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INDUSTRY AND
BOURGEOISIE



Although Joseph Wright of Derby (1734–1797) began his career as a portrait painter, he is most famous for paintings which express his interest in science and technology. His participation in the Lunar Society, a group of enlightened industrialists and scientists whose meetings were held when there was sufficient moonlight for making one's way along dark country roads, inspired his interior scenes illuminated by moonlight or artificial light. The family setting of the "Experiment with the Air Pump (1768)," emphasizes the egalitarian attitude that scientific concepts and discoveries could be presented to those outside the laboratory such as women and children.

We are accustomed to organizing our knowledge around central concepts which take the form of elementary truisms. The rise of industry and the rise of the bourgeoisie or middle classes are two such concepts, bequeathed to us by nineteenth-century historiography and social science to explain the modern world. The dominant view has been that a qualitative historical change took place at the end of the eighteenth and the beginning of the nineteenth centuries. This was an age of revolutions when both the “first”² industrial revolution in Great Britain and the “exemplary”³ bourgeois revolution in France occurred. No doubt there have been voices to challenge this consensus. And there has been incessant quibbling about the details. Nonetheless, the imagery of these two revolutions remains deeply anchored in both popular culture and scholarly thought.⁴ These concepts are in fact the lodestars by which we usually navigate the misty and turbulent waters of modern historical reality. Indeed, as I shall indicate, the two lodestars are but a single one.

The term “revolution” connotes for us sudden, dramatic, and extensive change. It emphasizes discontinuity. There is no doubt that this is the sense that most of those who use the concept of “industrial revolution” intend.⁵ Coleman speaks of a “comparatively sudden and violent change which launched the industrialized society,”⁶ and Landes of “a far more drastic break with the past than anything since the invention of the wheel.”⁷ Hobsbawm similarly insists: “If the sudden, qualitative, and fundamental

¹ Kerridge (1969, 468).

² See, for example, among very many others, Mathias (1969) and Deane (1979).

³ Poulantzas (1971, I, 187).

⁴ Charles and Richard Tilly put it well: “Belief in the Industrial Revolution is so widespread and tenacious among us that we may call it the principal dogma and vested interest of European economic historians” (1971, 186).

⁵ The original use of the term has been traced by Bezanson (1922, 345–346) to a comparison in 1798 with the French Revolution, a comparison that has remained implicit ever since. Williams suggests that its usage as the instituting of a new order of society rather than as mere technical change should be traced to Lamartine in the 1830s (1976, 138). It is used in this sense subsequently by Adolphe Blanqui, Friedrich Engels, John Stuart Mill, and Karl Marx (Mantoux, 1928, 25, fn. 1). Heaton suggests Arnold Toynbee took the term from Marx and put it “into academic circulation” (1932, 3).

We should note as well that contemporaries seemed little aware of the phenomenon. M. S. Anderson (1979, 192) observes that in the “best book of the time,” George Chalmers’s *An Historical View of the Domestic Economy of Great Britain and Ireland from the Earliest to the Present Times*, published in Edinburgh in 1812, there is much discussion of trade, population, and public revenues, but that “industry receives scarcely any attention.”

⁶ Coleman (1956, 20). Responding to usages of the term, “industrial revolution,” which he considers too loose, Plumb responds vigorously: “Between 1760 and 1790 it was crystal clear there were two worlds [in Britain], the old and the new. . . . Nor could the process of change be gradual. . . . Compared with the centuries which had gone before, the changes in industry, agriculture, and social life in the second half of the eighteenth century were both violent and revolutionary” (1950, 77).

⁷ Landes (1969, 42).

transformation, which happened in or about the 1780's, was not a revolution, then the word has no common-sense meaning."⁸

Of what is this revolution supposed to consist? Toynbee (to whom we owe the classic analysis of the industrial revolution as such), writing in 1884, finds its "essence" in the "substitution of competition for medieval regulations."⁹ Hartwell, writing 80 years later, defines its "essential character" somewhat differently: "the sustained increase in the rate of growth of total and per capita output at a rate which was revolutionary compared with what went before."¹⁰

The two emphases—freedom from "medieval" constraints (or social revolution) and the rate of growth (or economic revolution)—are, to be sure, not incompatible. Indeed, the heart of the traditional argument has been that the former led to the latter. But in recent years it has been the rate of growth that has been the focus of attention, with one after another factor invoked to explain it. Nor is this surprising. The continued development of the capitalist world-economy has involved the unceasing ascension of the ideology of national economic development as the primordial collective task, the definition of such development in terms of national economic growth, and the corresponding virtual "axiom . . . that the route to affluence lies by way of an industrial revolution."¹¹

The two "essential" elements—growth and freedom—remain too vague. Each must be translated into more specific concepts. Growth seems very closely linked conceptually to the "application of mechanical principles . . . to manufacturing,"¹² what the French often call "machinisme,"¹³ and the "revolution" of mechanization has usually been attributed to "a cluster of innovations in Schumpeter's sense of the term."¹⁴

⁸ Hobsbawm (1962, 46).

⁹ Toynbee (1956, 58). This emphasis on social or sociological change as the heart of "revolution" was put forward already in 1844 by Friedrich Engels: "On the surface it may appear that the century of revolution has passed England by. . . . And yet since the middle of the [eighteenth] century England has undergone a greater upheaval than any other country, an upheaval which has had consequences all the more far-reaching for being effected quietly and which is therefore more likely to achieve its goal in practice than the French political revolution or the German philosophical revolution. . . . Social revolution is the only true revolution, to which political and philosophical revolution must lead" (1971, 9).

¹⁰ Hartwell (1967a, 8). Cannadine (1984) sees four different and successive interpretations of the industrial revolution; as negative social consequences (1880–1920), as cyclical fluctuation (1920–1950), as economic growth (1950–1970), and as limit to growth (1970–).

¹¹ Deane (1979, 1).

¹² Hughes (1968, 253); see also Dobb (1946, 258) and Landes (1969, 41). Landes elaborates this into three improvements: the substitution of machines for human skill, of inanimate for animate power, and of mineral for vegetable or animal substances as raw materials. Cipolla calls this the substitution of mechanical for biological "converters" of energy (1961, 529).

¹³ See Ballot (1923). To translate "machinisme" by "mechanism" is to lose its usage as a concept.

¹⁴ Deane (1979, 106). In seeking to justify his argument that British industrialization was "unique," Mathias argues that it was unique "in the extent of the dominance of a single national economy in the crucial matrix of cheap coal, cheap iron, machine-making, power and mineral fuel technology, engineering skills." And, he adds, it was "first, and therefore unique" in that sense too (1979a, 19); cf. a similar argument of conjuncture in Rostow (1971, 33).

The argument of conjuncture is taken to its

The analysis of mechanization places the development of the forces of production in the foreground. The increase of “freedom” (or social revolution) refers, on the other hand, primarily to the relations of production: who may produce what, who may work for whom, and on what terms. Two phenomena are central to this part of the discussion: the factory (locus of concentration of the machines) and the proletarian or wage laborer (employee of the factory). The modern factory is said to have “originated in England in the last third of the eighteenth century.”¹⁵ For many authors, it is the factory, and all that it implies in terms of the organization of the work force, that is thought to be the crucial innovation in the organization of work, requiring a salaried work force. Hobsbawm insists that the industrial revolution “is not merely an acceleration of economic growth, but an acceleration of growth because of, and through, economic and social transformation.”¹⁶ The transformation refers, above all, to the rise of an urban proletariat, itself the consequence of a “total transformation of the rural social structure.”¹⁷

Much of the discussion on the industrial revolution, however, *assumes* both the processes of mechanization and the process of “liberation”/proletarianization and concentrates instead on the question: what made these processes occur “for the first time” in Great Britain, what made Britain “take off”? Take off is, in fact, an image which aptly reflects the basic model of the industrial revolution, however much Rostow’s detailed hypotheses or periodization may have been the subject of sharp debate. To this question, a series of answers, which are not by any means mutually exclusive, have been given, although various authors have insisted on the centrality of a given factor (which other authors have in turn duly contested). Placing them in an order of chronological immediacy, and

logical extreme by Wrigley. In seeking to refute the idea that “modernization” (or “rationality”) leads “ineluctably” to “industrialization” (or “sustained economic growth”), since in that case Holland which was more “modern” than England in the eighteenth century should have been the first to industrialize, Wrigley insists that the series of technical innovations were “the product of special, local circumstances,” what he terms a “happy coincidence.” It follows that “what is explained is not simply why the Industrial Revolution occurred in England earlier than elsewhere, but why it occurred at all.” He concludes on the thought that “it is quite possible for a man to have, say, a one-in-fifty chance of hitting the jackpot and yet still win it” (1972, 247, 259). This is logically similar to Hartwell’s argument that the industrial revolution must be seen “as a discontinuity in its own right rather than as a residual result of the rise of capitalism” (1970b, 10).

¹⁵ Mantoux (1928, 25), who adds that “the distinctive characteristic of the factory system is the

use of machinery” (p. 38). See also Toynbee (1956, 63).

¹⁶ Hobsbawm (1968, 34). Furthermore, this transformation was seen from the beginning as a “crisis.” Saint-Simon, in his apostrophe to the king in *Système industriel* published in 1821 wrote: “Sire, the march of events continues to aggravate the crisis in which society find itself, not only in France but throughout the large nation formed by the peoples of western Europe.” Cited in Febvre (1962, 514).

¹⁷ Saville (1969, 251). Once again the argument is that Great Britain is unique: “Nowhere save in Britain was the peasantry virtually eliminated *before* acceleration of economic growth that is associated with the development of industrial capitalism, and of the many features of early industrialization in Britain none is more striking than the presence of a rapidly growing proletariat in the countryside” (p. 250).

working backward, these are the factors of increased demand (which is said to make mechanization and proletarianization profitable), the availability of capital (which in turn makes the mechanization possible), demographic growth (which makes the proletarianization possible), an agricultural “revolution” (which makes the demographic growth possible), and a preexisting development of land-tenure patterns (which makes the demographic growth possible). Furthest in the rear, and most difficult to pin down, is a presumed attitude of mind (which ensures that there will be entrepreneurs who will take advantage of all the many opportunities this revolutionary process offers at its many junctures, such that the cumulative effect is “revolutionary”). Obviously, this chronology of factors is a bit abstract, and various authors have argued a different sequence.

Demand, as the explanation of innovation, is an old theory (“necessity is the mother of invention”) and Landes makes it central to his analysis: “It was in large measure the pressure of demand on the mode of production that called forth the new techniques in Britain.”¹⁸ But which demand? There are two candidates: foreign trade and the home market. The argument for exports centers on the fact that their growth and acceleration were “markedly greater” than those of domestic industry in the second half of the eighteenth century.¹⁹ Against this, Eversley argues that, in the “key period” of 1770–1779, it is “incontrovertible” that the export sector declined but nonetheless there was “visible acceleration” in industrialization, which reinforces the thesis that “a large domestic market for mass-produced consumer goods” is central to industrialization.²⁰ Hobsbawm suggests the inevitable compromise—both foreign trade and a large

¹⁸ Landes (1969, 77). See also Plumb (1982, 284). “After all, the new industrial methods began in the consumer industries—textiles, pottery, the buttons, buckles and pins of Boulton and Watt.” Deane argues in a similar vein: “It is only when the potential market was large enough, and the demand elastic enough, to justify a substantial increase in output, that the rank and file of entrepreneurs broke away from their traditional techniques. . . . There is no evidence to suggest that . . . the majority of producers were any more ready to innovate in 1815 than they had been in 1750” (1979, 131). Deane and Cole have, however, vacillated on the source of demand. Having located it in foreign trade in the first edition of their book in 1962, they wrote in the preface to the second edition: “Were we to write this book again today we might be tempted to take our stand on somewhat different ground, notably, for example, on the role of foreign trade in eighteenth-century growth” (1967, xv).

¹⁹ Whitehead (1964, 74). Crouzet calls the eighteenth century “the Atlantic stage of European

economic development,” asserting that, for France before the Revolution, trade with the Americas was “the most dynamic sector of the whole economy” (1964, 568). Boule adds a locus of demand not usually included. He notes that in the slave trade the assorted goods used to pay for slaves had become quite standardized. “Thus all the demand factors ordinarily identified at the beginning of the Industrial Revolution—importance of the market, standardization of merchandise, bonus for the artisan producing on schedule—were all to be found in Africa” (1975, 312).

²⁰ Eversley (1967, 248, 211); see also Bairoch (1973b, 571). Eversley places himself in the Rostow tradition, arguing that the 1770–1780 period, during which the domestic market was said to be favorable was “crucial as the ‘warming-up’ period just before the take-off [1780s] into sustained growth (p. 209). Rostow, however, *refutes* Marczewski’s arguments about eighteenth-century French economic growth on the grounds that France’s *foreign* trade was insufficient to permit take-off: “The difference between Prof.

domestic market were necessary, plus “a third, and often neglected, factor: government.”²¹

There are those who doubt that demand rose significantly. They put their emphasis rather on “supply not demand related processes.”²² For some, the question of the supply of capital has loomed large. Hamilton, in 1942, explained the “revolutionary” character of the industrial revolution by the “profit inflation” of the last half of the eighteenth century, resulting from the wage lag, the gap between the rise of prices and the rise of wages,²³ an old standby which Hamilton had previously used to explain the economic expansion of the sixteenth century.²⁴ Ashton found the heart of his explanation of the industrial revolution in “relatively cheap capital,”²⁵ coming from the fall in the rate of interest. A generation later, and after reviewing the literature covering the theme of capital formation, Crouzet would take his stand on a more modest position: the “relative abundance” of capital was a “permissive factor,” neither necessary nor inevitable, but one historically true of England in the eighteenth century.²⁶

But was fixed capital even important? There are a growing number of skeptical commentators who argue that “the capital needs of early industrialization were modest.”²⁷ In the face of these arguments, the proponents of capital’s importance have retreated to surer, because less provable, ground. “It was the flow of capital . . . more than the stock that counted in

Marczewski and him [Rostow] was a simple one. In assessing French evolution, Prof. Rostow said that he had decided . . . that the development of a modern textile industry for the home market alone did not have a sufficient scale effect to act as a basis for sustained growth. For textiles to serve that function, the lift which foreign trade gave was also necessary. This was an arbitrary judgment which led him to deny that the early nineteenth-century cotton industries in France and Germany could have acted as leading sectors in take-off” (Hague, 1963, 359).

Markovitch, Marczewski’s associate, inverts the argument, doubting that the growth of the English cotton industry in the late eighteenth century, which he admits was “exceptional,” could be “the central pivot which pulled the British industrial machine into the orbit of the Industrial Revolution,” since in 1770 cotton was only 5% of British textile production, and all textiles only 10% of the national revenue, whereas wool represented a third of British industrial production and was equally significant in France (1976a, 645). Cameron uses these same percentage figures about cotton to confront Hobsbawm’s assertion (1968, 40) that “whoever says Industrial Revolution says cotton” with the retort: “Insofar as the statement is accurate, it also reveals the inadequacy and pretentiousness of the term [industrial revolution]” (1985, 4).

²¹ Hobsbawm (1968, 42).

²² Mokyr (1977, 1005). For a critique of Mokyr and a defense of Elizabeth Gilboy’s argument of change of taste as the basis of expanded demand, see Ben-Schachar (1984). Another supply-side theorist is Davis who sees the impetus precisely in “technical change in the manufacture of cotton” (1979, 10). For the argument of technological innovations as the single, sufficient explanation of the industrial revolution, see Gaski (1982); and for devastating criticism, see Geary (1984).

²³ Hamilton (1953, 336). Landes (1969, 74) attacks Hamilton on the grounds that profit inflation was as high on the continent of Europe in that period but only Britain had the industrial revolution. See also Felix (1956).

²⁴ See Wallerstein (1974, 77–84).

²⁵ Ashton (1948, 11).

²⁶ Crouzet (1972a, 68). “Evidence of Britain’s wealth in the eighteenth century is overwhelming” (p. 40). Crouzet also agrees that there were in this period “extremely high net profits” (1972b, 195; cf. Pollard, 1972a, 127–129).

²⁷ Hartwell (1976b, 67). Chapman also uses the word “modest” (1970, 252). Pollard says the speed of growth of fixed capital has been “often exaggerated” (1972a, 143). See also Bairoch on the low capital costs involved (1974, 54–65).

the last analysis.”²⁸ A variant on this theme is the suggestion that what mattered was not a change in the “relative size” of capital stock (that is, the size “relative to the national income”) but the change in the “content of the capital stock,” that is, the diversion of investment “from traditional to modern forms of capital accumulation.”²⁹ Emphasis on the flow of capital leads immediately to a concern with credit facilities. A standard view is that Great Britain differed from other countries precisely in the amount of credit facilities available to industry.³⁰ This view, of course, assumes that capital investments were limited by frontiers. Lüthy, however, believes that, already in the mid-eighteenth century, western and central Europe constituted a “zone of exchange” characterized by “ease in banking transactions and the flow of capital” and speaks of the virtual absence of obstacles to this flow.³¹

Another group of authors gives pride of place to demographic shifts. Population growth presumably provided both the demand for industrial products and the work force to produce them. Britain’s “unprecedented growth of population”³² is said to be particularly remarkable because it was sustained, long term, and went along with a growth in output.³³ Plumb adds the twist that the key element was the survival of more children of “middle and lower middle class” parents, for “without a rapidly expanding lower middle class with sufficient education and technical background, the Industrial Revolution would have been impossible.”³⁴

²⁸ Landes (1969, 78). He seems to feel this thrust will hurt primarily the Marxists. “So much,” he adds, “for the preoccupation with primitive accumulation.”

²⁹ Deane (1973b, 358–359). Insofar as this means a shift from investment in land to investment in industry, Crouzet’s caution is salutary: “Landlords put their power of borrowing on the security of their estates at the disposal of transport improvements. But, as far as industry is concerned, one is tempted to keep to Postan’s view that ‘surprisingly little’ of the wealth of rural England ‘found its way into the new industrial enterprises’” (1972a, 56). The reference is to Postan (1972) who argues that “apart from the inner circle of merchants and financiers, the habit of investing has grown only in the nineteenth century” (p. 75).

Crouzet also notes that “in the eighteenth and even at the beginning of the nineteenth century, [agriculture, transport, and building] absorbed much more capital than was invested in British industry” (1972b, 163).

³⁰ See Gille: “[Credit facilities] were much lower on the continent, perhaps because the larger banks . . . got a larger proportion of their profits from government financing” (1973, 260). Chapman, however, does not believe that capital was all that

available from the banks for the English cotton industry. “All indications are that before the advent of the joint-stock banks and the coincident spread of acceptance houses [in the 1830s], the institutional support for northern manufacturers was weak” (1979, 66).

³¹ Lüthy (1961, 25). Morineau similarly argues about investment patterns in eighteenth-century Europe: “Capitalism didn’t worry about frontiers” (1965, 233).

³² Deane & Cole (1967, 5).

³³ See Deane (1979, 21). Habakkuk observes: “The growth [in English population] which started in the 1740’s was not reversed. It was not only not reversed; it accelerated” (1971, 26).

³⁴ Plumb (1950, 78). Krause provides the accompaniment of the reassuring hypothesis that the “poorer groups” possibly had the lowest reproduction rates, unlike the situation in the contemporary peripheral countries where they have the highest. He admits the assertion is on “treacherous ground” but argues that had the Western poor not limited the size of families, following closely it seems the good advice of Pastor Malthus, “it is difficult to see how the West could have avoided the poverty which is found in India today” (1969, 108). Thus, from theory, we infer empirical data.

There are, however, two questions to be posed: was there really a demographic revolution, and what in fact caused the rise of population (which, of course, then bears on whether it is cause or consequence of the economic changes)? The question of the reality of the demographic revolution is in turn two questions: were the changes “revolutionary” in relation to what went before and after, and was the pattern in England (or Great Britain) significantly different from that in France and elsewhere? Given a curve which is logarithmic, some authors see no reason to designate the late eighteenth-century segment as somehow singular.³⁵ To be sure, the rate of population growth in the second half of the eighteenth century was greater than in the first half. But it has been argued that it is the first half which was exceptional, not the second. Tucker argues, for example, in the case of England, that “the growth of population over the eighteenth century *as a whole* was not very much more than an extrapolation of earlier long-run trends would have led us to expect.”³⁶ Morineau makes exactly the same point for France. The demographic growth at the end of the eighteenth century was not revolutionary but should be considered more modestly as “a renovation, a recuperation, a restoration.”³⁷ And Milward and Saul reverse the argument entirely in France’s favor. The French population pattern was the unusual one (because its birth rate went down before or simultaneously with the reduction of the death rate). “But in the circumstances of nineteenth-century development a more slowly growing population made increases in *per capita* incomes easier to achieve and thus gave the French advantages rather than disadvantages in marketing.”³⁸

Even, however, if the population rise (uncontested) were not to be considered revolutionary, and even if it were not necessarily peculiar to England, the “core of the problem”³⁹ remains whether the population growth was the result of the economic and social changes, or vice versa. “Did the Industrial Revolution create its own labor force?” as Habakkuk puts it.⁴⁰ To answer this question, we have to look at the debate concerning whether it was a declining mortality rate or a rising fertility rate that accounts for the demographic increase. For the majority of analysts, there seems little doubt that the declining mortality rate is the principal explanation, for the very simple reason that “when both rates are high it is very

³⁵ See McKeown: “Since the modern rise [of population since the late seventeenth and early eighteenth centuries] is unique [in its size, continuity, and duration], it is quite unsatisfactory to attempt to explain separately its initial phase” (1976, 6). For Garden, the late eighteenth- and early nineteenth-century demographic pattern was that of “a very slow evolution, not a revolution,” the true revolution occurring in “the second half of the twentieth century” (1978d, 151, 154).

³⁶ Tucker (1963, 215).

³⁷ Morineau (1971, 323).

³⁸ Milward & Saul (1973, 314).

³⁹ Drake (1969, 2).

⁴⁰ Habakkuk (1958, 500). Habakkuk’s own answer was that “the most reasonable interpretation of the increase in agricultural output in the late eighteenth century is that it was a *response* to the growth of population rather than the initiator of that growth” (1971, 33).

much easier to increase the population by reducing the death-rate than by increasing the birthrate,"⁴¹ and of course when both are low the reverse is true.

Why then would the death rate decline? Since a death rate that is high is "chiefly attributable to a high incidence of infectious diseases,"⁴² there are three logically possible explanations for a reduced death rate: improved medicine (immunization or therapy), increased resistance to infection (improvement in the environment), or decline in virulence of the bacteria and viruses. The last may be eliminated if there is reduced mortality from multiple diseases simultaneously (which there seems to have been), since it is not credible that all of them could be due to "fortuitous change in the character of the [disease-causing] organisms."⁴³ This leaves us with the true debate: better medicine or a better socioeconomic environment. Better medicine has long been a favorite explanation. It still has its strong defenders, who give as the most plausible explanation of declining mortality rates "the introduction and use of inoculation against smallpox during the eighteenth century."⁴⁴ This thesis has been subjected to a careful and convincing demonstration that the medical influence on the death rate was rather insignificant until the twentieth century and can scarcely therefore account for changes in the eighteenth.⁴⁵ By deduction, this leaves us with the conclusion that it must be "an improvement in economic and social conditions" that led to demographic expansion and not vice versa.⁴⁶

The role of fertility has received a major boost in the monumental population history of England by Wrigley and Schofield. They see a rising fertility rate via the lowering of the percentage of non-marriers. This is tied to a model in which the increased availability of food is the key ingredient in a process that leads to the possibility of founding a household. Their data are over a very long period (1539–1873), in which they find that, except for a short interval (1640–1709), births, deaths, and marriages all increase but there are consistently more births than deaths. Thus they seem to be arguing a long-standing pattern of English demographic history. Yet they also wish to argue that somewhere between the early eighteenth

⁴¹ McKeown & Brown (1969, 53).

⁴² McKeown & Brown (1969, 53).

⁴³ McKeown (1976, 16).

⁴⁴ Razzell (1969, 134). The key argument is that since the English middle and upper strata also show a rise in their life expectancy, "an explanation in terms of increased food supplies is inappropriate." In a later article, Razzell (1974, 13) makes his argument more general: "It was an improvement in personal hygiene rather than a change in public health that was responsible for the reduction in mortality between 1801 and 1841."

See also Armengaud (1973, 38–43), who, however, believes this factor was combined with

higher agricultural productivity which led to better-fed populations, more resistant to disease.

⁴⁵ The disease-by-disease analysis is to be found in McKeown (1976, 91–109). He admits that hard data are only available after 1838, but argues that if this data show that "immunization and therapy had little influence on the trend of mortality in the hundred years after [1838 in Great Britain], it would seem to follow that they are very unlikely to have contributed significantly in the century that preceded it" (p. 104).

⁴⁶ McKeown & Record (1962, 122). See also Bairoch (1974, 30), Le Roy Ladurie (1975, 386–390), and Post (1976, 35).

century and the late nineteenth century England broke with the “preventive-check cycle” and the link between population size and food prices.⁴⁷

In addition to the contradiction in the Wrigley and Schofield logic (a long-standing pattern as explanatory versus a break in a pattern as explanatory), there is the further problem of reconciling their emphasis on increases in marriage rate (and/or lowering the marriage rate) as explanatory of economic “take-off” with the directly opposite argument by Hajnal. Hajnal has argued that there is a unique western European (note: *not* English alone) marriage pattern as of the first half of the eighteenth century which consists of a later marriage age and a high proportion of non-marriers. Hajnal finds that it is this pattern of *lower* fertility (lasting until the twentieth century) which serves economic development by “stimulating the diversion of resources to ends other than those of minimal subsistence.”⁴⁸

One last demographic factor, less frequently discussed but probably of great importance, is the increase in population transfer from rural peripheral zones in Europe to urban and industrializing areas. But this is, of course, the result both of increased employment opportunity and improved transportation facilities.⁴⁹

Increasing attention has been drawn in recent years to changes in the

⁴⁷ For the periodization, see Wrigley & Schofield (1981, 162); for the change in demographic pattern, see p. 478. On p. 245, they seem to date the moment of change more precisely as 1751, after which they say there was a clear “dominance of fertility in changing the intrinsic growth rate.”

Goldstone seeks to modify this thesis a bit, by arguing that, whereas in the sixteenth century it was the increase in the numbers of those who married that accounted for increases in fertility, in the period 1700–1850, it was primarily the lowering of the marriage age. “What was crucial was that in England industrialization and the growth of markets for foodstuffs occurred in the context of an agricultural sector that was already significantly proletarianized, and becoming more so” (1986, 28).

Another argument for emphasis on increased fertility is drawn from the presumed Irish example of earlier marriages as of the 1780s due to the earlier and more extensive “settlements” on young rural adults, due in turn to a shift from pastoral to arable cultivation. See Connell (1969, 32–33). The shift to arable cultivation is, of course, a consequence itself of the expansion of the world-economy, as Connell himself recognizes: “By [the 1780s], *because of* the growth of England’s own population she was no longer an exporter of corn and she could look with less jealousy upon its production in Ireland.”

Drake is skeptical, however, on the whole age of

marriage argument in the Irish case, because of the possibly inverse relationship of male and female ages at marriage. He prefers to credit the spread of potato cultivation (1963, 313). Connell indeed does not rule this explanation out: if our “insecure statistics” err and the population increase in fact began in the 1750s or 1760s, “it may well have followed hard upon the generalization of a potato dietary” (1969, 38).

Even if Ireland were in fact characterized in the early eighteenth century by a high death rate and low birth rate, McKeown and Brown doubt that a population rise could be explained by a lowered age of marriage. They point out that if an older husband in times of late marriage take a younger wife, the impact of an earlier marriage date (for the male) may be small. They point out furthermore that the greatest alleged difference is in the number of children per family, but that a high death rate, which increases with the size of the family, would have a counteracting effect (1969, 62). And Krause adds that, on the other hand, “even late marriage can lead to exceedingly high birthrates” (1969, 108).

⁴⁸ Hajnal (1965, 132).

⁴⁹ Le Roy Ladurie makes this point in terms of the migration of people from Auvergne and the Pyrenees to Paris and other northern cities in the eighteenth century (1975, 407), and Connell argues the same for Irish migration to England (1950, 66).

agricultural sector as a prelude to and determinative of changes in the industrial sector. (That such an emphasis has implicit policy directives for contemporary peripheral countries is not without a link to the increased concern and is often explicitly stated.) In addition to the industrial and demographic revolutions, we are now adjured to locate and explain the agricultural revolution. This turns out to be a big topic. First of all we must remember that, even for Great Britain and even through the whole of the first half of the nineteenth century, "agriculture was the premier . . . industry."⁵⁰ Therefore, if there is to be any meaning to the idea that an economic revolution occurred and in particular that there was an agricultural revolution, there must have been somewhere, and for the total of some entity, an increase in yield. We immediately run into the question of whether we mean yield per hectare cultivated (which in turn may mean yield per seed input, yield per unit of labor input, or yield per capita) or total yield. There seems little doubt that total arable production went up in the European world-economy as a whole in the 100 years that span the eighteenth and nineteenth centuries.⁵¹ If, however, there was a transfer of part of the work force from arable production to other kinds of production (and in particular to industry), then there must have been, it is argued, either an increase in yield per seed input or in yield per unit of labor input (combined with an expansion of the cultivated area).⁵² If there was, furthermore, an improvement in the general standard of living, it is argued, then there must have been an increase in yield per capita. There is no necessary reason, however, why an increase in yield per capita need accompany an increase in yield per seed input or labor input, and it is the latter two which are defining elements of an expansionary period of the world-economy.

Might an increase in yield have come about through the mechanization of farm implements? While there seems to have been some increase in the use of iron in plows (and horseshoes for horses),⁵³ it can scarcely be argued that there was significant mechanization of agriculture before the nine-

⁵⁰ Deane (1979, 246).

⁵¹ For example, Slicher van Bath suggests that this whole period constituted "a time of agricultural boom" (1963, 221) in terms of overall price levels (despite the relative decline after 1817), of expansion of cultivated area, and of new methods.

⁵² See, for example, Bairoch (1974, 83), who sees an increase in agricultural productivity as not merely "the determining factor in the initiation of industrialization," but as something which in turn requires the beginning of these processes. Wyczński and Topolski, however, specifically deny the need for increased agricultural productivity to free labor for industry given the "considerable latent reserve of labor force" in the countryside (1974, 22).

⁵³ The strongest case is made by Bairoch (1973a,

490–491), who argues that these usages of iron plus the increased number of plows in use (resulting from the extension of land clearance and the diminution of fallow) account for a significant increase in the overall demand for iron.

⁵⁴ O'Brien asserts that, in general, "mechanization in farming proceeded more slowly than mechanization in industry because agricultural operations are more separated in time and space than industrial processes" (1977, 171). Deane says that, even for England, "we can find nothing to suggest that there was a substantial increase in the stock of farming capital or in the rate of agricultural capital until the end of the eighteenth century; and even then the expansion appears to have been modest in relation to the growth of agricultural incomes at this period" (1972, 103). Indeed, Deane attributes

teenth century.⁵⁴ The advances came primarily through the more intensive cultivation of the soil by the use of fodder crops.⁵⁵ There were two main systems, that of alternate husbandry (called at the time the “Norfolk system”) and that of convertible husbandry (or ley farming). Both variants eliminated the need for fallow by using the roots (turnips, potatoes) to eliminate weeds and the grasses (clover, sainfoin, ryegrass) to nutify the soil.⁵⁶ The resulting continuous cropping permitted livestock to have food in winter with their manure serving as an additional nutrient to the soil.

Neither system was new, but the late eighteenth century was a moment of considerable expansion of their use. While, no doubt, these systems made great headway in England, it is doubtful whether this can be said to be exceptional. Slicher van Bath speaks of a “general shift from three-course rotation . . . to convertible husbandry” in western Europe after 1750 in response to higher wheat prices.⁵⁷ What was nonetheless new in this spread of the use of fodder crops was that it permitted the shift to increased arable production without the sacrifice, as previously, of pasturage.⁵⁸

Even this advance, if analyzed as output per capita, has been challenged by Morineau. He argues that a significant increase in yield occurred only in the mid-nineteenth century.⁵⁹ He sees agricultural “progress” in the late eighteenth century, no less than previously, as obeying a “logic of poverty.” Crop innovation tended, he argues, to coincide with conjunctural declines in living standards. These phases of decline were attended by food

to the limitations of agricultural mechanical technique the fact that until the middle of the nineteenth century, most of the new techniques “were suitable only to the light sandy soils” and it was not yet possible “to drain the clay soils and the fens” (1979, 41). Chambers and Mingay also minimize the role of mechanical innovation and point out that Jethro Tull’s famous drill which permitted constant tillage, although “described . . . in 1733, and with a long history before that, was not generally used for sowing corn before well into the nineteenth century” (1966, 2).

⁵⁵ See Timmer: “The leguminous crops not only increased soil fertility directly but supported larger herds of livestock which produced more, and richer, manure” (1969, 382–383).

Slicher van Bath, however, reminds us that “more intensive cultivation does not necessarily mean a higher yield” (1963, 245), but he means here yield per seed input. It is still possible to get greater yield per hectare cultivated by reduction of fallow. In terms of yield per seed input, it was possible also to get greater output through heavy manuring which, however, had previously to be brought in largely from the outside and was, therefore, too expensive by and large.

⁵⁶ The difference between the systems was that alternate husbandry could be used only on light

soils. On heavier (but still well-drained) lands, it was necessary to avoid root-break and to keep the pasture down (a ley) for a number of years. On wet and cold clays, neither system would work, until the development of cheap underdrainage in the mid-nineteenth century. See Chambers & Mingay (1966, 54–62), and Deane (1979, 38–42).

⁵⁷ Slicher van Bath (1963, 249–250). “The Norfolk system, in different forms, was followed by enlightened landowners in various European countries at the end of the eighteenth century and the beginning of the nineteenth” (p. 251).

⁵⁸ Chambers and Mingay say that the new husbandry broke medieval farming’s “vicious circle of fodder shortage which led to soil starvation” (1966, 6).

⁵⁹ See Morineau (1971, 68–87). He endorses the view of Ruwet that a critical prerequisite of yield per seed input was the development of chemical fertilizer (p. 69, fn. 129). He proceeds, however, to doubt Ruwet’s view that yield per capita went up since the mid-seventeenth century by the increase of quantity of seed sown (presumably made possible primarily by reduction of fallow). Similar doubts on the increase in yield per labor input of the Norfolk system are to be found in Timmer (1969, 392), who sees, however, some increase in yield per seed input.

shortages, and the crop innovations “contributed to maintaining them.”⁶⁰ While Morineau’s analysis centers on the French data, and he accepts the argument that England had certain advantages over France, he doubts that even England had “a substantial increase in productivity” before 1835.

The take-off of the Western economy did not plunge its roots in an ‘agricultural revolution.’ Is not this latter concept, inappropriate to designate, even in the case of England, such a somnolent progress, frightened away at the first frost?⁶¹

Even if the changes in husbandry could be said not to have resulted immediately in any dramatic increase in yield per capita, might not the changes in the social relations of production on the land have been an essential element in the process of industrialization, either because they made available manpower for industrial work (through higher yield per labor input, permitting intersectoral labor flows, or through greater total yield, permitting demographic expansion) or because they were a prerequisite to the technical innovation which would eventually lead to higher yield per seed input, or, of course, both? Was not, in short, enclosure a key element in the whole process?

There are three separate, not inevitably linked, processes that are discussed under the heading of enclosure. One is the elimination of “open fields,” the system which transformed individual units of arable production into common grazing land between harvest time and sowing time. The second is the abolition of “common rights,” which were the equivalent of open fields on the land that was harvested by the lord of the manor, or were “waste lands” (waste, that is, from the point of view of arable production). Both of these changes reduced or eliminated the ability of the person who controlled little or no property to maintain livestock. The third change was the consolidation of scattered property, necessary to realize the economies of scale which the end of open fields and common rights made possible.

Enclosure presumably made mixed husbandry more profitable, both by increasing the size of the units and by protecting those who planted fodder crops against free riders.⁶² The prime object of the landlords was “the

⁶⁰ Morineau (1971, 70–71; see also 1974b, 355). When Le Roy Ladurie describes the diversification in Lourmarin of agricultural production (no longer wheat alone; on the eve of the French Revolution, half the land was devoted to vineyards, orchards, mulberries, gardens, and irrigated leys), he explains: “There it is, the true agricultural revolution, adapted to the conditions of the French Midi” (1975, 402). Morineau criticizes this specific exclamation, accusing Le Roy Ladurie of “seductive reasoning” which has an insecure quantitative basis

and which “interprets, extrapolates, and is involuntarily circular” (1978, 383). Le Roy Ladurie responds in kind. He says that Morineau’s work is “paradoxical and brilliant” but still wrong: “I do not think, in fact, one can deny the agricultural progress of the eighteenth century” (1978, 32). All revolves, as we shall see, around what is meant by progress. Le Roy Ladurie tends to the view that inequalities diminish whereas Morineau sees them as increasing.

⁶¹ Morineau (1971, 76, 85).

increase in rents resulting from the technical improvements which were facilitated by enclosure and consolidation.”⁶³ Whether in fact enclosures did achieve increased yield is, however, less clear. Chambers and Mingay, who claim that enclosure was the “vital instrument” in greater output, nonetheless admit that the evidence for eighteenth-century England is at best “circumstantial.”⁶⁴ O’Brien is even more skeptical. “There can no longer be any easy presumption” that the massive enclosures between 1750 and 1815 “had any really significant impact on yields.”⁶⁵

Enclosures, of course, started long before 1750. What accelerated their pace and visibility was the new role of Parliament in Britain in the process.⁶⁶ It is this political intervention which accounted for the “massiveness” of the development. Still, it would be an error to believe that Britain alone was enclosing. The careful analyses of Bloch indicate that considerable enclosure of one form or another had occurred in France, and that there too it accelerated after 1730.⁶⁷ In fact, the relative expansion of what Bloch calls “agrarian individualism” was a Europe-wide phenomenon in the eighteenth century.⁶⁸ If the success of the movement was greater in Great Britain than on the continent, the difference was clearly in the strength of the state machinery in Britain which offered the large landlords weapons that were less available in France, both before and after the French Revolution.⁶⁹

⁶² On the increase of size of unit, see Chambers & Mingay (1966, 61). But Yelling says that “the environments favorable or unfavorable to large-scale farming do not correspond in distribution to regions of enclosure” (1977, 97). On the free rider problem, see Fussell (1958, 17).

⁶³ Doving (1966, 628).

⁶⁴ Chambers & Mingay (1966, 34, 37).

⁶⁵ O’Brien (1977, 170). This is given some confirmation by the estimate of Deane and Cole that “it would appear that output per head in British agriculture increased by about 25 percent in the eighteenth century, and that the whole of this advance was achieved before 1750” (1967, 75). They even add in a footnote that “it would appear that agricultural productivity may actually have fallen in the third quarter of the century and recovered thereafter.”

⁶⁶ See Mantoux (1928, 170–172). E. L. Jones suggests the history of enclosure was more gradual than generally acknowledged because of the exclusion from consideration of enclosure by agreement. “The apparently rapid upswing represented by the parliamentary enclosures of the second half of the eighteenth century would not be steam-rolled out of existence by the inclusion of other evidence, but it would be somewhat flattened” (1974b, 94). Yelling similarly suggests that a considerable amount of engrossment of common fields had occurred in the late seventeenth and early eighteenth centuries.

He denies wishing to replace the post-1760 period with the earlier one as the “decisive and revolutionary era that broke with the medieval past.” Rather, he argues, “it is unlikely that such an apocalypse ever occurred” (1977, 111).

⁶⁷ “In a large number of provinces—Champagne, Picardy, Lorraine and the Three Bishoprics, Bourgogne and Bresse, Franche-Comté, Berry, Auvergne, Toulousain, Béarn—beginning in the sixteenth and seventeenth centuries, but especially from about 1730, successive temporary measures were taken such that, each time there was a drought, a frost, or floods, the access to open fields (*la vaine pâture sur les prés*) before the second growth of grass was, if not always abolished, at least restricted in the subsequent year” (Bloch, 1930, 341). See also page 332 for a discussion of the various kinds of enclosure gradually established in various areas.

⁶⁸ “The movement was general, because it responded both to a doctrine that was professed everywhere and to needs, more or less clearly felt, by the most powerful elements among those who cultivated the land” (Bloch, 1930, 511).

⁶⁹ “Faced with enclosure, the village [in Britain] had no choice; Parliament having decided, it simply had to obey. In France, the strong constitution of peasant tenure seemed incompatible with such rigor” (Bloch, 1930, 534).