his vices. Unfortunately, the Emperor's private and public life — in Gibbon's words « immersed in blood and luxury » — sprouted only too rich a variety of these. Commodus was not a good advertisement for the moral claims of technology. The later Christian animus against wealth, and against those who sought and gained it, had deep roots in the pre-Christian world. So, in the centuries of peace inaugurated by Augustus, some of Rome's citizens might live luxuriously on commodities brought from China,

[10] H. W. PLEKET, *Technology and Society in the Graeco-Roman World*, in « Acta Historiae Neerlandica », 1967.

India and Africa by a thriving community of merchants. Ordinary Romans might live on bread made from corn paid to settle the tax bill due from the African provinces or Sicily or Egypt. But none of the prodigies performed at sea by Greeks or Romans did anything to bring fundamental changes in economy or society. The objectives remained military or administrative. The rich and powerful were supported: the poor were merely present. Greece and Rome lived and conquered by sea power; yet sea power, the power of ships, was not enough to change the fundamentally unprogressive nature of their economies, social structure and ethos.

I now turn to an intermediate stage between Ancient and Modern: in particular to the growth, between the 1590's and 1648, of that prodigy amongst the nations, the Dutch Republic. It rose, as we all know, from a conjunction of fishing, shipping and commercial exchange, and its spine, or backbone, was the shifting of goods by sea between the Baltic and Biscay, then the Mediterranean, and finally the entire oceanic area of trans-Atlanta, Africa and Asia. The cargoes involved were, first, grain, then timber and metals, salt and wine. Not much change, we may think, from the ancient or medieval world. Even the addition of new cargoes — spice, tobacco, sugar, cotton, etc. — did not introduce any necessarily new element into our problem. How different was the situation of the Dutch, living increasingly on imported food, from that of the Romans? How different the conditions of her merchant élite, living well on the profits of the colonial companies, from that of Roman millionaire merchants waxing rich on the profit of supplying senators with the luxuries of the East?

At first sight, the answer seems to be: not much. But on closer examination, important differences begin to emerge. We see that in reality the passage of centuries of medieval poverty and scarcity, the shift of the centre of economic gravity from Mediterranean fertility to a subacqueous northern swamp has wrought a substantial if not total change in facts and ideas. The fleets of the ancient world were privately run but could not have operated without the assistance of the state. In peace or war, they were politically, militarily, economically vital to the state. The flyboats of Hoorn,

Enkhuizen or Amsterdam were the laborious product and agency of private enterprise and a competitive society. The flyboat, the most potent invention or agency of Dutch growth, embodied no new technological invention. It merely reflected, as did so many Dutch scientific and technological ideas, the fruits of close, empirical but systematic observation relating ship design to ship purpose. Its success in capturing a major share in the world's trade in bulk commodities not only brought a significant income to individuals, and a large invisible export income to the Republic: it also generated a 'multiplier' effect as the demand for ships, ship's stores, tar, hemp, canvas, fishing nets, sailors, ports, cranes, handling gear for cargoes and a score of ancillary services grew.

Yet it was in shipping and shipbuilding that we must observe the first distinguishing mark of this new economic order. The Dutch did not merely transport goods for the greater advantage of consumers in the Netherlands or even Western Europe. This, it is true, was a part of their business, as of Greek and Roman shipowners and their medieval successors. It might be argued that the Baltic shipping run brought necessary bread grain just as the North Africa leviathans had brought bread grains to Rome. Shipping, in both cases, was necessary to survival. But, for the Dutch, it was plainly also necessary for *a changing and developing economy and society*. What the flyboats carried was not only grain and salt for immediate consumption. They also brought the timber which formed the essential basis of the shipbuilding industry, the Baltic or English barley for brewing and distilling, the Caribbean sugar for refining, the tobacco for cutting and rolling, rags for turning into paper — all their so-called *trafieken* industries — to say nothing of the supplies of Spanish and English wool for the weavers of Leiden.

In fact, Dutch transport — the interacting forces of canal construction, ship design, raw material supply, port organisation, etc. — has become by 1600 the basis for an internal system of industry using imported materials, an elaborate and delicate mechanism of international exchange in which an entire people are involved. Without ships, barges, canals this highly commercialised

and substantially industrialised society could never have come into being.

For let us not overlook the extent to which this *was* an industrialised society. True, it was to fall short of the power-driven growth potential of Britain in the 1760's: it did nevertheless embody a number of mechanical inventions, labour-saving and labour-dividing processes that were to characterise the later Industrial Revolution proper. They affected the textile, paper, printing and food industries that supplied a society different in structure and *ethos* from anything that preceded it. In shipbuilding in particular we see an industry of modern dimensions, inclining strongly towards standardised, repetitive methods.

This was the Dutch Republic — a commercial, middle-class, pacific, rational society with its eye on private profit rather than public power, and afraid, above all, of the extravagances of dynasticism; a collective society run by business for business, profitable above all to business but not unheedful of the calls of its poor. A remarkable, unprecedented society. Can we translate its achievements into specific terms of increased G.N.P.? I doubt it: though when Gregory King, the English statistician, compared England, France and Holland in the late seventeenth century he thought the annual *per capitum* income of the Dutch was higher than that of the English and a great deal higher than that of the French. If he was right, and he probably was, there seems an incontestable case for arguing that the richest society so far in history had been the creation of sea transport.[11] To some extent something similar might be said of Antwerp, Ghent, Bruges, London, Marseilles or Venice. Here also new forms of industry based on the exchange of raw materials and finished products by sea, the functioning of the *entrepot*, the emergence of a modern entrepreneurial function, are unthinkable without the complex operations of a system of sea transport. The Dutch, for the moment, were to

---

11 See GREGORY KING, *Natural and Political Observations* (1696), in J.H. HOLLANDER (ed.), *Two Tracts by Gregory King* (Baltimore, Johns Hopkins Press, 1936, pp. 54-56). Also CHARLES WILSON, *Taxation and the Decline of Empires*, in « Economic History and the Historian » (1969).

outstrip all competitors, though in England, too, the first statistical evidence of massive changes come in coastal shipping and in coal output — and they are intimately connected. How was Dutch superiority in sea transport achieved? Not, if Douglas North is correct, by any startling or revolutionary advance in technology. The flyboat, whose design and economics were explained to us years ago by Violet Barbour embodied no revolutionary features. It simply assumed forms[12] aimed specifically and exclusively at commercial profitability — it could be built cheaply, operated cheaply and with smaller crews. It also worked on certain political assumptions: viz. that the Dutch Republic would normally do its best to keep out of international conflicts. Its ships would therefore not need to be armed in self-defence against privateers or enemy vessels. Again, if Douglas North is correct, such assumptions enabled a class of ship to be built from the late sixteenth century onwards which facilitated a substantial rise in shipping productivity. This rise began about 1600 and continued till the mid-nineteenth century, and its sources lay not in technology but in the more rational and calculated exploitation of world markets, first by the Dutch and then by their imitators, in a world less plagued by piracy and privateering than its predecessors.[13]

I see no reason to quarrel with Professor North's general conclusions, though I have reservations about his calculations of freight rates. His emphasis on water transport is in line with what we know of the problems of land transport in ancient times (of which I have already spoken) and with what we have fuller evidence for in early modern times. When Sir Robert Southwell read a paper before the Royal Society in London in 1675 he argued that the comparative costs of carriage of heavy freight were such that you could carry a cargo of coal for 300 miles by water for the same price which would have taken it only 15 miles on land. It seems to have been true that the cost of transport overland prohibited any sales of coal at a distance more than 10-15 miles from the

---

[12] « Economic History Review », 1930.

[13] Douglas C. North, Ch. 12, in *The Reinterpretation of American Economic History* ed. Fogel and Engerman.

coal pit. The price of coal, it was believed, doubled every 2 miles on land. Such evidence provides powerful support for the argument that an entire economy could be founded on canal, river and ocean transport, even when fairly conventional designs of ship were used.[14]

The individual applications of technology, however, are less relevant to our enquiry than their general consequences. Was there an absolute difference between the economic development of the later, so-called, Industrial Revolution and that of seventeenth century Holland? Most historians would probably say there was. But can we be so sure? The late T. S. Ashton, in his remarkable little classic on the subject, described the conditions he thought indispensable to his concept of 'revolution': how inventions, discoveries and innovations became linked and enmeshed together. How innovation bred innovation as producing industries themselves bred demands which in turn encouraged supply, and how these in turn extended from production to services, including transport, without which producers' efforts must have been sterile or stagnant. Nor was transport merely an element responding to need: it could create need, be a cause as well as a consequence.

I suggest that some of these conditions were already present in the seventeenth century. Dutch shipbuilding was itself, in contemporary terms, a basic industry, as transport engineering was to be in the nineteenth century. It gave rise in turn to a demand for raw materials, labour and skilled management, and the quality of its design work set or abolished limits to the spread of markets. Its costs were a basic factor in national prosperity. The same was true of those other industries (significantly called *trafieken*) like distilling, sugar refining, paper making, tobacco manufacture, where imported materials brought by sea and canal were the raw stuff of industry. As the Dutch sea wars with England and France were to prove, Dutch industry, Dutch employment, even Dutch survival, depended on keeping open the sea lanes. In this way the Republic stood already in 1650 where Britain was to stand in 1914: vulnerable to any interference with the interconnected network of com-

14 J. U. Nef, *Rise of the British Coal Industry* (1932), Vol. I, pp. 100-103, 111

munications along which moved the supplies vital to working and survival. Transport here was not a spare, detachable factor: it was an indispensable component in a delicately integrated mechanism. But there of course Holland stuck — a small, overtaxed, decreasingly competitive economy.

Let me now turn back again to the nineteenth century. Professor Fogel and his friends have questioned some major assumptions of their predecessors. Their doubts relate less to transport and its importance *in toto* than to railroads in particular. Now, insofar as they are attempting to refine earlier assumptions, quantify them, test them by counter-factual analysis, etc., it seems to me they deserve our support. I have only two qualifying comments on their activities.

First, I am not sure how original their arguments are when seen on a broad canvas, and in the context with which we ourselves are concerned? Professor Rostow has already freely admitted that without the right context, railways were unlikely to initiate large programmes of economic development. Professor Fogel seems to agree that « while no single innovation was vital to economic growth in the nineteenth century... if any innovation had title to such distinction it was the railroad ».[15]

For Professor Fishlow, the process of economic development « is too complex, and also too diversified, to permit of unequivocal prime movers ».[16] Yet Professor Fishlow himself attributes very crucial and specific results to the railways. Thousands of the immigrants who went to settle the West (he says) arrived in the U.S. knowing what railways meant in terms of economic opportunities. Thus railways were an important determinant of recovery in America in the 1850's and played « a causal rôle » in population movement and settlement.[17]

There seems some confusion, perhaps some internecine differences, here in the camp of the new historians. I do not think it is sensible or fruitful to exploit their doctrinal differences. Yet

---

15 FOGEL, *op. cit.*, p. 202.
16 FISHLOW, in FOGEL and ENGERMAN, *op. cit.*, p. 416.
17 FOGEL and ENGERMAN, *op. cit.*, pp. 402-416.

one continues to intrigue me. If, as I believe, it is Fogel's intention to argue that in the absence of railways America would have been settled and exploited by wagon and water, is this only a hypothesis or a practical alternative to history as we know it? If it is the latter, why did investors settle for railway construction and not more canal construction? Was it not because canals no longer interested or excited men with money to invest? And are we not here at the heart of the counter-factual problem?

Professor Fogel has retorted to criticism (notably by Fritz Redlich) of his counter-factual methods, that all economic history is based on counter-factual propositions: the new economic history merely makes them explicit. All conventional arguments amongst historians involve implicit comparisons between actuality and « the state that would have prevailed in the absence of the specified circumstance ».[18]

But there is a difficulty as well as a truism here. I see no necessary reason to suppose that investors would have constructed 5,000 miles of canals if they had not constructed the railways. Technologically, canals may have been (as Fogel argues) feasible. Wagon and water might, as he says, have served. The fact is that they didn't: they didn't because they weren't allowed to and that is powerful evidence that as alternatives they suffered from serious weaknesses in the eyes of investors and users. One was that railways were (as Fishlow recognises) more versatile as a means of transport for passengers as well as freight. Speed and regularity had also advantages. Moreover, rail construction appealed to a complex of related interests in a way that canal/shipping development did not.

There is, for me, a conspicuous failure in historical technique here: a failure to appreciate the *totality* of history. It even affects an otherwise very impressive recent study of railways and economic growth in Britain by Dr. Hawke which skilfully applies econometric methods to the British scene.[19]

---

[18] FOGEL, *op. cit.*, p. 10.

[19] G.R. HAWKE, *Railways and Economic Growth in England and Wales, 1840-1870* (1970).

Dr. Hawke is more inclined to underwrite traditional views of railway importance than Fogel. Perhaps a quarter of British domestic capital formation in the 1840's was represented (he thinks) by railway investment, falling to 11 or 12% by the 1870's. No other sector could compete with such figures. Perhaps 10% of the British national income would have been lost if there had been no railways in 1865. And so on. Yet even a model of econometric history as impressive as this omits (if I am correct) to notice that 'railway demand' for iron and steel must include, if it purports to represent reality, *export* demand for rail construction abroad and not merely British home demand. This would again enlarge the importance of railway demand for iron. And now, not altogether surprisingly, the econometric historians have provoked a strong counter-attack. Ironically it comes from an economist, P. D. McClelland, and it is as bleak and grim in its conclusions as it is total in method.[20]

The critic summarily despatches the new economic historians to perdition: they are, quite simply, « all unfortunately incorrect ». To the question — would the economy have been better without the railways? — there is no answer: only « an intellectual quagmire ». Into this controversy I shall presume to enter no further. The fisticuffs will doubtless continue happily. I shall only recall that a great predecessor of mine at Cambridge, John Clapham, once defended the traditional methods of the historian against those who urged the case for more theory. The historian, he said, will be modest in the presence of the economist. But he will retain his pride as an historian attracted by the 'tangled variety' of human life, so that « even when his information is such that he can never hope to pick out with assurance the forces at work or measure exactly the changes brought about by the aggregate of them between dates x and y », he will continue to study 'the tangle of history'.

I do not think, in principle, that either Fogel or McClelland would disagree. Certainly we can all agree that history is both

---

[20] P. D. McCLELLAND, *Social Rates of Return on American Railroad in the nineteenth Century*, « Economic History Review », 1972.

tangled and various. We, in turn, may agree that, disagreements about the relative contributions of canals and railways apart, transport remained an essential ingredient and prerequisite of most modern phases of industrial development. It does not detract from the positive economic importance of railways in Germany or Russia that they also had a political or strategic objective. Military influence resulted in more lines and more and better equipment. Military support for railways probably gave their more exclusively economic advocates a stronger case than they might otherwise have had. If there *was* economic waste, so there was also waste in Britain, which pursued *laissez-faire* dogma to the point of building competitive lines between two points until one or the other was driven into bankruptcy. It would be absurd to suggest that the strategic element in Continental railway building means that it is in any way comparable with the non-developmental transport of the Ancient World: the comparison should rather be with the economico-strategic road building in 17th-18th century France or Scotland or the similarly 'mercantilist' shipping programmes of the English Navigation System to which even Adam Smith gave his blessing. All had a military purpose: all had economic consequences.

Oddly enough, it was Rostow who saw, more clearly than anybody else, that railways were not in all circumstances a *deus ex machina* of development. No one who has studied African development would disagree. In many parts of Africa — except South Africa proper in fact — railways were built around 1900 in the prevailing fervour of certainty that they were an indispensable part of the essential infra-structure. Only later did the painful truth dawn that while there is doubtless a time and a place for everything, this was not the time or the place for a railway. Financed on a fixed-interest basis, they were to be a terrible burden on primitive African economies which could generate neither freight nor passenger traffic in sufficient volume to justify their construction.[21]

---

[21] See e.g. S. H. FRANKEL, *Capital Investment in Africa* (1938), p. 172 and *passim*.

And today, in America and in Europe, just as railways were created, so they die: not because they cannot operate but because, like the canals before them, they have come to seem oldfashioned, inflexible, inconvenient. The real costs of air transport, trucks, automobiles may be higher but they are more modern, more fun. There are still enough people willing to pay high prices for such amenities.

What, then, does it all amount to? Like most historical generalisations, little more than commonplaces, but commonplaces nevertheless worth remarking. First, the exact contributions of different modes of traction and transport are still a matter of debate. There can, nevertheless, be no questioning the major rôle which the new powered transport played in the nineteenth century. Without it the movement of masses of goods and people, without which development could not have taken place, would have been impossible. Yet, as Rostow has warned, without the pre-requisites of development, even railways could fail as prime movers. Schumpeter's theory that railways could 'anticipate' development and in fact create it, did not prove to be true in all cases. Yet if transport can be, and has been, overestimated as a factor in such cases it has probably been underestimated in certain others. There is room to believe, as I have tried to argue, that this was the case in early modern Europe: it was conspicuously true of the Dutch Republic, whose economy was based to a unique extent on a rationally organised transport network: and it was plainly evident in 18th century England, enjoying a unique system of coastal shipping and inland navigation. In the Ancient World, by contrast, though transport, sea transport in particular, plays a large rôle in warfare and public food supply, it cannot be seen as performing a positive role in economic development proper. What therefore are we saying? That so long as transport is limited to the conveyance of food, or luxuries, or mail or consumption goods, it will be a subject of concern to us in so far as such commodities, their use or consumption, are characteristic of the society we are studying. Down to the 19th century, land transport could not change fundamentally the character of an economy or society. But as soon as transport

becomes a means of conjoining materials and labour and the factors of production in a particular location, and enabling the entrepreneur to distribute the finished product in ways and over distances otherwise impossible, we are in a different situation. Transport has ceased to be a mercantile instrument of exchange and become itself a part, and a major part, of the means of production. It is this which begins to distinguish early modern society and its economy from that of the Ancient and Medieval Worlds and has continued to characterize later ages with increasing force down to the climax of our own day.