

# ***Politicising the Gerschenkron Schema: Technology Transfer, Late Development and the State in Historical Perspective***<sup>1</sup>

**Ian Inkster**

Nottingham Trent University

## **I. Introduction**

Analyses of the 'State' have faced a cool climate for some time. For many, the very term suggests the bogeymen of marxism, fascism and maoism, as well as the somewhat less awful labels of keynesianism, structuralism, bureaucracy and technocracy. Throughout the 1980s and well into the present the academic bias has been towards the market and away from the statist orientations of earlier decades, the years of 'planning' and naive optimism as regards the power of the West to intervene benignly in 'Third World' affairs.<sup>2</sup> Nowadays the expert historians seem somewhat ambivalent, the popularists more determined in their adjudications on the historical role of the state in the process of industrial development. In a fine, brief account of industrialisation in a highly visible place, Amiya Kumar Bagchi argues that the state played a part in the original, eighteenth century transition from proto-industry to industrial revolution in Britain: 'Developments in science, technology and statecraft almost certainly helped resolve

<sup>1</sup> Earlier forms of this article have been presented to the Economic History Department at the University of New South Wales, the History and Philosophy of Science Department at Cambridge, the History Workshop of Nottingham Trent University, and at a seminar of the Centre for the History of Science, Technology and Medicine, University of Manchester. For their constructive comments and arguments I would particularly like to thank Derek Aldcroft, Roger Cooter, Barrie Dyster, Graeme Gooday, Colin Griffin, Nick Hayes, Jeff Hill, Bill Lukin, Jack Morrell, Judith Rowbotham, and Simon Schaffer.

<sup>2</sup> Strange, *States and market*, pp. 1-44.

the crisis [of older industrial styles] in favour of a higher stage of industrial development'.<sup>3</sup> However, this influential analyst then goes on to qualify heavily: the general importance of the state is delimited, the Gerschenkron perspective is doubted; Russia exemplifies failure, British and Japanese successes (the great examples always) were non-statist and private-sector driven, third world planning was disastrous as governments artificially raised investment and thus inflation and thus balance of payments problems, with consequent crowding-out effects and so on. Generally, for Bagchi, state interventions yielded 'multiple contradictions'.

A non-statist approach to industrialising Britain is understandable if inaccurate (see further below), but the Japanese case is also thrown up as evidence of the independent motoring impacts of the market. Thus, for Milton Friedman the 'Japanese adopted the policies of Adam Smith',<sup>4</sup> contra India and the pernicious effects of Harold Laski : early industrialisation being strongly associated with free trade, private enterprise, greater freedoms and a widening of opportunities. Thereby, Friedman entirely neglects the extremely important impact of Meiji government deficit financing, military expenditures, redistributive measures and massive expenditures on education, infrastructural technologies and social control. Far more authoritatively, Frank Tipton has also emphasised Meiji warmongering, inefficiency, crowding-out effects, smallness and partiality of direct interventions etc in estimating the *explicantiá* of success, without really providing any secure grounds for judgement of 'smallness' and 'inefficiency' and with only implications regarding the feasible alternative of efficient market systems operating across consumption and capital goods, labour, land and information, and foreign commercial relations.<sup>5</sup> The state has been having a really bad time.

Beyond and regardless of any renewed search for historical evidence or reconstruction of the 'known' historical record, the most

<sup>3</sup> Bagchi, 'Industrialization', p. 162.

<sup>4</sup> Friedman, *Free to choose*, p. 333.

<sup>5</sup> Tipton, 'Government policy', pp. 37-53.

influential academic trend serving to peripheralise the state was surely that of resurgent neo-classical economics. Although modern institutionalism and the impact of economists such as Douglas North<sup>6</sup> has severely modified the earlier thrust of the neo-classical approach, Anglo-American textbook economics has over a considerable time reduced the tasks of the state. Such analytical reductions have strongly influenced both industrial and economic historians on one hand, and the policies of their political masters on the other.

For a long time the consensus at this level was on a background or 'undergirding' role for the state as setter of the market environment (via, for example, legal rules over property rights) and as an interventionist 'window dresser' of the working of that market through the purchase of goods and services, the production of services (and, decreasingly, goods) and the transfer of payments and incomes through social security. Such latter activity requires the state to tax and to borrow and thus exert influence on prices, interest rates and production. The notion of 'market failure' (embracing such elements as stickiness in the labour markets, the non-production of critical information or technologies, and the public goods problem) allows the activity of window dressing to be extended, but not so as to challenge or contradict the more recent economic equation of 'democracy' with the normal and continual operation of voters who more or less effectively exert their preferences among alternative policy packages (goods). In an extension of Smith's 'invisible hand' into the political arena even more overtly, it is generally assumed in modern texts that the resulting legislature has direct power over a stable bureaucracy which then acts accordingly. This is a system influenced certainly by the existence of specific lobbying or pressure groups and admittedly further complicated (via public choice theory) by the recognition that the decision makers are themselves attempting to maximise local outcomes i.e. those outcomes of public action directly affecting their own well-being.

It is possible that most modern economists are not often at fault

<sup>6</sup> North, *Institutions*.

here, following J.M. Keynes in his belief that economics was only ever 'an apparatus of the mind, a technique of thinking' rather than a completed doctrine for policy. It is generally admitted (but as normally dismissed) that real policies might have to embrace systematic and rational judgements which acknowledge the cultural, social and political boundaries of any given economic structure or system. But at the same time, textbook economics frequently enlists and represents "history" very inaccurately in order to seemingly substantiate the commanding simplicities, rather than to serve as modifier of or challenger to those simplicities. Thus eighteenth-century Britain or early nineteenth-century America were *nearer* to 'market economies' than those of present-day advanced nations, and "democracy" appears to have been the industrial norm prior to 1870. Furthermore, at textbook level and even beyond there is an economistic chorus of agreement that the economies which today most clearly approximate market capitalism and democracy (above) have attained the highest standards of living in the world (correct), and that this uncontested present fact is also an historical fact, i.e. present prosperity invariably emerged out of markets and freedoms (incorrect).<sup>7</sup> At this point historians - particularly those who study the non-Anglo-Saxon past - lay down textbooks, perhaps more in anger than frustration. Even very contemporary history illustrates that the conventions can not provide reliable indications for government policy, given the longer-run and, especially, change and fluctuation in international economic and political environments. It is within the wider environment that public 'rationality' must be formulated. Thus import substitution in mid-and-later twentieth century poor nations may have been justified in spite of a misallocation of resources in the shorter-run (*ceteris paribus*, tariffs run counter to comparative advantage at textbook level), because given time and given the existence of other policies the protected industries may become more efficient and, secondly, because industrialisation might serve to stabilise economic growth by reducing

<sup>7</sup> Skully, 'Institutional framework'; Mathews, 'Economics of institutions'; Street, 'Institutional theory'; Inkster, 'Institutional theory'.

reliance on agricultural or other mono-exporting.<sup>8</sup> Generally, the new protectionism, including export promotion, cannot be ignored by even conventional economists' texts in a world where NICS are performing so well, not only in terms of economic growth overall but, specifically, in terms of great and substantial increases in the share of manufactures in their exports, a major feature of the global climacteric since the early 1970s.

Perhaps the most potent point in this does relate to the dangers inherent in over-generalisation and too-ready conceptualisation. If today the world is being remodelled in an economic and technological climacteric that began sometime in the 1970s with the collapse of the 'golden age',<sup>9</sup> then it may be as strongly argued that the major trajectories of the global system in the years from World War I to the present climacteric (circa 1914-1973) were laid down in the technological and industrial transformations *and* failures of the Gerschenkron years circa 1870-1914, a period in which industrial and economic success seemed to coincide with very few of the desiderata of textbook economics.

## **II. Technological Backwardness in Historical Perspective**

Alexander Gerschenkron (1904-1978) remains the master historian of industrialisation in the years circa 1870-1914, and his work will be generally known to many whose main interests lie beyond the specialist field of industrial history.<sup>10</sup> The main tenets of his work have frequently been seen as emerging from an early post-war world wherein, in contrast to the more recent trends depicted above, the development task was seen as properly overt as well as publicly planned.<sup>11</sup> Our task here, however, is to show how the Gerschenkron schema is implicitly centred on technology and technology transfer, and is thereby potentially applicable to an understanding of the politics of

<sup>8</sup> Corden, *Protection*; Bruton, 'Protection and development'.

<sup>9</sup> Scammel, *Internal economy*; Armstrong *et al.*, *Capitalism*.

<sup>10</sup> Gerschenkron 1962-77; Sylla and Toniolo, *Patterns*, pp. 1-28.

<sup>11</sup> Gregory, 'Role of the State' especially pp. 75-77.

development and underdevelopment prior to 1914. Furthermore, the ramifications of such claims extend beyond the original European focus of the schema and also well into the years beyond 1914. This section of the paper draws out very briefly the technological elements of the Gerschenkron approach. The following section concerns the necessarily political character of the industrial development process under conditions of relative economic backwardness.

In a wonderfully honed comparative paper, William N. Parker has explicitly raised questions concerning the position and role of the ideological component in Gerschenkron's approach.<sup>12</sup> But, on the whole, Parker follows Gerschenkron himself in presenting the formal functionalist position. That is, the character of capital sourcing and management more or less determined the character of the prevailing 'ideology', moving across the ideal couplings of small-scale original accumulation with bourgeois democracy, credit banks and combines with corporatism, the mercantilist state with absolutism. This was always attractive, and traces of such stylised relationships can be found in a number of very influential accounts concerning the twentieth century political repercussions of late development.<sup>13</sup> In itself, however, such functionalism fails to address the possible causal relations between the actual mechanisms of late development, dominated by technology transfers, and the agents of change, dominated, if not overwhelmed, by the state

Gerschenkron is of especial concern to students of science and technology and to historians describing the development and spread of industrial capitalism (as well as economic and commercial underdevelopment) for at least four broadly-based reasons. Firstly, he focused on nations (rather than economies, regions or enterprises) and therefore potentially on policy, on specific institutions and upon the actions of those in command of nations who view the world from a perspective which is by no means always benign or profit maximising,

<sup>12</sup> Parker, 'American mirror', pp. 86-91.

<sup>13</sup> Moore, *Social Origins*; Anderson, *Lineages*; Shanin, *developing society*; Sulejewicz, 'Some difficulties'; Wilber, *The Soviet model*.

but rather, in this period, mainly geopolitical. The New Mercantilism of the later nineteenth century was merely one aspect of this outward perspective of authoritarian leaderships as they perceived the political and military implications of earlier industrial development in nations elsewhere. Secondly, and perhaps to an extent explaining his emphasis on the socio-institutional 'essential tension' (the cognitive impact of the gap between the reality of economic backwardness and the seeming potential of industrialisation as exhibited in leader nations), Gerschenkron at all times emphasised that 'measurable aspects of economic change do appear in conjunction with aspects which in their very nature defy measurement', acknowledging that the latter were most likely to lie in the realm of the social, the institutional and the attitudinal rather than in the conventional, direct factors and forces of industrial production.<sup>14</sup> Patrick O'Brien has astutely and critically emphasised that any claims which involve the quantification of 'political stability' or the 'efficiency of political leadership and representative institutions' are of dubious veracity, but he did not go on to argue that such elements should not be incorporated into analyses of industrial development.<sup>15</sup> All analysts and students of past and present development must hear the chord being struck here on the obvious need to go beyond the textbook conventions into the complexities and apparent vagaries of an imperfect reality. Aspects of technological transformation are clearly difficult to measure and, in particular, significant technical change and its associated or contingent institutional innovations may take a considerable time to impact on the commercial efficiency of any economic system or sector.

Furthermore, a wider perspective such as this, permits us to abandon the rigid distinctions between the economic and the social, and the often related and wholly artificial demarcations between technologies (artefacts and processes) and sciences (observations, experiments and theories). For those most interested in the profound impacts of technological transfer between nations throughout history,

<sup>14</sup> Gerschenkron, 'Discipline', p. 451.

<sup>15</sup> O'Brien, 'Typology', pp. 325-6. However, compare Skully, 'Institutional framework'.

but especially in the crucial years prior to 1914, Gerschenkron's astute two-liner becomes an operational text : 'The line between what is a precondition of, and what is a response to industrial development seems to be a rather flexible one'.<sup>16</sup> Gerschenkron's consistent studies of Germany, Italy, Austria, Bulgaria and Russia showed how rigid Rostovian notions of 'prerequisites' were of little operational significance in the shorter-run, that traditions and 'givens' (cultural or otherwise) could be overrun or redressed in very short time within a programme of planned technological change. Gerschenkron, therefore, fought the economic conventions of his own time (though not the political) and in so doing paved the way for not only today's reformulations of neo-classical economics but also for much of the contemporary work of historians and social scientists who seek to forge the dynamic links between technologies, institutions and industrial development.

Thirdly, Gerschenkron makes no real claims about 'efficiency': New, transferred technologies do not yield inexorable or immediate production effects, extra output or gainful employments which justify their usage on rational commercial grounds. The new is disruptive, sometimes cumulative, often incremental, but very difficult to control, and it is precisely this which creates a trajectory of change leading to the possibility of industrial and social transformation well beyond the original control mechanisms or expectations of the statist elite who instigated or rejuvenated late industrialisation in the first place.

But fourthly, the reason that analysts of science, technology and societal transformation might be interested in the Gerschenkron approach lies essentially in its ultimate dependence on technology transfer as the *machina* or strategem of late development.

Much of the evidence for the general schema lies in the establishment of a complex of elements which vary directly with the degree of relative backwardness of a nation on the verge of the great 'spurt'.<sup>17</sup> Thus, the more relatively backward the nation and the more

<sup>16</sup> Gerschenkron, *Economic backwardness*, p. 33.

<sup>17</sup> *Ibid.*, pp. 5-30, 353-64.

discontinuous the late industrialisation, then the more industrialisation is to be characterised by a large scale of plant and enterprise and an emphasis on producer goods rather than consumer goods. Associated with this is the increased and at times unbearable pressure on the living standards of the population (eg late nineteenth-century Russia) and a relative lag in agricultural output together with the creation of specific 'institutional arrangements' designed to effect some redirection of national income between consumption and investment to cover the capital needs of nascent industries.<sup>18</sup> A somewhat neglected feature of the schema is its dependence on technology transfer.<sup>19</sup> Gerschenkron's argument depends on the claim that, despite superficial complications, 'the contingency of large imports of foreign machinery and of foreign know-how, and the concomitant opportunities for rapid industrialisation with the passage of time, increasingly widened the gulf between economic potentialities and economic actualities in backward countries.'<sup>20</sup>

Although technology is not accorded pride of place in the formal presentation of the framework, Gerschenkron appears to conceive of it as the prime instrument whereby industrialisation is actually realised once the relatively backward nation has 'recognised' its situation and has removed fundamental socio-institutional barriers or 'obstacles'.<sup>21</sup> Thus: 'Industrialisation *always* seems the more promising the greater the backlog of technological innovations which the backward country could take over from the more advanced country. Borrowed technology, so much and so rightly stressed by Veblen, was one of the primary factors *assuring* a high speed of development in a backward country entering the stage of industrialisation.'<sup>(my emphasis)</sup>. One explanation for the centrality of the transfer of 'most modern and efficient techniques' is the supposed chronic shortage of skilled labour in the relatively backward nation.<sup>22</sup>

<sup>18</sup> Gerschenkron, *Continuity*, pp. 35-6.

<sup>19</sup> Inkster 1998, pp. 1-20.

<sup>20</sup> Gerschenkron, *Economic backwardness*, p. 8.

<sup>21</sup> Hirschman, 'Obstacles', pp. 385-407; Sweezy, 'Obstacles', pp. 191-7.

<sup>22</sup> Gerschenkron, *Economic backwardness*, pp. 8, 46-7.

"Illiteracy and low standards of education and the resulting difficulty in training skilled labour and efficient engineers, can be over-come to some extent by immigration from more advanced countries and to some extent by using the training facilities of those countries. The same is true, even more importantly, of those imported from abroad. In this sense, however, one can say that in a backward country there exists a 'prerequisite' to industrial development which the advanced country did not have at its disposal".

On such grounds McKay shows the great value of foreign technology in Russian industrialisation from 1885 to 1913.<sup>23</sup> A more formal statement by Gerschenkron on the labour-technology link reads: 'The inadequate labour supply was substituted for by introduction of modern labour-saving technology ... the importation of technology and qualified personnel from abroad being a substitution for the missing prerequisites of indigenous knowledge and deficiency in educational background'.<sup>24</sup> In apparent contradiction, Bentzel posits the labour-surplus hypothesis in his disagreement with the Gerschenkron scheme, claiming that 'the more backward an economy was the greater the degree of hidden unemployment and the greater the possibility of industrialisation without a fall in agricultural output'.<sup>25</sup> But this is not the central issue, which concerns skilled labour and labour productivity.

Furthermore, economies of scale and indivisibilities are associated with advanced, large-scale imported technologies. Technology is thereby a determinant of those overall characteristics of bigness and speed exhibited by relatively backward nations during their 'great spurts'. There is some ambiguity here. Do *existing* indivisibilities and complementarities and economies determine the nature of the technology borrowed, or is it an advantage of backwardness that it is possible to borrow a technology which will allow the purposive exploitation of economies of scale? Or are

<sup>23</sup> McKay, *Pioneers*.

<sup>24</sup> Gerschenkron, *Russian mirror*, pp. 99-104.

<sup>25</sup> Rostow ed., *Take-off*, p. 381. This fits the Japanese case (see Fei and Ranis, *Labor surplus*), and is quite compatible with Gerschenkron's position on skills.

both forces in operation during the 'great spurt'? At one point Gerschenkron suggests that economies of scale may be deliberately exploited as an advantage.<sup>26</sup> At another point his explanation of the association between relative backwardness and the characteristics of the 'spurt' is in terms of 'the exigencies of the dominant technology as well as in terms of specific advantages inherent in the bigness of plant and enterprise and in the simultaneity of industrial development ...'<sup>27</sup> In a pathbreaking essay in historical economics, Henry Rosovsky (a former student of Gerschenkron's) acknowledged the speed and discontinuity associated with technology transfers in the Japanese case, but doubted the identification of 'most modern and efficient technologies' with capital intensity and metallurgical industries.<sup>28</sup>

Finally, technology is ultimately linked together with other fundamental elements of the schema. An essential role of the industrial investment banks was that of carriers of technology, the 'imitative' nature of the Italian case being seen as a result of German technological influence directly through financial tutelage. Several fundamental units of the Gerschenkron schema - banks, the state, 'tension' and foreign capital - appear to be functionally related to technology and its transfer.<sup>29</sup> One point about which Gerschenkron does not disagree with Hicks is over the great role of technology in industrial development, that which lends the latter its 'essential novelty'.

Several of Gerschenkron's reviewers and critics have emphasised this focal position of technology. David Good, in his reflections on Austria-Hungary, emphasises that technology transfer is the major means of 'spatial spread' in the Gerschenkron schema, and that catch-up was never automatic. This point, with an additional important commentary on the role of institutions, has also been well made by Abramovitz in his classic essay on historical economic growth.<sup>30</sup> In some contrast, Bhatt

<sup>26</sup> Gerschenkron, *Economic backwardness*, pp. 9-11.

<sup>27</sup> Gerschenkron, *Continuity*, p. 36.

<sup>28</sup> Rosovsky, *Capital formation*, pp. 85-92.

<sup>29</sup> Gerschenkron, *Russian mirror*, p. 664; Hicks, *Theory of economic history*, pp. 145-8.

<sup>30</sup> Good, 'Austria-Hungary', pp. 237-39; Abramovitz, *Thinking about growth*, pp. 41-70 and pp. 220-245.

simplifies the complexities of the approach in the formula that, 'A backward country borrows the most modern technology from an advanced country.' Indeed, for Bhatt the technology gap serves as a rough proxy for the degree of 'tension' between nations.<sup>31</sup> In one paper, Gregory subsumes foreign technology in foreign capital and argues that both are equally central to Gerschenkron's approach.<sup>32</sup> For Barsby the 'technological revolution' associated with great spurt development is essentially that of the absorption of advanced techniques, and he finds this to be the reason for the predominance of producer's goods.<sup>33</sup>

A variety of researches and analyses concerning late nineteenth century Europe have either coincided with or followed from the relative backwardness schema.<sup>34</sup> Even Rostow, writing generally of the strategic function of income shifts, has admitted that 'in Czarist Russia the *substitution* [my emphasis] of government bonds for the great landholders claims on the flow of rent payments led to a highly Smithian redistribution of income into the hands of those in the modern sector'.<sup>35</sup> More modest as a constructor of theories but acknowledged as the leader in the production of aggregate series, Simon Kuznets has more generally acknowledged that historically associated shifts in economic and social structures are not absolute requirements for development, for they 'could be avoided or substituted for'.<sup>36</sup> Writers as diverse as Erlich, Wilber and Roberts have considered aspects of Russian economic history within the light shed by Gerschenkron's approach.<sup>37</sup> Wilber is especially convinced of its value: 'The concepts of

<sup>31</sup> Bhatt, 'Two recent theories', pp. 183-91.

<sup>32</sup> Gregory, 'Russian national income', pp. 445-46

<sup>33</sup> Barsby, 'Economic backwardness', pp. 449 *passim*.

<sup>34</sup> The most important collection of case studies introducing new quantitative data to more or less overtly test features of the Gerschenkron schema is Sylla and Toniolo, containing especially important studies of Britain by Crafts, Leybourne and Mills (sceptical of the degrees of industrial discontinuity posited in Gerschenkron) and on aspects of methodology by McCloskey. None of the essays give analytical consideration to the historical relations of technology transfer, ideology and the behaviour of the state.

<sup>35</sup> Rostow, *Stages*, pp. 46-7.

<sup>36</sup> Kuznets, *Economic growth*, p. 348.

<sup>37</sup> Erlich, *Industrialization debate*; Wilber, *Soviet model*; Roberts, 'War communism'.

relative backwardness and substitution will be used to relate Soviet development experience with past European development and with the problems facing underdeveloped countries today'.<sup>36</sup>

On the research front, Cohen has considered the role of industrial credit banks in Italian industrialisation in the period 1894-1914, years almost coincident with Gerschenkron's identification of the industrial spurt (1896-1908). He has found that the importance of the producer goods sector was as might be expected from the relative backwardness hypothesis, whilst the relatively great function of institutionalised industrial credit was in the new sectors of industrial chemicals, iron and steel, engineering, the merchant marine and the production of electrical power.<sup>39</sup> McKay has concluded that the foreign indebtedness of Russia in the years 1880-1913 financed one third of all corporation capital by 1890, and in mining alone 70% of fixed capital was foreign by 1900.<sup>40</sup> The large scale and concentration of foreign financing fits nicely into the relative backwardness schema. More sweepingly, Barsby has attempted to test the 'specific definition' of backwardness (incorporating per capita income, agriculture's share of the active labour force, and the timing of industrialisation) and to correlate this with degrees of *relative* backwardness. By using England as a plumb-line to rank six nations in relative backwardness on absolute measures, Russia and Italy appear as most relatively backward and a high degree of overall consistency in ranking is obtained. The predicted positive relation between degrees of relative backwardness and the speed and intensity of industrialisation is thereby well shown, although those concerning producer goods and labour productivity are not so readily established.<sup>41</sup> The latter point is of

<sup>36</sup> Wilber, *ibid.*, p. 100.

<sup>39</sup> Cohen, 'Financing industrialisation', pp. 650-58.

<sup>40</sup> McKay, *Pioneers*.

<sup>41</sup> Barsby, 'Economic backwardness', pp. 455-72. For the implications of a shift in that plumb-line resulting from new quantifications, see Crafts *et al.*, 'Britain', especially pp. 131-41. Elsewhere in that paper some historical innocence does surface, eg., p. 117 where it is suggested that the well-known debates on the standard of living illustrate that 'pressure on consumption standards' in early developers like Britain might be somehow equivalent to those of late development, when it is far more obvious that such extended debate implies that doubts are cast - there is no doubt about very depressed consumption standards in the late developers nor about their more disruptive and costly political impacts.

interest as it substantiates the findings of Paul Gregory on Russia. Testing the Gerschenkron hypothesis that in a relatively backward nation rural overpopulation existed alongside a dearth of skilled industrial labour, due to the nature and institutional backwardness of the agrarian sector, (in the case of Russia, the lingering emancipation of 1861), Gregory established a relatively high rate of growth in the industrial work force between the years 1884 and 1900 - the period of most rapid industrialisation - and agrees with the contemporary estimates of 4.81 per cent per annum growth rates of factory labour for 1887-98 given by Tugan-Baranovsky.<sup>42</sup>

From this variety of evidence it can hardly be said that all the details of the Gerschenkron approach to nineteenth-century European history are substantiated. Particularly, the position of capital goods and the size of the industrial labour force require more research. On the other hand the tremendously important general claims of the schema have not been shown to be either false or trivial. Substantial historical and contemporary works continue to be written within this general perspective.<sup>43</sup> Of greater importance here, the schema throws a bright light on the workings of technology transfer in conditions of relative economic backwardness, to which we shall return in the concluding section.

### III. Putting Politics Back In

It is clear that 'governments' are prime actors in the late development schema of Alexander Gerschenkron. Thus, given great backwardness, the absence of preindustrial accumulation of capital meant that it 'was the budgetary policies of the state that must be considered as the strategic factor in capital supply'.<sup>44</sup> But beyond the argued emphasis on 'essential tension' and the financial role of the state, there is little which is overtly political or even statist in Gerschenkron's approach. In his splendid essay on Bulgaria,

<sup>42</sup> Gregory, 'Backwardness', pp. 654-55.

<sup>43</sup> Rosovsky, *Capital formation* chapter 4; Kemp, *Historical patterns*; Levy, *Modernization*; O'Brien, 'Typology', pp. 304-333.

<sup>44</sup> Gerschenkron, *Economic backwardness*, p. 46.

Gerschenkron judges that a 'curious combination of economic backwardness with a rather advanced system of constitutional government', perhaps a condition for the effective voicing of opposition to technology transfer and foreign capital on the part of the peasantry and others, was a partial explanation of the ultimate failure of the economy to break through to a path of sustained industrialisation.<sup>45</sup> In addition, in essays on Italy and Austria, Gerschenkron argued that tariff and other government policy could seriously hamper an industrial spurt even if otherwise fully supported and partially endowed by the state.<sup>46</sup> Whilst the state may or may not have laid down some institutional undergirdings for later development (eg the abolition of serfdom, agricultural reform, industrial training) there is no generalisation concerning pre-spurt states and their relationship to levels of relative economic backwardness, although Chaudhry has begun such an assessment.<sup>47</sup> Surprisingly, the leading notion of 'institutional substitution' was never developed by Gerschenkron much beyond finance and, perhaps, labour training in new skills, a theme only sketchily perceived. Certainly, Gerschenkron acknowledged in his important piece on Bulgaria that 'whole patterns of substitutions become discernible across the graduated scale of economic backwardness' and that political backwardness might prohibit the selection of industrially appropriate substitutions, but the notion is not exploited there or elsewhere.<sup>48</sup> Yet there is a strong case to make that the Gerschenkron approach is crucially political.

In his notion of the 'essential tension', Gerschenkron of course emphasises the demonstration effects of early developers on later industrialisers, but in terms mostly relating to the availability to late starters of technology, financial institutions and finance capital, as well as the threat of war. The latter is an appropriate addition for an interpretive schema which is designed for the era between the Franco-Prussian war (1870) and the First World War (1914). Herein lies the crucial motivation

<sup>45</sup> *Ibid.*, pp. 198-234.

<sup>46</sup> *Ibid.*, pp. 72-118; Gerschenkron, *Economic Spurt*.

<sup>47</sup> Chaudhry, 'Myths of the market', pp. 245-60.

<sup>48</sup> Gerschenkron, *Economic backwardness*, pp. 227.

for statist efforts, one found missing by David Landes in his most recent account of the schema.<sup>49</sup> An initial politicisation of the approach is to more fully recognise that even early industrialisation integrally involved socio-political changes that created or engendered new ideological formulae and new programmes for political change amongst populist reactionaries, conservative asset-holders, liberal proponents, all of whom thrived within developing class cultures of increasingly urbanised workers who were suffering the drawn-out transformation from workshop and shed to warehouse, mill and factory. Here the notion of 'creation' is problematic. To the Humean notion that socio-ideological advances may have caused initial industrialisation in the first place, we might add the additional rider, derived from Polanyi and others, that the contemporaneous or subsequent ideological shifts associated with early industrialisation did not fall 'naturally' from the minds of new industrial men, but were ultimately the products of statist and bureaucratic cultural engineering.<sup>50</sup> Polanyi's 'great transformation' was essentially the singular departure represented by the 'institutional separation of society into an economic and a political sphere', a characteristic of the liberal ideology fostered by the British industrial state. Thus, 'social not technical invention' was the effective intellectual 'mainspring' of the original, early industrialisation, a relationship to be reversed in very short phases of late industrialisation in the years prior to 1914.<sup>51</sup>

To deliberately install industrial change 'from above' - from the 1860s the intention of such contrasting cases as the Meiji oligarchs of Japan and the Tsarist bureaucracies of Russia - was automatically to entail the importation of advanced foreign equipment. We argue below that this, in turn, necessarily politicised late development on several levels, but encompassing both 'supply' and 'demand' features of political change.<sup>52</sup>

<sup>49</sup> Landes, *Wealth and poverty*, pp. 274.

<sup>50</sup> Inkster, 'Culture action and institutions', pp. 242-7.

<sup>51</sup> Polanyi, *Transformation*, pp. 68-71.

<sup>52</sup> For very insightful discussions of changing relations between economic development, states and bureaucracies which are sensitive to contrast between early and late development, see Mann, *Social power*, pp. 358-509.

By the beginnings of the climacteric period, around the late 1860s, very big ideas had emerged from the early industrialiser group, particularly perhaps from France and Britain. The labels are the ones we still live by: competition, individualism, evolution, democracy, equality, economic justice, racism (from Dreyfus to the Russian pogroms), positivism, suffrage, colonialism, revolution. Such concepts were variably claimed by a bewildering host of ideologies and political movements. To traditional brands of nationalism and the early industrial varieties of liberal democracy were now added populists and social democrats, scientific socialists and communists, libertarian socialists, collectivists, anarchists and mutualists, as well as parliamentary Marxists, syndicalists, federalists and nihilists.<sup>53</sup> Under the global conditions of the first 'golden age' (circa 1850-1870), during which British industry remained uncontested as the central industrial system, it might have been possible for authoritarian systems elsewhere to close out such disruptive notions at relatively low cost. During the climacteric years of later industrialisation this was no longer so. Technology transfer meant ideological transfer through a range of agencies. The consumption of the products of modernised technology was itself of political import through altered expectations and altered standards, this simple effect given far greater potency in mass migration. By 1914 some 20 million Europeans were settled elsewhere<sup>54</sup>, having especially large political impacts in the South American republics - in the anarchist movements in Mexico, Brazil and Uruguay and perhaps explaining the speedy growth there of anarcho-syndicalism.<sup>55</sup> Just as insidious was the 'scientism' which travelled alongside machinery and carried in its sway the political repercussions of geneticism, evolutionism and competition. Physical measurement (craniometry) and the theories of anthroposociology combined to generate a host of racial and social claims and projects, many of which

<sup>53</sup> Webb, 'Social Movements', pp. 732-761; Whetham, 'Scientific age', pp. 772-791, Hyams, *Millennium*, pp. 109-184.

<sup>54</sup> Gould, 'Intercontinental emigration'; Green and Urquhart, 'Factor and commodity flows'.

<sup>55</sup> Griffin, 'Latin America', pp. 530-41; Dealy, 'Prolegomena', pp. 37ff.

were integral to wider, colonial and cultural pursuits. What Michael Biddis has so aptly summarised as 'the idiom of eugenic engineering, the jargon of the calliper'<sup>56</sup> could be introduced almost anywhere through the mechanism of erstwhile scientific transactions, journals, pamphlets and lectures, especially when fed by romantic allusions to the peripheral peoples and cultures of the new colonies and regions of imperial expansion. Within this the social scientists, headed by the classical economists, increasingly claimed a formal, mechanistic and universal basis for those particular types of political institution that supported and enhanced the operation of market forces.<sup>57</sup>

More immediately, the new communications and transport technologies<sup>58</sup> offered an ever-more efficient mechanism to the direct agencies of politicisation, such as the Internationals from 1866 and 1867 (the year of strikes, Geneva and Lausanne), federations and congresses, the widely read periodicals and journals such as *Insurrezione*, *Associazione*, *Le Révolte*, *Iskra* and so on. It might be noted that the most recollected ideologues of the climacteric were also its greatest disseminators - Karl Marx, Michail Bakunin (from Germany to Russia, Italy, Spain, Lithuania, Switzerland), Enrico Malatesta (the anarchist, from Italy to Spain, Greece, Egypt, Turkey, England, Argentina) and so on. The political disruptions of technological modernism and late development were carried to new locations within a confused complexity of levels and mechanisms - we might remember that Kropotkin wrote for *The Times*, the *Encyclopaedia Britannica*, the *Nineteenth Century* and such other influential, conventional venues.

Thus by the 1870s it was becoming difficult to separate the flows of Western technologies from the flows of anti-statist ideology within the global processes of climacteric, colonialism and late development. Japan was the one large system which might have had some effective choice (an ability to separate out overseas techniques from overseas ideas), because of its centralised state, isolation and relative cultural

<sup>56</sup> Biddis, *Masses*, p. 116.

<sup>57</sup> Backhouse et al., *Economics and Language*, pp. eg 64-84; McCloskey, *Knowledge and Persuasion*, McCloskey, 'How economics', pp. 15-32.

<sup>58</sup> Headrick, *Tentacles of progress*.

homogeneity, but with that possible exception the power of the agencies of ideological transfer might in itself have been sufficient to politicise the industrialisation process, from the heroic agency of the individual, through the mundane (eg newspapers), to the secretive and tenuous. The last should not be discounted, as illustrated in the often neglected case of international freemasonry. The climacteric was a period wherein freemasonry spread very quickly into such late industrialisers as Germany, Austria (from 1870 across-border transactions with Hungary), Italy (Garibaldi being a very influential Grand Master) and into areas outside Europe with little previous masonic tradition, such as Mexico, Guatemala, Brazil, Argentina and Chile, the Philippines, Japan and China. Apart from at times being embroiled in religious and political disputes, freemasonry served to link relatively backward economies to key groups of political activists in such advanced centres as London or New York. Noted freemasons in this period included Léon Gambetta, Alexander Kerensky, Lajos and Ferencj Kossuth, Guiseppe Garibaldi and M. F. de Campos Salles.

*Ceteris paribus*, this set of ideas and agencies might have been expected to politicise further economic growth and expansion. That is, the very existence of such ideologies, created in advanced powerful industrial systems and associated with virulent agencies of diffusion and transmission, might have been sufficient to alter radically the political contours of the entire globe. But in addition, and possibly of greater importance, late development inevitably established the conditions for an increasing *demand* for political ideologies amongst a diversity of groups and classes.

The politicisation of late development is a technological imperative in a Marcusean sense : "Technology is always a historical-social *project* : in it is projected what a society and its ruling interests intend to do with men and things'.<sup>99</sup> If this is so in a comparatively 'organic' or mature system, where technologies are emitted within a given social system, then it is even more true in the case of rapid technology transfer. New technologies inhere in the intentions of the authoritarian elite, and this in

<sup>99</sup> Marcuse, *One-dimensional*, p. 225.

turn calls up a political response. Far more profoundly and irrevocably, through employment and cognition at many levels, technology transfer in particular carries ideologies down through the social strata at a greater rate than mere propaganda ever could. Thus the transfer of 'industrial' revolutionary socialism into agrarian Russia was not in fact so anachronistic: the points of conflict during the 1890s clearly followed the sitings of transferred technique in the Ukraine, in the major centres of the Krivoi Rog - Donetz - Ekaterinoslav metallurgical project, and along the line of the Trans-Siberian Railroad (1896-1904).<sup>60</sup>

It is probably a somewhat stylised exercise, but worthwhile to briefly enumerate on thematic grounds the forces behind the politicisation of late development which stem primarily from the interaction of industrial technologies with the existing institutions and structures of late developing systems.

(1) Gerschenkronian spurts entailed foreign trading in order to pay for imported equipment and personnel. With such trade came a clutch of requirements regarding quality control and standardisation, uniformity of customs, haulage and other procedures, and conformity to new property rights (eg international patenting). Together, these instigated a change of perception amongst key indigenous groups, particularly bureaucrats, professionals and commercial agents.

(2) Elite foreign skilled workers, educators, consultants and foreign residents (in total, an imported technocracy) in new ports and urban centres of industry and commerce introduced novel standards and expectations during the process of technology transfer. Such communities represented a virile micro-culture for ideological transfer, a phenomenon especially well documented for China and Japan, but operating at many nodal points throughout the first climacteric.<sup>61</sup>

(3) Technology transfer and rapid late development served to socially redefine the assets of entire classes, particularly landowners and farmers and traditionally skilled workers. Assets held in the form of land or mines or education or training or local and tacit knowledge

<sup>60</sup> Gatrell, *Tsarist economy*; Owen, *Capitalism and Politics*; Crisp, 'Russia', pp. 248-68.

<sup>61</sup> Moulder, *World economy*; Hawks Pott, *Shanghai*, pp. 132-49; Inkster, *Science and technology*, pp. 123-8, 236-9.

often dwindled to nothing. Contrariwise, those landowners fortunate enough to control tracts close to new, modernised developments in industry or transport infrastructure reaped monopoly rents. Workers whose existing skills were complementary to new, transferred technique (Japanese silk weavers and paper makers, Russian cotton weavers, large numbers of workers involved in building, haulage and metal fabrication), commanded rising wages. Within this process, intellectual assets were most easily eroded, and the potentially dangerous publicists and schoolmen emerged amongst those who were unemployable (or refused employment) in the new industries, urban services, administrative bureaucracies and educational systems. In essence, technology transfer in many cases forced a redundancy of assets and this in itself promoted unrest, a sense of loss, and a search for alternative ideologies of resistance and renewal.

(4) Education and training were unavoidably Janus-faced. Most late developers mounted an educational programme of some sort, often dividing general 'literacy' provision for the masses from the scientism and technocracy and specific engineering and legal skills required of a small elite of system builders, managers and proponents. Thus the formulae of evening technical education, polytechnics and more 'training' oriented higher education.<sup>62</sup> But systems designed for training and conformity also put into the hands of ideologues the tools of literacy and information, the knowledge of alternatives of style and substance, from which could be forged the weapons of ideology. Scientific and technical associations supplied a new, formal professionalism amongst a higher middle-class, often detached cadre of society, acting as a new medium for the transmission of political and social ideas as well as for those skills being promoted by the modernising elite. The politicisation of a new meritocracy was hastened by training abroad - by 1912 some 8000 Russian students were studying in Western Europe, approximately half of whom were in Germany, a centre of progressive political ideology.<sup>63</sup>

<sup>62</sup> Ringer, *Education and society*; Ringer, *Mandarins*; Fox and Guagnini, *Industrial performance*.

<sup>63</sup> Vucinich, 'Politics', pp. 154-78; Black, 'Imperial Russian', pp. 186-207.

(5) The politicisation of the late development effect was inevitable for such reasons, but also because geographical and occupational mobilities, new education and a series of new assumptions about labour markets and contractual relationships served together to weaken the ability of older forms of community and filiation to maintain subservience, populism and localism. The new institutions of the authorities, the syndicalists and the unionists cut across old allegiances, promoting those new identities with whole sectors and social interests which were to erode traditional community mores. This 'decline of community' lamented frequently enough during the more evolutionary changes of the early-start industrialisers, was in late developers surely a major and systematic force behind the control measures of the state, a point to which we shall return below.

(6) Finally, and easily ignored, was the seemingly in-built tendency of the 'politicisation of late development' to reproduce itself rather rapidly. Emulation of the practical and institutional solutions of successful late developers was common enough at various levels. On the one hand there was that emulation amongst managing elites well exhibited in the movement of the Meiji institutional system (eg civil law, property rights, education etc) away from an original Anglo-Saxon model towards a Prussian model, clearly evident during the 1890s.<sup>64</sup> On the other hand, we might witness the pattern of spread of radical political ideologies both within and outside Europe itself. The first case might have been quite as common as the second. The state, after all, was most frequently the instigator of new 'institutional substitutions' of a Gerschenkronian sort, those designed to reduce or control the social displacements or contradictions of late development but which also breached traditional institutional patterns. Thus the German enactments of the 1880s regarding labour benefits and insurance influenced legislation in Austria, Italy and other late developers.<sup>65</sup>

To show more adequately how a schema of late development incorporating politicisation matches the historical experience would

<sup>64</sup> *The developing economies*, 1977.

<sup>65</sup> Oncken, 'German empire', pp. 154-8.

require a very lengthy presentation. However, some analytical commentary on those two outstanding cases of late development which also happen to contrast in many respects - Tsarist Russia and Meiji Japan - is appropriate.<sup>66</sup>

Clearly, in the case of Russia it is possible to interpret the years 1890-1917 as ones of political disturbance derived from both imported technique and imported ideology. Furthermore, the many accounts of politicisation in late Tsarist Russia include at least some of the notable elements in our presentation above, particularly concerning the proletarianisation effects of large enclaves of modernity, the dissolution of community and local controls (and the attempts of the state to reassert local control mechanisms through the institution of the *zemskii nachal'nik*, safeguards to the *obshchina* or village commune and so on), the role of foreign ideology and itinerant 'ideologues' in fomenting unrest, and the activity of associations linking Russian activists with European ideologues.

Apart from claims regarding the extreme and unrepresentative nature of the Russian case, a problem of interpreting such features as primarily a collective and inevitable characteristic of late development, is that there is a seeming strong case which asserts the neo-slavophile belief that Russian tradition swamped the forces of modernisation and determined the 'regressive' character of the political outcomes of 1905 and 1917. This is a problem which Gerschenkron spends some space wrestling with in order to address the strictures of E.H. Carr and as part of a general effort to distinguish the industrial spurt of the 1890s from earlier industrialisation attempts and failures.<sup>67</sup> The alternative view would admit to the special character of 'ideological supply' and agency

<sup>66</sup> For an early juxtapositioning, see Madison, *Economic growth*. For an equally early scepticism concerning Japan as an exemplar of the relative backwardness formulation, see Smith, 'Pre-modern economic growth', pp. 156-60, Rosovsky, *Capital formation*, chapter 4. For replies to these, Inkster in Macpherson, *Industrialisation*, pp. 63-65.

<sup>67</sup> Shanin, *Developing society*, especially pp. 1-65, 174-222 and *Moment of truth*, pp. 236-316.

<sup>68</sup> Gerschenkron, *Economic backwardness*, pp. 130-42, 147, 152-7; *Russian mirror*, pp. 62-130; Carr, 'Random reflections', pp. 281-3.

during the climacteric period, but would then tend to argue that the Russian political outcome was a result of the direct interaction between such ideologies and agencies and the traditional 'culture' or institutional trajectory, based on a very long-term perspective departing from around Peter the Great and omitting the 'demand' effects inherent in late development. We might claim that a more convincing and empirically rich case may be made for aligning such supply-side forces with the forces created in the very process of technology transfer. These may, without strain be taken back to the emancipation era of the 1870s and 1880s but were concentrated in the industrialisation effort of the 1890s.

In the contrasting case of Japan, the argument is frequently put that late industrial development (circa 1870-1900) came to the nation without significant ideological conflict or physical protest. At least here, late development was not politicised. This is, however, both counter-intuitive and empirically unsound. As to the first, Meiji industrial development was clearly predicated on transferred techniques.<sup>69</sup> Furthermore, because Japan was well outside the Atlantic system, the effective 'technological gap' was very substantial in a situation of raw material scarcity. The latter point, however, should not be exaggerated, and we might distinguish raw materials proper from accessible assets: during the Meiji era copper was a major export alongside the 'processed' raw materials of silk and tea, coal was being exploited using German technologies, water power and coastal trading abounded, transport systems were well-established. Nonetheless, in a situation of both significant technological gap and general raw material scarcity, the vital and central significance of technological transfers is more easily mooted.<sup>70</sup> Finally, the long period of fairly efficient isolation policy had permitted a trickle of scientific and technological knowledge into the upper reaches of Japanese society and to provincial, progressive and militaristic elites, but had on the whole

<sup>69</sup> Ohkawa and Rosovsky, *Japanese economic growth*, pp. 7-8; Macpherson, *Industrialisation*, pp. 143-66.

<sup>70</sup> Fei and Ranis, 'Innovation analysis', pp. 312-35; *idem. Labour surplus economy*, Blumenthal, 'Factor Proportions', 547-9.

ensured that Japan was particularly uninformed by cumulative ideological transfers from industrialising systems prior to the opening up process of the 1860s. Intuitively, therefore, Japan's industrial breakthrough was causally associated with a rush of both technological and ideological transfers once the restoration process was underway. Even a brief account of the 'great spurt' years (circa 1868-1885) provides full evidence of the speedy politicisation of late development of a sort explicable in terms of a broadened Gerschenkronian perspective.

Although a picture of peaceful transition to modernity is frequently drawn,<sup>71</sup> in fact the years to circa 1885 were genuine crisis years on several counts. Two hundred peasant uprisings occurred between 1868 and 1878, a rate of recorded rebellion far greater than ever took place even in the more distressed years of late Tokugowa, such as the famine decades of the 1780s or the regional famines and risings of the Tempo reform period (1830-43). In the opinion of T.C. Smith 'never in modern times has Japan been so close to social revolution'.<sup>72</sup> Reasons for popular unrest were many - high rents and tenancy disputes mingled with reaction to usury and new forms of taxation, providing for frequent peasant revolt led by discontented and independently armed ex-samurai. The famous Satsuma Rebellion of 1877 may well have represented in the words of Barrington Moore Jr., 'the last bloody convulsion of the old order'<sup>73</sup>, but in fact violent activity continued well into the 1880s as a vital element of a more politicised opposition to Meiji government policies.<sup>74</sup> The late development effect was clearly evident in the political opposition arising in silk and textile regions, facing stiff competition from imported cottons. In the vanguard of technological change was the modernised army itself, and even the military elite were by no means immune to physical resistance. In January of 1879 there occurred very serious riots of the Imperial Guard at Takebashi Imperial Barracks in Tokyo, including a direct armed

<sup>71</sup> Silberman and Harootunian, *Japanese leadership*.

<sup>72</sup> Smith, *Political change*, p. 30.

<sup>73</sup> Barrington Moore, *Social origins*, pp. 249.

<sup>74</sup> Inkster, 'Other side of Meiji', pp. 107-28.

attack on those leading government figures who were viewed as modernisers of too comprehensive a type.<sup>75</sup> During a period when the new mechanisms of technology transfer dominated the national industrial and technical effort and were at their most open, vulnerable and public (eg internal machinery competitions, external exhibitions, model factories and arsenals), resistance and riots were endemic. An excellent example of this was the resistance to the modernised medical techniques which were introduced during the cholera epidemic of 1879, which was led by socially displaced *ex-samurai* and required a massive police and military presence in order to control.<sup>76</sup>

Late development effects were not only evident in the reaction to technological and social displacement, but in the interaction *between* the Western agents of technological change and Japanese intellectuals and bureaucrats. Japan's 'enlightenment' stemmed not only from books and journals but from men and machines. This is particularly true in the case of such liberal democratic societies as the Tosa-based *Risshisha* (Society of Free Thinkers) or the similarly minded intellectuals of the *Meirokusha* (Meiji Six Society), which included foremost Japanese intellectuals and later statesmen like Fukuzawa Yukichi and Mori Arinori. Within the Free Speech Society of Tokyo during the 1870s, influential Westerners addressed and debated with Japanese intellectuals in the Japanese language. Contemporaneously, the political group, *Kyoson Doshin* (Co-existence Circle) began to hold its meetings in the English language in order that its Japanese members 'who have visited England and America' might utilise their new tools of enlightenment.

The bureaucratic agents of late development were similarly politicised and 'guided' by the internal Western presence, perhaps especially through the focally important Imperial University in Tokyo, dominated by the foreign element in both technology and political economy and by far the most influential seminary for the training of the modernising elite. Here, neither science nor technology were neutral tools of change. Science professors such as Perry and Ayrton at the

<sup>75</sup> *Nichi Nichi Shimbun*, 2 October 1878.

<sup>76</sup> *Japan Weekly Mail*, 16 August - 20 December, 1879.

greatly influential Imperial College of Engineering, involved their students in research programmes that went well beyond pure science into what, today we might term science policy work - on mineral exploitation, surveying and the costing of public sector projects, medical and sanitary reform and so on. Official positions were no real measure of influence. Thus, from his base in the Home Department, Dr P. Mayet began a series of forays into Japanese industrial and financial policy and was eventually rewarded through promotion to the position of adviser to the Financial Section of the newly established Council of State, where he continued to have a major impact on national budgets.<sup>77</sup>

If by 1885 the politicisation of late development was under control and, in the words of E. H. Norman 'the government offensive had triumphed',<sup>78</sup> this was very much a result of immense efforts at socio-political control on the part of the authorities, utilising a combination of hard and soft control techniques. At a time when the total yield from the land tax (the major regular income source for government into the 1890s) was around 40 million yen, the expenses of quelling civil unrest amounted to over 50 million yen, met by inflationary financing, borrowing and reserve funding. A precise measure of the costs involved in the immediate political control of the social displacement effects of technological change was represented by Okuma's estimate of an accumulated internal national debt of 219 million yen, made up mostly of financial payments to the displaced *samurai* and *han* groupings which 'is the extinguishment of the pensions awarded to them in consequence of the events of 1868-71' (the 1868 Restoration). Soft control through enactments on assembly, local representation etc was far less expensive, with the exception of education itself. The total cost to local government of mass education during the Meiji era accumulated to around 1,000 million yen, about one third of all local government expenditure and equivalent to the suppression of over 20 Satsuma rebellions.<sup>79</sup> By 1908 six years of schooling was made free and compulsory, raising the attendance rate to around 95%.

<sup>77</sup> Mayet, *Deutsche Gesellschaft*, pp. 725-43.

<sup>78</sup> Dower, *Origins of the Japanese state*, p. 447.

<sup>79</sup> Emi, *Government fiscal*, pp. 73, 157-62, 168-70, 175-7.

#### IV. The Critical Context

To this point we have suggested that Gerschenkron's approach to late industrialisation is of considerable interest but neglects to incorporate an account of technological change or an acknowledgement of the wider political economy of the development process. It should be noted, then, that the stance of this paper is quite different from that of the several critics of Gerschenkron who have fastened on to supposed formal shortcomings of the approach. We may now suggest that although such criticisms have been influential they are by no means decisive. They have, therefore, served to inappropriately divert attention away from the potential value of the underlying propositions in areas such as technological history and the political economy of industrial transformation.

A seemingly significant empirical fault of Gerschenkron's hypothesis relating degrees of relative backwardness to characteristics of the industrial 'spurt' is pointed out by Barsby when he contends that the position of producer's goods during the spurt, although of some significance, is a lesser one than that predicted. Furthermore, Barsby argues that this may have been because some absorption of producer's goods took place prior to the spurt itself. In turn this may explain why 'There is no evidence supporting Gerschenkron's hypothesis that the backlog of innovation available to a backward country on the verge of its 'great spurt' had a consistent positive relationship with the subsequent stress on producer's goods industries'.<sup>80</sup> Closely related to this is Landes' argument that, even if there is a stress on heavy industry during the spurt of relatively backward nations, this is not a function of relative backwardness per se but of a general tendency in the growth of nineteenth century technology.<sup>81</sup> This misses the precise point. If the relatively backward nation of the later nineteenth century had gone through an industrial revolution of a type approximating that of the advanced nations at an earlier stage, then it would more likely have

<sup>80</sup> Barsby, 'Economic backwardness', pp. 463-4.

<sup>81</sup> Landes, *Unbound Prometheus*, p. 541.

been dominated by light industry technologies. However, the relatively backward group selected as appropriate to their situation that range of technologies associated - especially but by no means entirely - with the heavy industry, capital goods sector of the economy. Perhaps emerging best techniques lay predominantly in the newer heavy industries, but this is surely not sufficient explanation of a bias in their selection, especially given the obvious problems connected with economies of specialisation, indivisibilities and complementarities.

Another critical claim arises from misunderstanding. At one point Bhatt argues that nations such as Denmark and Italy deviated from the 'expectations' of the system and therefore stand as 'exceptions to the model'.<sup>82</sup> Remembering that Gerschenkron's approach is not properly definable as a model, we might also note that such deviations serve to enrich the approach as they are incorporated into it. Thus, when the magnitude of the Italian spurt was found by Gerschenkron to be less than 'expected', further detailed research showed that dynamic negative elements were meshing with the positive effects of backwardness to realise a dampened overall performance. The two most important forces isolated by Gerschenkron in 1955 and 1960, were an inappropriate structure of tariffs after 1887 and diminishing returns to railroad construction.<sup>83</sup> In his recent studies, which comprehend the more sophisticated quantitative work, Toniolo has judged Gerschenkron as prescient and accurate on both elements of retardation.<sup>84</sup> In the case of Denmark, Gerschenkron's argument that a nation with a paucity of natural resources, an agricultural base and proximity to large and developing markets for agrarian produce will not face the 'tension' of backwardness and develop outside the general scheme, simply serves to highlight the notion that relative backwardness is not absolute backwardness. Gerschenkron was only trying to explain significant phases in industrial history and

<sup>82</sup> Bhatt, 'Two theories', p. 188.

<sup>83</sup> Gerschenkron in essays 4 and 5 republished in *Economic backwardness*, pp. 72-118.

<sup>84</sup> Toniolo, 'Effective protection' and *Liberal Italy*, and Federico and Toniolo, 'Italy', pp. 206-13.

acknowledges in the schema that every nation has its unique internal characteristics.

Milward and Saul conclude that the approach (which they label a 'model') is 'excessively general and oversimplified', if only because it fails to explain the continued backwardness of south-eastern Europe through this period.<sup>85</sup> But this position is based on oversimplification and a misunderstanding similar to that of Bhatt. Despite the authors, Gerschenkron's premise is not that in 'those economies with the worst heritages of economic backwardness development had to take place through the positive intervention of the state' but, rather, that in those backward economies which did exhibit a 'spurt' of industrial growth one would expect banks or the state to play a relatively large role, and that this does not preclude the notion of an inappropriate or dysfunctional role. Despite repeated assertions to the contrary, Gerschenkron does not indeed argue that it normally 'pays to be late'<sup>86</sup> but, rather, that under certain circumstances, the conversion of potential is possible. And referring again to this issue at a later point, Milward and Saul emphasise that the 'most frantic' efforts of government were made 'in southern and eastern Europe where the development gap was most serious.'<sup>87</sup> Two further points are worthy of note. When the authors say that variability in banking structures within western Europe had 'nothing to do with stages of backwardness', and that the relatively great part played by investment banks in Germany and Belgium was a reflection of the dominance of heavy industry, they are, without notice, stating one of the formal relationships of the Gerschenkron schema. Secondly, when they argue that south-eastern Europe would have remained underdeveloped even given adequate government policies and resources, and stress the backwardness of agriculture and the consequent unbalancing of the economy which would result, they are once more outlining central features of the Gerschenkron approach. Gerschenkron's focus is industrialisation through 'great spurt' which may, under certain conditions of

<sup>85</sup> Milward and Saul, *Continental Europe*, p. 528.

<sup>86</sup> Landes, *Wealth and poverty*, p. 274.

<sup>87</sup> Milward and Saul, pp. 462, 528.

backwardness, occur alongside stagnation or even dynamic underdevelopment of the agrarian sector.<sup>88</sup> Milward and Saul simply suggest the richness of the research base which is required if the approach is to be either confirmed or refuted. As Gerschenkron has written, 'what better measure for the validity of an historical concept can there be than its fertility in research?'.<sup>89</sup>

But there are more meaningful problems. The nature of the 'broad front' upon which industry must advance in a relatively backward nation, together with the idea of a necessarily great 'tension', lead Gerschenkron to argue that the great spurt requires a purposeful and planned leadership. The complexity of the instruments of banking, state and ideology seems to mean that careful control and planning based on a high level of information and communication is more necessary as relative backwardness increases.<sup>90</sup> Yet a more general approach to institutionalised development might suggest the opposite, i.e., that projects such as model enterprises or reformist taxation schemes will often only be attempted under conditions of imperfect knowledge and a tentative goal-orientation. This is not the same as the point made by Landes when he argues that the technology chosen in backwardness may not be capital intensive because not only is labour often available at a low price, 'the choice of production functions was not always governed by the rational calculations of theory. Habit, social prejudice, and entrepreneurial caution all conduced to a relatively conservative (i.e. less than best techniques) investment policy'.<sup>91</sup> Although this is perfectly true and astute, it may yet be the case that choice in certain areas becomes more sensitised to economic considerations ('rational calculations of theory') the greater the degree of backwardness at the time of industrial revolution. My point is that it is possible that full realisation of the financial, organisational and other difficulties involved in major projects in backward nations on the threshold of 'spurt' would have an atrophying or stultifying effect.

<sup>88</sup> Gerschenkron, *Economic backwardness*, p. 18; 'Discipline', p. 444.

<sup>89</sup> Gerschenkron, *Continuity*, pp. 37.

<sup>90</sup> Gerschenkron, *Russian mirror*, pp. 103-110.

<sup>91</sup> Landes, *Unbound prometheus*, p. 542.

Situations would gel before material commitments were made to such a level that reversal was impossible. On the other hand, Hirschman's conception of the 'hiding hand' suggests that commitments made under conditions of highly imperfect information may ultimately lead to development through significant projects. Innumerable and incremental partisan adjustments might yield a surprising degree of 'rationality' in an industrial project, particularly in cases dominated by incremental technological improvements or adaptations of transferred technologies.<sup>92</sup> So, Hirschman's approach to projects is probably more representative of the industrial spurt in Russia or Japan than are Gerschenkron's implications of more perfect knowledge and apparatus.<sup>93</sup> Furthermore, it is possible that the disjointed incrementalism associated with the Meiji leadership (exhibited, for instance, in the selling-up policies of the 1880s) might have been an element in the greater success of government in Japan than in Tsarist Russia, and that such comparisons of late developers offers the possibility of further widening of the Gerschenkron perspective.

Equally problematic is the status of the functionalism implicit in the Gerschenkron approach. It has been suggested that the removal of an 'obstacle' to great spurt development is an 'absolute prerequisite' and thus functional, and that its replacement by innovative institutions is seen by Gerschenkron as positively functional at all times or that, where it is not, its non-positive features may not be explained in terms of the schema. Thus Landes has written of the approach that 'too often it is assumed that non-economic obstacles simply melt in the face of economic opportunity'.<sup>94</sup> However, Gerschenkron's position is somewhat more subtle than this. At several points he analyses Russian serfdom as a strong cultural institution and tradition which lasted well

<sup>92</sup> Lindblom, 'Muddling through', pp. 79-82; Klein and Meckling, 'Operation research' pp. 354-63; Hirschman and Lindblom, 'Converging views', pp. 212-6; Inkster, *Transfer mechanism*, pp. 14-19.

<sup>93</sup> Hirschman, *Development projects*; Sawyer, 'Entrepreneurial error'.

<sup>94</sup> Landes, *Unbound prometheus*, p. 541, at which point Landes makes reference to Gerschenkron *Economic backwardness*, 68-9, which seems a little inappropriate given the stress there on the need to eschew 'the impression of a unified and general normative system'. (p. 68).

beyond its functional phase and, indeed, served as a barrier to industrialisation. The 'force of the state alone' was required to do away with the child of its own creation.<sup>95</sup> Elsewhere he writes that 'industrialisation in conditions of considerable backwardness may well proceed at the expense of other branches of the economy' because of the nature of backwardness and substitutions.<sup>96</sup> Particularly, the greater the degree of relative backwardness then the greater likelihood there is of negative effects being released through innovative substitutions.<sup>97</sup> This points towards the notion of an optimal degree of institutional backwardness. Of more significance in the opinion of the present writer is the lack of an argument as to how functionally indispensable instruments may be socially and culturally mediated. Though it may be necessary to institutionalise the function of channelling wealth from agriculture to industry or from consumers to investors, the range of possibilities and the actual possibility chosen will have some dependence upon socio-cultural features. This is of importance for two reasons. A necessary function may not be fulfilled at all due to the operation of such factors. Secondly, the richness and variability of individual nations' experience is better acknowledged and explained when the concept of mediation is introduced. Knowledge of the *obschina* system allows one to gauge the conditions for certain substitutions, but the socio-cultural forces operating so as to effect the selection of the actual substitution are not thereby elucidated.

In the present account we have stressed the inevitably "political" character of technological transfer during the late nineteenth century climacteric and the key role played by such transfers in the overall industrialisation process. We have suggested the 'rationality' of late development agency (statist or otherwise) given the exigencies of the wider international economic and political context. We have followed Gerschenkron uncritically in emphasising the play of both institutional and technological innovations and transfers but have extended that

<sup>95</sup> Gerschenkron, 'Mercator gloriosus', p. 660.

<sup>96</sup> Gerschenkron, 'Discipline', pp. 444-5.

<sup>97</sup> Gerschenkron, *Economic backwardness*, pp. 28-9.

notion to claim that late development required a disruption of those existing political structures which by their very nature dampen the forces for industrial change. That is, late developer systems are radical or unstable in the sense of being motored by governments or regimes intent on disturbing but controlling the existing institutional and social equilibria.

We might here also note the seeming central importance of the phenomenon of 'followership'; the process whereby private agency emulates the initial technological and other activity of the state and benefits from the latter's early construction of a financial, infrastructural and social environment (eg. from education or training on the one hand to cultural engineering on the other) which induces the "emergence of market forces" ie those forces emphasised in the developmental stories of the conventional text books.<sup>98</sup> Such followership phases may be identified in the outstanding cases of Japan and Russia as having occurred during the 1890s, in contrast to Gerschenkron's identification of the early twentieth century (especially 1907-13) as the crucial period in the Russian case. An emphasis on the importance of followership becomes of even greater potential value when combined with the already mooted idea that incrementalism rather than omnipresence characterised the early agency of late development. Then the state remains, in this view, crucial but not necessarily consistent, efficient or uniformly dominant.

Clearly enough, even the earliest of industrial modernisers exhibited both technology transfer and government support of the technological enterprise, and we do not wish to dispute this here.<sup>99</sup> Thus a recent influential sceptic such as Joel Mokyr is happy enough to argue that British industrialisation was a compound of technological clusterings resulting for such key factors as emulation, competitiveness, a social interaction of technicians and businessmen and, importantly, a relative absence of resistancies to technological change, for in Britain technological change was in essence a social struggle wherein the

<sup>98</sup> Inkster, 'Technology transfer', pp. 189-98.

<sup>99</sup> Pollard, *Peaceful conquest*, pp. 3-141; Trebilcock, *Industrialization*, throughout.

government's support of winners remained 'unflinching'.<sup>100</sup> And in early starters war or its threat obviously stimulated both statist and private technological activity, thus Bessemer's search for an efficient shell, Wilkinson's boring machine for cannon, and the whole development of the 'American System' of manufactures, which arguably centred on the interchangeability of machines developed in the arsenals and related machine emporiums.<sup>101</sup>

Whilst Olson and others<sup>102</sup> might expect technological change to follow on from political revolution, if only because of the subsequent stimulative effects of the relatively rapid sequences of clearance (the politically-led overhaul or overthrow of ancient regime institutions and presumptions), the French case appears to be one of revolution followed by industrial technology lag, perhaps an outcome of accelerated insecurities, or perhaps because of the Napoleonic deflection of the entire system towards empire rather than industry? In the case of the presumptively plumb-line nation, England, political revolution was limited and long prior to an obvious industrial outcome. Here, Humean processes of openness and mobility and emulation were perhaps of greater importance than more specific chaos associated with political revolution or resurgence. In the opposite sort of case, that of technologically stagnant Imperial China, Mokyr reminds us, in accord with the contemporary assessments of Hume and Smith, that public-sector supported technical change 'has the nasty weakness of depending on the government's approval, the government can flip the switch off, so to speak, and private enterprise is then unlikely to step in'.<sup>103</sup>

But we argue that the several cases of late development discussed here do represent a genuinely different type and do provide interesting examples of the technology-state relationship. Perhaps in the case of China, Adam Smith's dictum about the diminishing returns of centralised or interfering regimes was correct (he certainly applied it

<sup>100</sup> Mokyr, *Lever*.

<sup>101</sup> Sawyer, 'Social basis', pp. 361-79; Rosenberg, *American System*; Roe Smith, *Harper's Ferry*; Hounshell, *American system to mass production*.

<sup>102</sup> Olson, *Rise and decline*; Mokyr, *Lever*, pp. 179-83.

<sup>103</sup> Mokyr, *Lever*, p. 237.

quite fiercely to China at that time), perhaps there was something specifically inhibitive in the inherent nature of the Ming and Qing regimes, and perhaps as Mokyr suggests (p. 237) 'there was no substitute for the state in China'. However, our later nineteenth century cases are located between the extremes of Britain and China and almost certainly represent a pertinent 'success' story of the first global climacteric.

## **V. Climacteric Limits**

It would be tempting but facile to translate the complex phenomena of the first climacteric into the development process of the twentieth century, which already boasts a goodly number of analyses which focus on the initiating and transforming role of the state, although seldom dealing with the pre-emptive effects of technology transfer as such. Technology transfer was never the sole *machina* of industrial development (even given a theory of necessarily associated institutional innovation, which we do not yet have), and both techniques and the international context of the national development process have altered quite fundamentally, especially since 1945. Nations more aligned with those of the initial climacteric, such as those of Eastern Europe, did seem to re-run the broad Gerschenkron process during the inter-war years, although here perhaps the state was even more concerned with the protection of vested interests than during the years of the later nineteenth century. Interestingly, recent analyses of Eastern European development do stress such characteristics as the constraints imposed by agriculture, the importance of import substitution and general interventionism, the expansion of state investment in the absence of any state socialist ideology, the constraints imposed by skilled labour shortage and the importance to industry of technology transfers from more advanced systems, more through investment than through trade. The infrastructural role of the state, seen as fundamental in the Gerschenkron approach and in our sketches of Japan and Russia, seem to have been of lesser positive impact in inter-war Eastern Europe, reducing the overall impact of the state. Also the

fact that most of the Eastern European nations were newly-created as a result of post-war (1914-1918) solutions, meant that large-scale programmes of industrialisation were bound to be problematic for reasons developed in section III of this paper. Given also the great breakthroughs in machine, transport and communication and chemical technologies in these years, which created a very significant technological gap between the best technique of early starters and climacteric followers on the one hand, and the indigenous techniques of Eastern Europe on the other, then this was not a conjunction for successful industrial development.<sup>104</sup>

Similar arguments in more exaggerated form might be offered in explanation of industrial failure elsewhere. The common shortcomings of technology transfer throughout the inter-war years were central to the process whereby the "Third World" was more closely defined. Again, Gerschenkron's position was always that his schema was primarily designed to elucidate success rather than explain the norms of failure, such as that which hit Egypt during the climacteric, despite a sustained and seemingly effective phase of technology transfer into that nation under Muhammed Ali earlier in the century.<sup>105</sup> This position was sensible enough. Altering technological imperatives, new external constraints and mechanisms of transfer, and potent new ideologies and methods of warfare and authoritarian control all served to move the experience of the twentieth century away from that of the first climacteric era. The exception may be the emergence of the newly industrialising nations of Asia and South America in particular, whose dependence on state interventions and on technological transfer has been so well documented in an era which may now be considered that of a second climacteric, one beginning around 1971. The characteristics of this second climacteric do seem to allow for salient comparisons with the years between 1870 and 1914. Within both periods industrial leadership was challenged quite dramatically, new technologies emerged and new institutions of transfer were associated with a range

<sup>104</sup> Fallenbuchl, *Soviet Union and Eastern Europe*; Cameron, 'Economic growth'; Gomulka, *Growth, innovation and reform*.

<sup>105</sup> Crouchley, *Modern Egypt*; Marlow, *Spoiling*.

of political ideologies and institutions. At the same time, both periods were crucial in forging the major characteristics of the contemporary scene, for these were the periods *par excellence* wherein new players emerged on the industrial stage to threaten the technological supremacy and contentments of earlier starters.

#### BIBLIOGRAPHY

- ABRAMOVITZ M., *Thinking about growth*, (Cambridge, 1989).
- ANDERSON P., *Lineages of the Absolute State*, (London, 1979).
- ARMSIRONG P., GLYN A. and HARRISON J., *Capitalism since world war two*, (London, 1984).
- BACKHOUSE R., DUDLEY-EVANS T. and HENDERSON W. (eds.), *Economics and Language*, (London 1993).
- BAGCHI A.K., 'Industrialisation', in J.Eatwell *et al.* eds., *Economic Development. The New Palgrave* (London, 1987), pp.160-73.
- BARSBY S.L., 'Economic backwardness and the characteristics of development', *Journl. of Econ. Hist.*, 29 (1969), pp. 449-72.
- BHATT V.V., 'Some notes on two recent theories of stages of growth', *The Indian Econ. and Soc. Hist. Review*, 1 (1964), pp.183-91.
- BIDDISS M.D., *The age of the masses*, (London, 1977).
- BLACK C.E., 'The nature of Imperial Russian society', in P.W.Treadgold ed., *The development of the USSR* (London 1973), pp. 186-207.
- BRUTON H.J., 'Protection and development', *Williams College Research Memorandum Series*, RM-116, July 1989.
- CAMERON N.E., 'Economic growth in the USSR, Hungary and East and West Germany', *Jrnl Comp. Econs.*, 5 (1981), pp. 24/42.
- CARR E.H., 'Some random reflections on Soviet industrialization', in Feinstein, C.H., ed., *Socialism, capitalism and economic growth, essays presented to Maurice Dobb* (Cambridge, 1967), pp. 271-84.
- CHAUDHRY K.A., 'The myths of the market and the common history of late developers', *Politics and Society*, 21 (1993), pp. 245-74.
- COHEN J.S., 'Financing industrialisation in Italy : The partial transformation of a latecomer', *Jrnl. of Econ. Hist.*, 38 (1978), pp.650-80.
- CORDEN W.M., *Protection, growth and trade*, (Oxford, 1985).
- CRAFTS N.F.R., LEYBOURNE S.J. and MILLS T.C., 'Britain', in Sylla and Toniolo eds., *Industrialization*, pp. 109-152.

- CRISP O., 'Russia', in Sylla and Toniolo eds., *Ibid.*, pp. 248-268.
- CROUCHLEY A.E., *The economic development of modern Egypt*, (London, 1938).
- DEALY G., 'Prolegomena on the Spanish American Political Tradition', *The Hispanic American Historical Review*, 17 (1968), pp.37-54.
- DOWER J.W., ed., *Origins of the modern Japanese state: Selected writings of E.H.Norman*, (New York, 1975).
- EMI K., *Government fiscal activity and economic growth in Japan, 1868-1960*, (Tokyo, 1963)
- ERLICH A., *The soviet industrialization debate, 1924-1928*, (Cambridge Mass., 1960).
- FALLENBUCHL Z., ed., *Economic development in the Soviet Union and Eastern Europe*, vol.2, (New York, 1976).
- FEDERICO G. and TONIOLO G., 'Italy', in Sylla and Toniolo eds., *Industrialization*, pp. 197-217.
- FEI J.C.H. and RANIS G., *Development of the labor surplus economy*, (Homewood, 1964).
- FEI J.C.H. and RANIS G., 'Less developed country innovation analysis and the technology gap', in Ranis, G., ed., *The gap between the rich and the poor countries*, (New York, 1972).
- FOX R. and GUAGNINI A. (eds.), *Education, technology and industrial performance in Europe 1850-1939*, (Cambridge, 1993).
- FRIEDMAN M., *Free to Choose*, (New York, 1980).
- GATRELL P., *The Tsarist economy 1850-1917*, (London, 1986).
- GERSCHENKRON P.A., *Economic Backwardness in historical perspective. A book of essays*, (Cambridge Mass., 1962).
- GERSCHENKRON P.A., 'The Discipline and I', *J.Econ.Hist.*, 27 (1967), pp. 443-59.
- GERSCHENKRON P.A., *Continuity in history and other essays*, (Cambridge Mass., 1968).
- GERSCHENKRON P.A., *Europe in the Russian mirror*, (London, 1970).
- GERSCHENKRON P.A., 'Mercator Gloriosus', *Econ.Hist.Rev.* 24 (1971), pp. 653-66.
- GERSCHENKRON P.A., *An economic spurt that failed*, (Princeton, 1977).
- GOMULKA S., *Growth, innovation and reform in Eastern Europe*, (Madison, 1986).
- GOOD D.F., 'Austria-Hungary', in Sylla and Toniolo eds., *Industrialization*, pp. 218-247.
- GOULD J.D., 'European intercontinental emigration', *Jrnl. Eur. Econ. Hist.*, 8 (1979), pp. 593-679.

- GREEN A. and URQUHART M., 'Factor and commodity flows in the international economy', *Jrnl. Econ. Hist.*, 36 (1976), pp. 217-52.
- GREGORY P.R. 'Backwardness: The Russian case', *Econ. Dev. and Cult. Change*, 22 (1974), pp. 654-65.
- GREGORY P.R., '1913 Russian national income - some insights into Russian economic development', *Quatly. Jrnl. of Econs.*, 90 (1976), pp.445-59.
- GREGORY P.R., 'The role of the state in economic development: the Russian case and its general implications', in Sylla and Toniolo eds., *Industrialization*, pp. 64-79.
- GRIFFIN C.G.T., 'The states of Latin America', in F.H. Hinsley ed., *The New Cambridge Modern History, XI, Material progress and world-wide problems 1870-1898* (Cambridge, 1962), pp. 516-41.
- HAWKS-POIT F.L., *A short history of Shanghai*, (Shanghai, 1928)
- HEADRICK D.R., *The tentacles of progress: technology transfer in the age of imperialism 1850-1940*, (New York, 1988).
- HICKS J., *A theory of economic history* (London, 1969).
- HIRSCHMAN A.O., 'Obstacles to development: A classification and a quasi-vanishing act', *Econ. Dev. and Cult. Change*, 12 (1965), pp. 385-412.
- HIRSCHMAN A.O., *Development projects observed*, (Washington, 1967).
- HOWNSHELL D.A., *From the American system to mass production 1800-1939*, (Baltimore, 1984).
- HYAMS E., *The millennium postponed*, (London, 1974).
- INKSTER I., 'The other side of Meiji: Conflict and conflict management', in G. McCormick and Y. Sugimoto eds., *The Japanese trajectory: modernisation and beyond*, (Cambridge, 1988), pp. 107-28.
- INKSTER I., 'The institutionalist theory of economic development, technological progress and social change', *Journal of Economic Issues*, 23 (1989), pp. 1243-47.
- INKSTER I., *Science and technology in history. An approach to industrialisation*, (London, 1991).
- INKSTER I., 'Culture, action and institutions: On exploring the historical economic successes of England and Japan', in P.Gouk ed., *Wellsprings of achievement. Cultural and economic dynamics in early modern England and Japan*, (Aldershot, 1995), pp. 239-68.
- INKSTER I., 'Technology transfer and industrial transformation; an interpretation of the pattern of economic development circa 1870-1914', in R. Fox ed., *Technological change* (Amsterdam, 1996), pp. 177-200.

- INKSTER I., *Technology and industrialisation: Historical case studies and international perspectives*, (London, 1998).
- JAPAN WEEKLY MAIL (Yokohama)
- KEMP T., *Historical patterns of industrialisation*, (London, 1978).
- KUZNETS S., *Economic growth of nations. Total output and production structures*, (Cambridge Mass., 1971).
- LANDES D., *The unbound prometheus*, (Cambridge, 1969).
- LANDES D., *The wealth and poverty of nations*, (London, 1998).
- LEVY M.J., *Modernization: Latecomers and survivors*, ( New York, 1972).
- MACPIHERSON W.J., ed., *The industrialisation of Japan*, (Oxford, 1994).
- MANN M., *The sources of social power: II The rise of classes and nation-states, 1760-1914*, (Cambridge, 1993).
- MARCUSE H., *One-dimensional man*, (London, 1968).
- MARLOWE J., *Spoiling the Egyptians*, (London, 1974).
- MATHEWS R.C.O., 'The economics of institutions and the sources of growth', *The Economic Journal*, 96 (1986) 903-18.
- MAYET P., 'The national debt of Japan. A lecture delivered for the Deutsche Gesellschaft fur natur und voelkerkunde Ostasiens', *Japan weekly mail*, 7 June 1879, pp. 725-43.
- MCCLOSKEY D., 'Kinks, tools, spurts and substitutes: Gerschenkron's rhetoric of relative backwardness', in Sylla and Toniolo eds., *Industrialization*, pp. 92-108.
- MCCLOSKEY D., *Knowledge and persuasion in economics*, (Cambridge, 1994).
- MCCLOSKEY D., 'How economists persuade', *Journal of economic methodology*, 1 (1994), pp. 15-32.
- McKAY J.P., *Pioneers for profit: Russian industrialization 1885-1913*, (Chicago, 1970)
- MILWARD A, and SAUL S.B., *The development of the economies of continental Europe 1850-1913*, (London, 1977).
- MOKYR J., *The lever of riches. Technological creativity and economic progress*, (New York, 1990).
- MOORE B., *Social origins of dictatorship and democracy*, (Harmondsworth, 1966).
- MOULDER F.V., *Japan, China and the modern world economy*, (Cambridge, 1977).
- NICHI NICHI SHIMBUN (Tokyo)

- NORTH D., *Institutions, institutional change and economic performance*, (Cambridge, 1990).
- OHKAWA K. and ROSOVSKY H., *Japanese economic growth - trend acceleration in the twentieth century*, (Stanford, 1973).
- OLSON M., *The rise and decline of nations*, (New Haven, 1982).
- ONCKEN H., 'The German empire', in *Cambridge modern history. XII The latest age*, (Cambridge, 1929), pp. 134-74.
- OWEN T.C., *Capitalism and politics in Russia: A social history of Moscow merchants 1855-1905*, (Cambridge, 1981).
- PARKER W.N., 'Europe as an American mirror: reflections on industrialization and ideology', in Sylla and Toniolo eds., *Industrialization*, pp. 80-91.
- POLANYI K., *The great transformation*, (Boston, 1944)
- POLLARD S., *Peaceful Conquest*, (Oxford, 1981).
- RINGER F.K., *The decline of the German mandarins. The German academic community 1890-1933*, (Cambridge Mass., 1968).
- RINGER F.K., *Education and society in modern Europe*, (Bloomington, 1979).
- ROBERTS P.C., 'War communism: a re-examination', *Slavic Review*, 29 (1970), pp.238-61.
- ROSENBERG N. (ed.), *The American system of manufactures*, (Edinburgh, 1969).
- ROSENBERG N., *Technology and American economic growth*, (New York, 1972),
- ROE SMITH M., *Harper's Ferry armory and the new technology: the challenge of change*, (New York, 1977).
- ROSTOW W.W., ed., *The take-off into sustained growth*, (London, 1963).
- ROSTOW W.W., *The stages of economic growth*, 2nd edition, (Cambridge, 1971).
- SAWYER J.E., 'The social basis of the American system of manufacturing', *Jrnl. of Econ. Hist.*, 14 (1954), pp.361-79.
- SAWYER J.E., 'Entrepreneurial error and economic growth', *Expl. in Entrep. Hist.*, 4 (1962), pp.186-207.
- SCAMMELL W.M., *The international economy since 1945*, (London, 1983).
- SHANIN T., *The roots of otherness: Russia's turn of century. I. Russia as a 'developing country'*, (London, 1985)
- SHANIN T., *The roots of otherness: Russia's turn of century. II Revolution as a moment of truth*, (London, 1986).
- SILBERMAN B.S. and HAROOTUNIAN H.D. (eds.), *Modern Japanese leadership*, (Tucson, 1966).
- SKULLY G.W., 'The institutional framework and economic development', *Journal of Political Economy*, 96 (1988) 653-64.

- SMITH T.C., *Political change and industrial development in Japan: government enterprise 1868-80*, (Stanford, 1955).
- STREET J., 'The institutionalist theory of economic development', *Journal of Economic Issues*, 21 (1987) 1861-87.
- SULEJEWICZ A., 'Some difficulties in the concept of late development effect', *Economic papers*, Research institute for developing countries, Central school of planning and statistics in Warsaw, 16 (1987), pp. 103-33.
- SWEZEY P.M., 'Obstacles to development', in C.H. Feinstein, ed., *Socialism, capitalism and economic growth*, (Cambridge, 1967), pp. 191-7.
- SYLLA R. and TONIOLO G., eds., *Patterns of European industrialization. The nineteenth century*, (London, 1991).
- THE DEVELOPING ECONOMIES, *Special Issue on Western Institutions and Meiji Development*, vol. 15 (1977) (Tokyo, 1977).
- TIPTON F. B., 'Government policy and economic development in Germany and Japan, a sceptical revaluation', *Jrnl. Econ. Hist.*, 41 (1981) 37-53.
- TONIOLO G., 'Effective protection and industrial growth: the case of Italian engineering', *Jrnl. Europ. Econ. Hist.*, 6 (1977), 659-73.
- TONIOLO G., *An economic history of liberal Italy*, (London, 1990).
- TREBILCOCK C., *The industrialization of the continental powers, 1780-1914* (Harlow, 1981).
- VUCINICH A., 'Politics, universities and science', in T.G.Stavron ed., *Russia under the last Tsar*, (Minneapolis, 1969), pp. 154-78.
- WEBB S., 'Social movements', in *The Cambridge modern history. XII The latest age*, (Cambridge, 1929), 730-65.
- WHETHAM W.C. DAMPIER, 'The scientific age', in *Ibid.*, pp. 766- 791.
- WILBER C.K., *The soviet model and underdeveloped countries*, (London, 1969).

