# Globalisation, History and Technology

## An Introduction

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*"Only connect … "*[1]

If one had to select a single word to symbolise the last decade of the 20th century it would have to be *globalisation*. The adjective *global* is now used to describe such a large number of phenomena sharing a transnational or world-encompassing character, that it has become truly ubiquitous. We have the global economy and the global trade and capital markets which support it. We have the global environment and the global pollution that is destroying it, we have global communications and the global culture that it seems to encourage, we have global tourism endangered by global terrorism and a global climate threatened by global warming. We have a global community of corporate executives buying and selling global enterprises, we have global scientists discussing their work at global conferences, and, as a result, we have global technology, one of the chief stimuli of the global economy. Thus the process of globalisation is universal. It should not surprise us, therefore, that its impact on everything from financial markets to local culture has been analysed and debated not only in the public arena by journalists and politicians but also, and more exhaustively, in a wide range of disciplines, by academics.

The idea of globalisation raises seminal questions. Is globalisation an historical process? Is it an inevitable, perhaps the final, stage of capitalism? It also confronts us with new challenges. Does globalisation mean the end of the nation state? And if so, how will governments protect and provide for the world's citizens in the future? Could that responsibility be assumed by transnational corporations, some of which already have a turnover in excess of the Gross National Product of many sovereign states?

This book does not aspire to provide any definitive answers to these questions, but aims instead to place globalisation in its *historical* context and to focus in particular on the role of *technology* in the globalisation process.[2] The evolution of technological systems over the last two hundred years undoubtedly ranks as one of the most absorbing subjects for the student of modern history. The line of argument followed in this work is that there is also an unmistakeable thread connecting that evolution with the unfolding pattern of globalisation, indeed in the final analysis, and at a broad, interdisciplinary level, "connection" may well be what globalisation is all about.

## Globalisation

Firstly, however, *what is globalisation*? It has been an influential concept in the social sciences since the beginning of the 1990s, and both sociologists and economists have discussed and debated its meaning. At a general level we can agree with Martin Albrow that globalisation "refers to all those processes by which peoples of the world are incorporated into a single world society."[3] However this does not get us very far. Globalisation tends to mean different things to different people. For sociologists it has acquired a paradigmatic quality, superceding the debate on modernity and postmodernity in the understanding of social and cultural change. For Anthony Giddens, for example, globalisation *is* modernity or, put another way, modernity is inherently globalising as it "introduces new forms of world interdependence."[4] However Giddens also places *connection* at the centre of the globalisation process and describes "the intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa."[5]

For economists, globalisation signifies a rapidly increasing level of world trade and capital movements, made possible by falling transport costs and new information technology – indeed everyone seems to agree that the revolution in communications technology has been vital to globalisation. Capital markets are even more globalised than product markets because money, like information, flows more easily than people and products.[6] Globalisation has also meant the global transfer of technology, production and marketing facilities, and, to a more limited extent, the global movement of labour. Thanks to strategic alliances, joint ventures, acquisitions and mergers, firms are emerging for whom the transnational *network* is more important than a centralised national bureaucracy.[7] The chief concern of economists and political scientists here would seem to be that the institutions of capitalism may not be adequate to the global tasks which now face them.[8] Since capital and technology have become so mobile, Third World countries have the potential to produce goods as efficiently as the developed countries yet at a fraction of the cost. In this way globalisation can be a "job-killer" in the West and governments are understandably concerned. Some scholars have focused on the growing impotence of national governments in the formation of economic policy and the way globalisation encourages transnational concerns to "bypass" national politics.[9] The chief agent in this erosion of national power is the transnational corporation (TNC). Richard Barnet and John Cavanagh believe that because of globalisation and the increasing tendency of companies to "roam the world," the nation state is not only losing its authority but is threatened in one of its basic functions, namely the ability to transform economic progress into increased welfare for its citizens.[10] As "the first human institution with both the ideology and the technology to operate

on a global scale," TNCs also head the cast of actors in the process of globalisation; they are no less than "the revolutionary force of our time."[11] These global concerns, both now and in their earlier incarnation as multinational companies, have crossed many borders since the beginning of the 20th century and through their strategic alliances with one another, have been the main channel of technology transfer between nations. Today they are the key players in the global generation of technology and probably account for as much as 75% of industrial R&D in the advanced economies.[12] Their activity has had a profound effect on the economies of host nations, but it has not always been beneficial to national technology policies. When TNCs manufacture and sell their products in many different countries they promote a global standardisation of technology and this often conflicts with the aims of individual governments trying to preserve traditions and institutions of technological innovation as a source of national strength – "techno-nationalism" as it is known.[13]

The social scientists have helped us identify the characteristics of globalisation, but they are clearly divided as to its meaning. Beyond a general recognition that there is a greater degree of global inter*connectedness*, there is little agreement as to how globalisation should be conceptualised, how it works and where, if anywhere, it is leading us. Amongst economists and political scientists there is dispute between those who believe that globalisation is inevitable and we are all subject to the dictates of a global market economy, those who see globalisation as a myth which hides a world still divided up into developed and undeveloped regions, and those who believe that globalisation is not only new but also presents us with some worrying challenges for the future.[14]

We do not intend to directly engage the "meaning" debate on globalisation, instead we will concentrate on what we consider to be its chief characteristic. We argue that over the last two centuries, a technology-driven process has steadily raised the level of *connectedness* between different parts of the world; and globalisation is the result. Barnet and Cavanagh have identified four critical global networks – *connectedness* in its most modern form. These are global financial networks, global cultural networks (from TV to theme parks), global marketing networks, and global production networks (manufacturing everything from cigarettes to airliners).[15] What these four networks have in common is global communications technology, but technology not only connects, it also deconstructs existing networks and concentrations of power. A recently-proposed phenomenological approach to globalisation, which sees it as "new change" comparable to the Industrial Revolution of the early 19th century, has yielded a number of ideas which can be fitted into an explanatory framework for globalisation built around technology. Amongst the ideas in this approach the notions of boundary erosion, the replacement of hierarchy with heterarchy, and the diminution of legitimacy are the most important.[16]

Boundary erosion, or the blurring of the boundaries, or distinctions, between "in" and "out," and "us" and "them," is clearly evident in globalisation because the boundaries that exist in business, social, cultural and even political environments are eroded by the growing intensity and volume of trans-global interactions. At the same time control and government are *de*-centralised, so that hierarchies are replaced with heterarchies. In other words, vertically-structured forms of power and organisation, typical of the national state or the Chandlerian company, are replaced with horizontally-structured ones. Meanwhile the decline of organisational authority and responsibility which accompanies this process creates a legitimacy crisis for national bodies, both economic and political. Central control, whether of the government bureaucracy or the traditionally-organised company, is giving way to decentralised control, to a series of dispersed nodes of power, connected by global webs of capital and technology.

## History and Technology

Surprisingly it is only recently that historians have become aware that globalisation affects their discipline. Certainly *world history* has a lengthy tradition and has helped widen the view of historical storytellers, but in most cases *world history* has remained linked to the concept of the nation state.[17] Globalisation, however, calls for *global history;* history which treats the planet as a single structure. It is the history, perhaps, which can only have been written since the watershed occasion in July 1969 when man stood on the moon and was able to look back at the earth and gain for the first time an instinctive understanding of its fundamentally interdependent nature.

The contribution of history and historians to the debate on globalisation must be to place it firmly within the context of time and space – to interpret it as an historical process. The phenomenon of globalisation in the last third of the 20th century is not simply something which has been triggered by path-breaking innovations like the computer. The world-encompassing technology that is driving globalisation should instead be seen as the continuation (perhaps the climax) of long-established trends. If history is an open process with undefined ends, then global history must be built upon a full appreciation of the autonomy of historical progress. It needs to be concerned with the origins of the emerging global society and how its long-term development has been shaped by geographical, economic, political, social and technological factors. In particular, as Raymond Grew has argued, global history should acknowledge the association between historical change and technology – "to understand technology in terms of its social and intellectual context."[18]

According to *The Economist*, "globalisation – the shrinking of distance and the increase in interplay and interdependence – has been a theme of the whole century

and longer."[19] Historians can confidently seek its origins in the mid-19th century. The 19th century was an age when both nation states and border-crossing technologies first appeared. There were few frontiers that mattered and in many respects the world resembled a global market, with money, goods and people flowing more or less freely. At the centre of this global market was Europe, which *connected* the world with the new technologies of the telegraph, radio and the telephone, and with "communications-based systems of control," such as the Gold Standard, which had enveloped "the world in global circuits of power" by 1900.[20] Britain had led the world into an era of free trade with the repeal of the Corn Laws in 1846 and from the late 1870s it encouraged international capital mobility (through the elimination of exchange risk) with the establishment of a global financial system based on the Gold Standard.[21]

But the technological foundations of the 19th century global economy were even more momentous and lasting. They were concentrated in two areas both of which are familiar to students of 20th century globalisation: communications and transport. The telegraph grew in importance from the second quarter of the 19th century and increased the efficiency of the market by speeding up the transfer of information between financial centres. In 1851 the first successful submarine telegraph cable was laid under the English Channel, linking London's capital market to mainland Europe and in 1866 a permanent transatlantic telegraph cable was laid.[22] Moreover the Morse Code, the telegraph's "software," became the global standard for sending messages along wires, a sort of "network protocol for the world's first internet."[23] By the time of Samuel Morse's death in 1872, the world was literally *wired* with telegraph lines and submarine cables. Matching this revolution in communications were major advances in transport, forging rapid new links between producers and consumers and dramatically lowering prices. Indeed thanks to canals, railroads, steamships and refrigeration, transport costs in the period of "first globalisation" from 1840 to 1914 may even have fallen faster than in the "second globalisation" of the late 20th century.[24] These advances in transport technology prompted a convergence of world commodity prices and a new degree of connection between national markets. To quote the economists Kevin O'Rourke and Jeffrey Williamson, in a passage that should strike a familiar chord to observers of late 20th century globalisation, in 1914

> there was hardly a village or town anywhere on the globe whose prices were not influenced by distant foreign markets, whose infrastructure was not financed by foreign capital, whose engineering, manufacturing, and even business skills were not imported from abroad … not everyone was happy with the new global economy. Farmers voiced populist complaints about railroads and bankers. Rich landowners demanded protection from cheap farm products. Workers pointed to un-

> fair competition from imports made with cheap foreign labor and claimed that their jobs were being robbed by immigrants … domestic policy makers began to feel they were losing their ability to manage prices, interest rates and markets; they felt increasingly vulnerable to financial panic, industrial crisis and unfavourable price shocks generated in distant corners of the globe.[25]

What stopped this "first" globalisation dead in its tracks was of course the First World War; the unsuccessful attempts to restore prewar conditions in the 1920s and the slide into depression and autarky in the 1930s ensuring that the second globalisation would be delayed for another fifty years.

What has happened since 1970, at the latest 1980, is the spawning, as the political scientist John Gray puts it, of radical new technologies which have accelerated and widened the flow of goods and information to such an extent that globalisation has become synonymous with capitalism itself. For Gray it is the global spread and adoption of technology, even more than the ideology of free markets which became so fashionable in the 1980s, which is the driving force of this new globalised capitalism.[26] Indeed it does not require a great stretch of the imagination to see technology itself as a new ideology and, notwithstanding the negative voices of philosophers and theologians, even a religion with the potential to unify the globe.

Just as one might select two technologies from the 19th century, say, the telegraph and the steam engine, to symbolise and explain the first globalisation, so the 20th has two technological systems which stand out from a long list of worthy candidates. These are firstly, aerospace and the air transport industry, and secondly, the communications industry embodying the globalising promise of the telephone, television, and networked computer. Aerospace is the quintessential 20th century high-tech industry: an arena, as Ruth Schwartz Cowan sees it, "in which technological change has been both conspicuous and celebrated."[27] It has also been vital to the globalisation process in its present form. Because of aircraft, and in particular the jet engine, global transport is now so efficient that product parts can be manufactured all over the world, depending on the cost of labour, and assembled close to the final sales market. And tourism, a past-time which until the 1960s was limited to the prosperous middle-classes, has, thanks to the jet aircraft, not only become the largest single revenue earner in history but has allowed countless millions to travel and acquaint themselves with other parts of the world – a genuine globalisation of human experience. Indeed the economic implications of air travel are no less dramatic as those of the steam engine in the 19th century. Meanwhile the communications industry has been revolutionised by recent technologies such as satellites, lasers, microchips and fibre-optics. One example will suffice: The main reason for the astonishing expansion of long-distance telephone capacity in the

1990s, with all its implications for fax transmissions and the internet, was the rapid development of fibre-optic cables, "the oil pipelines of the information economy."[28]

The challenge that globalisation presents to governments still wedded to techno-nationalist agendas, and to individuals worried about their prospects for employment, is mirrored by the threat it is perceived to pose for national or local *culture*: there is a widespread fear that in the train of the economic globalisation comes cultural homogenisation. The idea that technology and communication networks can homogenise culture is an intriguing one that has not surprisingly engaged a number of scholars. The impact of globalisation on culture is a good example of the boundary erosion and de-legitimisation of vertical structures, referred to above. Modern communications technology has made it harder for governments to prohibit the things which they once did: imports of capital, computer software, pornography and ideas generally, because technology has eroded the boundaries between nation states. But globalisation has meant, above all, the *democratisation* of technology; it has become faster, cheaper and more widely available than ever before, and this is in contrast to the technology-led globalisation of the 19th century. Computerisation, miniaturisation, digitalisation, satellites and fibre-optics have allowed people in previously undeveloped parts of the world to communicate, manufacture, transmit news, money, pictures and knowledge. And nations acquiring this technology can catch up fast – take, for example, India's emergence as a major player in data processing. As Kenneth Boulding noticed long ago, technology feeds on democracy and the technology of globalisation will be harder to absorb and adopt where democracy has failed to take root, where there are still "authoritarian forms of organisation and government."[29]

If there is a global culture enveloping the world in the train of global technology, then, as Samuel P. Huntington has argued, it is a culture distinguished by the ideas of freedom of expression, free trade and democracy: it is a *western* culture and therefore bound to be at odds with local particularisms in the rest of the world.[30] The columnist Thomas Friedman has described how on a visit to Egypt he noticed how the lift attendant uttered a prayer from the Koran before he operated the elevator and concluded that while Americans identify easily with modernisation and technology because they increase individul choice, "in traditonal societies, such as Egypt's, the collective or the group is much more important than the individual and empowering the individual is equated with dividing society." Globalisation means not only "being forced to eat more Big Macs," but also "changing the relationship of the individual to his state and community in a way that they feel puts their society at the risk of disintegration."[31] In a similar vein the sociologist Roland Robertson has noted that globalisation is inevitably opposed to local cultures and endangers them; the distinction being between local culture, generally seen as em-

bodying positive (because traditional) values, and global culture, which is seen in negative terms.[32] Local culture is obviously a powerful source of identity and pride, but the perception of a threat to it posed by globalisation has to be tempered with the knowledge that local jobs may depend on global connections and networks and many traditional societies may be willing to accept a measure of globalisation to ensure economic progress. In general it seems that the non-Western world wants to be modern without being Western – but is this possible? Or is it the nature of globalising technology to be so inherently Western that the technology cannot be acquired without the culture? In the case of the internet the whole world wants to be connected to the "net" but not necessarily acquire the cultural assumptions that go with it.

## Wiring Prometheus

We have argued that globalisation is a historical process and that technology and technological change have acted as catalysts. Moreover the main technologies involved, i.e. those in transport and communications, but also manufacturing production, are only fully optimised when they work in networks. This network effect applied to the launch of the telephone at the end of the 19th century and it applies to the internet at the beginning of the 21st. Some products, it seems, are only really useful when a lot of other people have them – when *Prometheus is wired*. In the following chapters the role of networks and technology in history is examined using a multidisciplinary and contextual approach, with the object of providing elements for the historicisation of globalisation studies.

According to this historicisation, there are *two* globalisations: the 19th century one that unified nations and the 20th century one that began to unravel them. In the 19th century technical innovation was the cement which held together the emerging nation states of 19th century Europe. Railroads (and a customs union) transformed Germany from a regional grouping into an institutional nation state, as predicted by the economist Friedrich List in 1841.[33] In the United States railroads and electrification sustained white settlement of the West and led to "networks of power" which united the nation in a new web of steel and wire.[34] In the second quarter of the 20th century aircraft were the dynamic elements in a complex new transport technology which strengthened the spirit of nationalism in a nationalistic age.[35]

By the second half of the 20th century, however, the thrust of technology had changed direction. It now began to erode the nation state as technical systems became increasingly transnational. After playing a major role in shaping history, the nation state now began to seem like its victim. Information technologies, in particular, have undermined national sovereignty by eliminating geographical and so-

cial distance – by making it possible for more and more people, ideas and goods to travel faster and safer through time and space.[36]

In the opening contribution to this volume *Bruce Mazlish* looks at the ties that have bound Europeans since early modern times, dividing them into three chronological forms: patronage, connections and networks. The oldest, patronage, was a private interdependent relationship between individuals or families with a very particular set of "courtly" rules. With the Enlightenment and then the Industrial Revolution, patronage gave way to connections for a while, characterising the transition from an aristocratic to a bourgeois society. Finally connections became networks in a computer-driven world of increasing social equality. Networks, as *Mazlish* uses the term – in the sense of patronage and connections – may refer to a collection of old boys or old girls, but in the late 20th century are more likely to mean satellite television and the world wide web. In his chapter the economic historian *Rainer Fremdling* concentrates on the 19th century and the "first" globalisation. He argues that the evolving free trade regime and falling transport costs in the 19th century – particularly technological breakthroughs in the development of the steam engine – led to a high level of foreign trade between European nations which had reached the proportions of "a globalised market" by the First World War. *Stephan Lindner* takes up the theme with an study of a traditional 19th century industry: textiles. He argues that the globalisation of the spinning and weaving processes, and the loss of supremacy in textiles by European producers, was caused by the export of advanced textile machinery and the tendency of the Europeans to establish overseas production facilities. Moving to new looms needed a more intensive use of the machines to cover their capital cost, i.e. three shifts instead of one, and this intensification of labour use was only possible beyond Europe's borders. Another traditional industry is considered by *Paul Rosen*. Bicycles have now become "global" products; no matter where they are assembled, they are likely to consist of components manufactured in a large number of countries in Asia, Europe and North America. The British bicycle industry, after losing its markets to Far Eastern competitors, has sought to restructure itself and adapt to new technologies in bicycle production as well as changes in the culture of cycling. The chapter traces the interweaving of industry and culture in the mountain bike boom of the 1980s and how this global trend influenced the British industry's revival.

In his chapter *Wolf Schäfer* argues that we should no longer treat *time* as different for people around the globe at different stages of economic or social development. We can no longer treat people as "backward" (a chronometrical concept) or "behind the time." Globalisation means global time, as the factory worker in China is connected to the stock broker in New York and through him to the factory worker in Detroit; globalisation subjects us all to the same forces and constraints, and at the same time. Moreover in a society based on the exchange of information, a premium

is be placed on time and the speed of interchange and transaction; distance, as Daniel Bell has observed, "becomes a function not of space but of time; and the costs of time and the rapidity of communication become the decisive variables."[37] The technologies of rapid communication and information exchange have been developing for the last century and a half. The German cultural theorist Aby Warburg predicted gloomily in 1923 that the telegram and the telephone would bring about the "destruction of distance" and lead to a "comeback of chaos."[38] Speed, for many of his generation, meant chaos, yet speed triumphed and became one of the dominant symbols of the 20th century. Two chapters on the telephone describe the early days of that instrument: a crucial artifact in the acceleration of information exchange. *Bernard Carlson* shows that American inventors and entrepreneurs like Bell and Edison promoted the new technology of the telephone not only in the United States but throughout the world, by establishing overseas operating companies and securing foreign patent rights. Both their business sense and their inventions were "global" from the outset. In his chapter *Helge Kragh* argues that it was the telephone – rather than the earlier telegraph – that represents the key technology in the establishment of the international communications network that was so critical to the globalisation of business and culture. Both *Kragh* and *Carlson* show in the case of the telephone, the importance of marrying technology to the right economic approach.

Moving forward to the late 20th century, information technology is the spearhead of the "second" globalisation. The expansion of telephone capacity through the use of fibre-optics, lasers and satellites has accelerated the rate of information and product exchange. Globalising process systems have revolutionised everything from newspaper production to banking and the travel business, and at the heart of them all, of course, is computer science. The combination of computer and telephone has brought about the on-going crusade in time-saving. Two examples are the Automated Teller Machine (ATM) which has transformed high-street banking (and threatens to make a great many bank clerks redundant), and the Computer Reservation System (CRS), now universally employed by the world's airlines. *Richard Coopey* traces the development of the ATM from its origins in the 1960s. Although the "hole-in-the-wall" has revolutionised and globalised banking and lowered the cost of transactions, the author believes that ultimately it will be seen as an ephemeral technology and replaced by a fully cashless society based on electronic fund transfer. The ATM story is a striking example of how technology can get ahead of social acceptance. Many people still expect banks to resemble marble halls laden with cash and this residual attitude will have to change before people will be entirely comfortable with the idea of conducting their financial affairs with a computer – whether in the wall of a local bank or at home on their desk. In her case study, *Nathalie Mitev* considers how a traditional transport industry – the railroad –

has been modernised in France, and looks at the troubled adoption by the French Railways of the American Airlines computer reservation system "Sabre" in the early 1990s. She shows that the difficulties experienced by the French in installing the Sabre CRS had their origins as much in human factors and cultural differences as in the nature of the technology itself. *Donald MacKenzie* also looks at computer software, without which the air transport, banking and telecommunications industries, not to mention entire national defence systems, would be unable to function. Computerisation in these fields has brought speed and flexibility, but also vulnerability to software errors. When human life or national security depend on computer systems such errors are of obvious concern, but software blunders also cost money: the London Stock Exchange lost $650 million when it was forced to abandon its automated trading system in 1993. *MacKenzie's* work prompts the question as to whether computer hardware, in the form of ever faster processors, might have got ahead of computer software – in the terminology of the historian Thomas Hughes, a "reverse salient" in the computer industry?

For those who worry that cultural standardisation follows in the train of globalising technology, the chapter by *Andre Millard* gives cause for hope. He examines the history of a classic globalising artifact – the music cassette invented by Philips in the early 1960s – to show that people are not the same throughout the world and you never know how a technology is going to be received or used. The humble cassette is a true global technology which can be found in almost every corner of the planet. However far from globalising Western music to the exclusion of all else, the cassette has actually decentralised commercial music and brought forth a wide variety of local music forms from indigenous performers. Instead of homogenising culture, this simple standard device has actually encouraged regional diversity and, as an unintended consequence, challenged the global homogenisation of music – what the author calls the "empires of sound."

As long ago as the 1930s, the philosopher Karl Jaspers spoke for many of his contemporaries when he said that "all technological and economic problems seem to have become global problems. The earth has not only become a place with a web of economic relations and possible technical solutions, but also more and more people regard it as the space in which they develop their history."[39] Jaspers was perhaps a global historian before his time; in any case the following chapters aim to show how the contemporary phenomenon of globalisation can be analysed and interpreted from a variety of standpoints and disciplines through historicisation. The idea that the earth and not the village community or nation state is space in which human beings "develop their history" is a novel and challenging one for historians, perhaps more so than for other social science disciplines, but it is an idea whose time has undoubtedly come.

## Notes

1 Epigraph to the novel of E. M. Forster, *Howards End* (Harmondsworth: Penguin Books, 1976).
2 This book arises out of an international conference entitled *Prometheus Wired: Globalisation, History and Technology,* which was held at the Deutsches Museum in Munich in October 1998.
3 Martin Albrow, "Introduction," in Martin Albrow and Edith W. King, eds., *Globalisation, Knowledge and Society. Readings from International Sociology* (London: Sage, 1990), 9.
4 Anthony Giddens, *The Consequences of Modernity* (Cambridge: Polity Press, 1990), 174-175.
5 Giddens, *Modernity*, 64.
6 Ralf Dahrendorf, "Anmerkungen zur Globalisierung," in Ulrich Beck, ed., *Perspektiven der Weltgesellschaft* (Frankfurt am Main: Suhrkamp, 1998), 41.
7 Luc Soete, "Die Herausforderung des 'Technoglobalismus': auf dem Weg zu neuen Spielregeln," in Friedrich Meyer-Krahmer, ed., *Innovationsökonomie und Technologiepolitik: Forschungsansätze und politische Konsequenzen* (Heidelberg: Physica-Verlag, 1993), 171-195, on 175.
8 See for example Barry Eichengreen, *Toward A New International Financial Architecture* (Washington DC: Institute for International Economics, 1999).
9 See Michael Geyer and Charles Bright, "A World History in a Global Age," *American Historical Review* 100 (1995), 1034-1060. The sudden desertion and sale of its British subsidiary, Rover, by the German automobile manufacturer BMW in the spring of 2000, is a striking example of the impotence of governments (in this case the British) in the pursuit of national economic policy.
10 Richard J. Barnet and John Cavanagh, *Global Dreams: Imperial Corporations and the New World Order* (New York: Simon & Schuster, 1994), 14.
11 Richard J. Barnet and John Cavanagh, "A Globalizing Economy: Some Implications and Consequences," in Bruce Mazlish and Ralph Buultjens, eds., *Conceptualizing Global History* (Boulder: Westview Press, 1993), 154.
12 OECD figures, see Daniele Archibugi and Jonathan Michie, "The Globalisation of technology: a new taxonomy," in Daniele Archibugi and Jonathan Michie, eds., *Technology, Globalisation and Economic Performance* (Cambridge: Cambridge University Press, 1997), 172-197, on 184.
13 Christopher Freeman, "The 'national system of innovation' in historical perspective," in Archibugi and Michie, eds., *Technology, Globalisation and Economic Performance*, 24-49, on 38.
14 For a full discussion of the participants in this debate, see David Held, Anthony McGrew, David Goldblatt and Jonathan Perraton, *Global Transformations: Politics, Economics and Culture* (Cambridge: Polity Press, 1999), 2-14.
15 Barnet and Cavanagh, *A Globalizing Economy,* 157.
16 Ulrich Steger, ed., *Discovering the New Pattern of Globalisation* (Ladenburg: Gottlieb Daimler- und Karl Benz Stiftung, 1998), 25-34.
17 An partial exception would be the world system theory of economic historian Immanuel Wallerstein who dates globalisation to the sixteenth century, when the rapidly expanding

flow of capital and goods created a capitalist world economy usually based on large imperial states and their areas of influence. See Immanuel Wallerstein, "The Rise and Future Demise of the World Capitalist System: Concepts for Comparative Analysis," in Immanuel Wallerstein, *The Capitalist World-Economy* (Cambridge: Cambridge University Press, 1979), 19.

18 Raymond Grew, "On the Prospect of Global History," in Mazlish and Buultjens, eds., *Conceptualizing Global History,* 233.

19 *The Economist* (11.9.1999), 41: "A semi-integrated world, 20th century survey."

20 Geyer and Bright, *A World History,* 1047.

21 See Harold James, *Die Globalisierung der Wirtschaft* (München: dtv, 1997); Harold James, *The End of Globalization. Lessons from the Great Depression* (Cambridge, Mass.: Harvard University Press, 2001); also Part 1 of James Foreman-Peck, ed., *Historical Foundations of Globalisation* (Cheltenham: Edward Elgar, 1998), 3-100.

22 Joel Mokyr, *The Lever of Riches: Technological Creativity and Economic Progress* (New York: Oxford University Press, 1990), 123-124; also James Foreman-Peck, *A History of the World Economy: International Economic Relations since 1850* (London: Harvester Wheatsheaf, 1989), 67-68.

23 *The Economist* (23.1.1999), SOS, RIP, 89.

24 Kevin O'Rourke and Jeffrey Williamson, *Globalisation and History: The Evolution of a Nineteenth Century Atlantic Economy* (Cambridge, Mass.: MIT Press, 1999), 29.

25 Ibid., 2.

26 John Gray, *False Dawn* (London: Granta Books, 1998), 204.

27 Ruth Schwartz Cowan, *A Social History of American Technology* (New York: Oxford University Press, 1997), 250.

28 Frances Cairncross, *The Death of Distance: How the Communications Revolution will Change Our Lives* (London: Orion Business Books, 1997), 30.

29 Kenneth E. Boulding, *The Image* (Ann Arbor, University of Michigan Press, 1956), 108-109.

30 Samuel P. Huntington, "The Clash of Civilisations," *Foreign Affairs* 72 (1993), 49.

31 Thomas L. Friedman, "Pushing Globalisation in the Land of Prayer-operated Elevators," *International Herald Tribune* (29-30 January 2000). Friedman's ideas on third world "backlash" against globalisation are elaborated in his book, *The Lexus and the Olive Tree* (London: HarperCollins, 1999).

32 Roland Robertson, "Glocalisation: Time-Space and Homogeneity and Heterogeneity," in Mike Featherstone, Scott Lash and Roland Robertson, eds., *Global Modernities* (London: Sage, 1995), 25-44.

33 Friedrich List, *Das nationale System der politischen Ökonomie*, 2nd ed. (Jena: Fischer, 1910).

34 See David E. Nye, *Narratives and Space: Technology and the Construction of American Culture* (New York: Columbia University Press, 1997), 9. For the unifying effects of power networks in America, see Thomas P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm 1870-1970* (New York: Viking, 1989).

35 For the aircraft's role in the development of national consciousness, see David Edgerton, *England and the Aeroplane: An Essay on a Militant and Technological Nation* (Basingstoke: Macmillan, 1991).

36 James Rosenau, *Turbulence in World Politics* (Brighton: Harvester, 1990), 17.

37 Daniel Bell, *The Coming of Post-Industrial Society* (New York: Basic Books, 1999): "The Axial Age of Technology, Foreword to the 1999 edition," XLXII.
38 Ernst H. Gombrich, *Aby Warburg: Eine intellektuelle Biographie* (Frankfurt am Main: Europäische Verlags-Anstalt, 1981), 302-303.
39 Karl Jaspers, *Die geistige Situation der Zeit* (Berlin: de Gruyter, 1931), 68.