BUSINESS MANAGEMENT IN ENGLAND DURING THE PERIOD OF EARLY INDUSTRIALIZATION: INDUCEMENTS AND OBSTACLES

R. M. HARTWELL*

I

A major interest of economists since 1945 has been to measure, or at least to rank, the relative contributions to economic growth of increasing inputs of the productive factors on the one hand, and of increasing efficiency on the other. When M. Abramovitz in a famous article[1] showed that most of the increase in net product per capita in the United States since 1870 was the result of inputs *other than* inputs of physical capital stock and the services of labor, he started "the great *Residual* hunt," the search for those factors which raise productivity rather than those which expand resource inputs. And although his and the many other studies of growth which now exist have used unreliable statistical data processed under assumptions of heroic simplicity, their conclusions are the same: for the period of modern statistics, i.e. since the third quarter of the ninteenth century, increases in per capita product have been the result of increasing the efficiency rather than the volume of resources.[2] Unfortunately the economists have failed to identify conclusively the constituent elements of the Residual, although some have argued persuasively for technical progress and investment in human capital.[3]

Historians have not had the disadvantage, in seeking the sources of increasing output over the ages, of the intellectual straitjacket of a preposterously simple growth model, and so have long recognized the growth roles of both resource inputs and improved pro-

* R. M. Hartwell is Professorial Fellow of Nuffield College, Oxford, and Visiting Professor of Economics, University of Virginia (1969). Mr. Hartwell is the author of a number of articles on the English industrial revolution, and edited *The Causes of the Industrial Revolution in England* (London, 1967). He is the author, also, of articles on Australian economic history, and of *The Economic Development of Van Dieman's Land, 1820–1850* (Melbourne, 1954). From 1957 to 1969 he has been an editor of *The Economic History Review*.

[1] "Resource and Output Trends in the United States since 1870," *American Economic Review*, XLVI, No. 2 (1956), pp. 5–23.

[2] See, particularly, the work of S. Kuznets, J. W. Kendrick, S. Fabricant, E. Denison, etc.

[3] R. W. Solow, "Technical Progress, Capital Formation and Economic Growth," *American Economic Review*, LII, No. 2 (1962), 76–86) and T. W. Schultz, "Investment in Human Capital," *ibid.*, LI (1961), pp. 1–17.

ductivity. As K. F. Helleiner pointed out in 1946: "It would be difficult to decide whether man in the course of history has achieved more through making additions to his land, or through improved utilization of his available soil."[4] However, over much of history, when economic organization and technology were relatively static, and when the dominant economic activity was agriculture, output was expanded mainly by increases of population and by the colonization of new land; by having more people, with the same simple tools, till more land. There were occasionally significant improvements in the efficiency of production, such as that marked by the invention of agriculture, but the industrial revolution was a major turning point in the history of increasing output, after which increasing efficiency became generally more important than increasing resource inputs. Before this, as the slow growth of output attests, it was usually inputs which were more important. And on the industrial revolution the historians, although as a collectivity they have had an eclectic explanation of the rise of English output, have emphasized, realistically, the increasing efficiency of the economy: the attention given to increasing inputs (more land cultivated, more minerals mined, more labor employed, more capital equipment) has been far less than that given to analysis of the productivity gains of transferring production from the home or the workshop to the factory (and thus, generally, of substituting power-driven improved metal machinery for handworked primitive wooden machinery), and of centralizing ownership and management in the person of the capitalist-entrepreneur. These changes have been summed up, by the historians, in the phrase "the factory system."

"The factory system," wrote P. Mantoux, "concentrates and multiplies the means of production so that the output is both accelerated and increased. The manufacturer, being at the same time a capitalist, a works manager and a merchant, sets a new pattern of the complete business man."[5] "The manufacturer" was a new type of business organizer; "the factory" was a new type of business organization. This was recognized by contemporaries, and subsequently by historians, who for long have lavished praise on the great industrial revolution entrepreneurs, especially the great technical innovators. The emphasis has been, however, on technology; on the role of the new manufacturers as organization-inno-

[4] *Readings in European Economic History* (Toronto, 1946), p. 29.

[5] P. Mantoux, *The Industrial Revolution in the Eighteenth Century* (London, 1928, English Edition), p. 386.

vators there has been reticence or silence; attention has focused on the machine, rather than on the factory which housed it. Technical change has been described in great detail; organizational change has been discussed, and then only briefly, in terms, usually, of the advantages of the economies of scale. And the gains of scale have been seen, not so much as the explicit gains of managerial competence, but rather as the windfall gains of machine technology. For example, it is obviously important to think of the invention of the factory as a crucial step in the industrialization of England. However, although there has been some discussion of early factories, the pioneering importance of John and Thomas Lombe, who in 1719 built the first modern textile factory of the industrial revolution, is barely recognized, although there is one short article on them.[6]

Economists now recognize the central role in economic change of the entrepreneur, and also explain productivity differences between factories, industries, and economies partly, at least, in terms of managerial-organizational differences.[7] Historians have not been so explicit. Organization is certainly more difficult to describe than machinery, and the evidence which historians have to demonstrate its changing character is elusive and difficult to interpret. For these reasons, management has been discussed rarely (with one notable exception) as a subject in its own right; rather it has appeared at a highly generalized level, or in terms of particular managerial problems. At the elevated level of the stage-builders, for example, "the factory system" has been seen as one of an orderly sequence of evolutionary stages of organization; and, to those who divide history into periods, each characterized by a distinctive ethos or spirit, the factory emerged in the period of "economic rationality" and "individualism." More typical, however, has been the discussion of *problems of management and organization:* in particular, the two problems of capital accumulation and industrial relations have received considerable attention from the historians of the industrial revolution. Capital accumulation has been linked with management through the importance of abstinence and the plough-

[6] "Sir Thomas Lombe (1685–1739) and the British Silk Industry," in W. H. Chaloner, *People and Industries* (London, 1963), pp. 8–20. Also see Mantoux, *op. cit.*, p. 198.

[7] As C. P. Kindleberger (*Economic Development*, 2nd ed., New York, 1965, p. 118) notes: "in modern Egyptian factories, technologically the equal to those in the United States, labour productivity is one-sixth to one-fourth that of the United States, a difference attributed to differences in the quantity and quality of organization."

ing-back of profits, both managerial qualities for success in this period. The problems of industrial relations have been seen mainly as problems of labor recruitment and training, and have been considered more as the province of the history of labor, as part of "the making of the English working class,"[8] than as part of the history of management. Only S. Pollard has placed both problems in the explicit context of a long and detailed account of "the genesis of modern management." But Pollard's conclusion is surprising: "Perhaps the most important conclusion to emerge is that 'management' . . . , though not a barrier to progress, yet could not be shown to have been an initiator of change either. The pragmatic discovery of new methods was no doubt adequate, but management appears everywhere to have adapted itself merely to the needs of technology, discipline or financial control. Among the many competing explanations there can surely nowhere be a managerial theory of industrial revolutions."[9] Such a conclusion contrasts not only with what economists have discovered about modern growth, but also with Pollard's own detailed account of management problems during the industrial revolution and how they were solved.

It is difficult, certainly, to separate technical progress from capital accumulation during the industrial revolution, and technical change almost invariably involved changed organization; to this extent the decision to invest automatically involved decisions also about organization. But that these latter decisions were important should be obvious: the very high failure rate among the early industrialists can be explained, not so much in terms of differences in the quality of labor or of machines, but more in terms of differences in the quality of management.[10] It is important to remember also that during the English industrial revolution, more than in any subsequent industrialization, the one man often combined two or more of the roles of capitalist, inventor, innovator, and manager, so that high success demanded wide ability. Richard Arkwright is an outstanding example of technical and managerial innovator. As R. S. Fitton and A. P. Wadsworth affirm, "The decision to go to Cromford and apply water power to machinery still far from per-

[8] The title of an important book by E. P. Thompson.

[9] S. Pollard, *The Genesis of Modern Management: A Study of the Industrial Revolution in England* (London, 1965), p. 271.

[10] H. Burgess (*Parliamentary Papers*, 1836 (465) viii, part 2, p. 365) reckoned about industry generally that between 1819 and 1836, 9 out of 10 of the great manufacturing works had changed hands. R. Baker, the factory inspector, (*ibid.*, 1847 [779] xv, letter of 7 November, 1846) estimated that of 318 firms in his district in 1836, only 127 were still in operation in 1846.

fect was one of the turning points in the history of the factory system."[11] At Cromford, Arkwright built a factory for his own newly-invented machinery, created a new type of community (the cotton factory village), and managed both with such success that he became wealthy and famous and was widely imitated. Where one great innovator led, others followed, and it was the host of imitators, with roughly the same spectrum of advantages and disadvantages, who constituted the ongoing impetus to the industrial revolution. Whatever the qualities of the initiators of change, the success of imitators was more dependent on good management than on the machines and laborers they so assiduously tended with such varying results.

II

The context of this inquiry into the development of business management in the period of early industrialization is in terms of "inducements and obstacles;" i.e. in the now common context of discussion about contemporary underdevelopment in terms of "obstacles to industrialization."[12] Having established the importance of management and organizational change as a factor in England's industrial revolution, it is necessary to ask what determined the supply of entrepreneur-managers, and whether or not entrepreneurs were seriously limited in their activities by social and economic restraints? Was there a shortage of entrepreneurs? What were the inducements to enterprise? Were entrepreneurs faced with formidable obstacles? Is it possible to draw a balance sheet of inducements and obstacles? On the supply of entrepreneurs it is doubtful that any argument, or proof, can be produced to demonstrate shortage. "They came," as Charles Wilson has argued, "from every social source and every area."[13] They flourished, and failed, in every variety of enterprise. "Like a newly discovered gold mine," Mantoux wrote, "the factory system attracted men from all over the country."[14]

[11] R. S. Fitton and A. P. Wadsworth, *The Strutts and the Arkwrights* (Manchester, 1958), p. 98. See, also, J. P. Addis, *The Crawshay Dynasty* (Cardiff, 1957), for an interesting account of the evolution of an innovating manufacturing family, with origins in merchanting.

[12] For example, *Processes and Problems of Industrialization in Under-Developed Countries* (United Nations, New York, 1955).

[13] Charles Wilson, "The Entrepreneur in the Industrial Revolution," *The Experience of Economic Growth*, ed. B. E. Supple (New York, 1963), p. 182.

[14] P. Mantoux, *The Industrial Revolution in the Eighteenth Century*, *op. cit.*, p. 376. See, for a particular industry, an account of the varied social origins of the ironmasters of the eighteenth century by T. S. Ashton (*Iron and Steel in the Industrial Revolution*, Manchester, 1924, pp. 209 *et seq.*).

But what of the environment in which they strove and competed? In a very general way historians have argued that there is a functional relationship between entrepreneurship and the social structure and value-system of the society in which they live and work. The argument is that some societies are more encouraging to enterprise than others. As A. Gerschenkron has written: "The theoretical formula is persuasively simple: social approval of entrepreneurial activity significantly affects its volume and quality."[15] Certainly the socio-political environment of eighteenth century England was a favorable one for entrepreneurial endeavor. Generally, as Witt Bowden has pointed out, entrepreneurs were held "in high esteem;" and the great industrialists were men of "great wealth and opulence, and of great power and influence arising from that wealth and opulence," and men whose status and importance was recognized and rewarded.[16] The century and a half between 1700 and 1850, also, was a period of great social mobility, when humble men of talent could aspire to, and attain, riches and social prestige, and even a title. As E. W. Gilboy has written, "the changing economic structure occurring with widespread development of factories enabled many of [the working classes] to assume positions of responsibility in the industrial world."[17] There was, as Leslie Stephen argued, "the absence of . . . sharp lines of demarcation between classes and of . . . exclusive aristocratic privileges;" the men who were "the chief instruments" of the industrial revolution were "self-made" and "owed nothing to government or to the universities which passed for the organs of national culture;" they sought and gained political power and became "the backbone of the Whig party when it began to demand a serious reform." Stephen concluded that, "There is probably no period in English history at which a greater number of poor men have risen to distinction."[18]

What, however, of the economic environment? The ability of entrepreneurs to effect a successful transformation of the economy depended basically on an increasingly efficient market which enabled economic behavior, whether by consumers or producers, to be rationally "satisfied" or "rewarded," and hence to be encouraged.

[15] A. Gerschenkron, *Economic Backwardness in Historical Perspective* (Harvard University Press, 1966), p. 59

[16] Witt Bowden, *Industrial Society in England towards the End of the Eighteenth Century* (London, 1965, 2nd edition), pp. 22, 160–61.

[17] E. W. Gilboy, *Wages in Eighteenth Century England* (Harvard University Press, 1934), p. 243

[18] Leslie Stephen, *The English Utilitarians* (London, 1900), Vol I, *Jeremy Bentham*, pp. 21, 61, 63, 111–12.

Obviously fundamental to market development was the increasing and more general economic rationality of behavior; i.e. a maximizing behavior towards work and wealth by an increasing number of people. However, while rationality, particularly its association with the Reformation and protestantism, has been exhaustively, if not conclusively, debated, the equally important physical development of the market (in terms of communications and institutions) has been relatively, and curiously, neglected. The theme of the protestant origins of rationality has had the good fortune to have commanded the attention of some of the most formidable minds in economic history; for example, Max Weber and R. H. Tawney. Even so, after much research, writing and debate, doubts remain both about the necessary relationship between capitalism and religion, and about the primacy of ideas in the process of social change.[19] A basic dilemma is posed by the facts that capitalism has risen and flourished with and without protestantism, and that protestantism has risen and flourished with and without capitalism. It is by no means certain that exogenously changed values spurred men to greater and more effective effort, or, rather that successful enterprise created both the favorable environment for change and the rationalization in values which favored such enterprise. C. B. Macpherson has argued that, "The essence of rational behaviour is industrious appropriation,"[20] and certainly in England by the end of the seventeenth century a "theory of possessive individualism" had received articulate rationalization by John Locke, preparing the way for the economic liberalism of Adam Smith.

But analysis at this general level of explanation does not enable us to understand the actions of individual entrepreneurs. To them the market and its institutions were all important; to operate effectively they needed a market with factor mobility and prices which reflected supply and demand conditions (so that factors were responsive to price incentives and had the ability to move); a market with consumers who maximized their satisfaction by buying according to price and quality differences; a market, also, in which "true profits" could be earned (i.e. profits which included a margin above costs, including managerial costs, which "measured"

[19] See K. Samuelsson, *Religion and Economic Action* (English translation, London, 1961), for a critical summary of literature on "religion and the rise of capitalism."

[20] C. B. Macpherson, *The Political Theory of Possessive Individualism* (Oxford, 1962), p 232.

enterprise).[21] Many developments in the eighteenth century were combining, mutually reinforcing each other, to produce such a market. In the first place, in the century before 1760 the movement of goods, persons, and information was much improved; all three moved more easily and more quickly. Improved communications "valorised the hinterland" (as C. R. Fay once put it), greatly facilitated the movement of raw materials and finished goods, reduced the cost and increased the speed; the greatly extended use of stage wagons on the roads and the rapid development of water transport, especially canals after mid-century, enormously boosted the carrying trade; for the first time in history a commodity and its transport—coal—was measured in millions of tons.[22] Some measure of mobility can be seen in the growth of towns and of industrial concentrations, and particularly in the migration towards the north and west.[23] Such differential growth, between town and country, between region and region, reflected both the ability of labor and goods to move, and also the sensitivity of labor to wage incentives. As E. W. Gilboy has clearly demonstrated, England in the eighteenth century had "a working population excited by changing wages and standards of life;" especially in the north, the workers were "ambitious and active," "with a growing taste for articles not heretofore included in their budget."[24] Such motives allowed the

[21] The concept of profit in the eighteenth century was complicated by the fact that capitalist and manager-entrepreneur were, so often, the one person. For this reason profit was seen mainly as a return to capital; the idea of a management theory of profit did not come until much later. In most industrial revolution enterprises for which accounts have survived, profits were the residual after costs had been met, and were divided, in the case of partners, according to capital contributions. Only when enterprises came to depend mainly on borrowed capital did attitudes towards profits change. A. Marshall, in particular, gave detailed consideration to the concept of profit: in *The Economics of Industry* (London, 1886) he discussed the relative advantages of trading on borrowed capital and on owned capital, noting that "men with borrowed capital seem likely to displace to a great extent those trading with their own;" in *The Principles of Economics* (London, 1890), he argued "profits are something more than interest in addition to Net Earnings of Management;" i.e. those earnings which are properly to be ascribed to the abilities of business men. It is the Marshallian definition of profit that I use above.

[22] See W. T. Jackman, *The Development of Transportation in England* (London, 1916), for a detailed account of transport changes and the extent of the carrying trade; e.g. pp. 304–7; 310–12; 340–46; appendices 5 (on rate of traveling), 6 (on cost of traveling), and 7 (on cost of carriage of goods by land).

[23] See Mantoux, *op. cit.*, pp. 358–63, 365–66. For example, the population of Warwickshire and Staffordshire doubled, and that of Lancashire trebled, in the course of the eighteenth century. Manchester probably had 10,000 inhabitants in 1730, 27,000 in 1770, 50,000 in 1790, and 95,000 in 1801.

[24] E. W. Gilboy, *Wages in Eighteenth Century England* (Harvard, 1934), pp. 241–43.

expanding industrial centers to draw labor continuously from the countryside.[25]

Changing tastes and an increasing demand for goods were catered for by a rapidly growing mercantile community engaged in both internal and external trade. R. B. Westerfield has detailed the increase in merchants and the growing complexity of their operations and institutions in the century before the industrial revolution, showing their rate of increase to have been three to six times as great as that of total population. The growth of the market in size and sophistication can be seen, also, in the growth of shops at the expense of fairs and the old-type town markets. "The rise of permanent shops," wrote Westerfield, "was concomitant and causal to the relative decline of the public market and the travelling merchant and chapman. Middlemen increased in number and became sedentary."[26] A good example of an individual manufacturer's response to changing market conditions is that of the Darbys of Coalbrookdale: the Darbys began, c 1710, by selling ironware in small quantities to customers whom they met in person at fairs and country markets, and by taking orders at the great fairs at Chester and Stourbridge; by mid-century, to cater for a new type of customer, agents were employed in Cornwall and Northumberland; later still, as the industrial revolution got under way, warehouses were established in London, Bristol and Liverpool, holding stocks of goods for direct sale, and travelers were employed to make direct contact with purchasers, especially large customers.[27] R. Davis, in particular, has documented the commercial organization of an expanding external trade, writing of the period 1635 to 1735, that, "Nearly everywhere . . . change tended in the same direction. Nearly everywhere trade with England had greatly expanded . . . and the growth of this trade had led to, or been accompanied by, the creation of a great network of English merchant houses or agencies abroad, closely linked with their homeland."[28]

Financial change, to the extent that P. G. M. Dickson has entitled it a revolution, facilitated manufacturing and trade by more ade-

[25] See A. Redford, *Labour Migration in England, 1800–1850* (Manchester, 1964) for an account of the process of migration during the industrial revolution.

[26] R. B. Westerfield, "Middlemen in English Business, 1600–1760," *Transactions of the Connecticut Academy of Arts and Sciences*, XIX (1915), pp. 347, 412, 414.

[27] See A. Raistrick, *Dynasty of Iron Founders. The Darbys of Coalbrookdale* (London, 1953).

[28] R. Davis, *The Rise of the English Shipping Industry in the Seventeenth and Eighteenth Centuries* (London, 1962), p. 381.

quately providing currency and credit [29] Improved and new financial institutions, particularly banks and insurance companies, laid the firmer foundations of a well-integrated system of public and private finance. The development of the City of London as a capital and money market and as the nation's financial center, with a complex network of complementary institutions, was important for the finance of industry, and for the finance of internal and external trade. Part of this financial growth was the establishment of a carefully organized and disciplined insurance sector which allowed the efficient offsetting of business risks, especially in international trade.[30] Better accounting, the result of better and more textbooks on accounting,[31] and also of the general expansion of commercial education,[32] enabled more businessmen to get their costs and prices in a profitable (and competitive) relationship, with encouraging effects on enterprise and survival. Such financial and mercantile change ensured the emergence of a price-sophisticated consumer market and a price-conscious manufacturing and mercantile community servicing that market. Increasing and keener competition everywhere sharpened wits, led to constant market skirmishing, and ensured the survival of the clever and well organized in an increasingly free domestic market. In the development of this free market, moreover, the activities of businessmen were reinforced by changes in law. Such changes took many forms: a decline occurred in the rights of the Crown in economic affairs (so that the Crown's once extensive powers to control, or to give to persons or corporations to control, internal trade were almost decadent when Blackstone wrote); the legislative fixing of prices and wages was abandoned as impracticable and undesirable; a range of statutes contributed to legal developments which favored industry and commerce (by promoting domestic industry by fiscal expedients, by prohibiting the export of machines and artisans, by regulating colonial trade, etc.); there was a remarkable development of commercial law, especially under the influence of Lord Mansfield.[33] The general

[29] P. G. M. Dickson, *The Financial Revolution in England A Study in the Development of Public Credit, 1688–1756* (London, 1967).

[30] For example, see P. G. M. Dickson, *The Sun Insurance Office, 1710–1960* (London, 1960) for an account of the development of one important office.

[31] For example, William Hamilton, *Book-keeping New Modelled: or, A Treatise on Merchants' Accounts* (Edinburgh, 1735). See books also by Roger North (1715), Alexander Brodie (1722), Richard Hayes (1739), Martin Clare (1751), William Gordon (1756), William Perry 1777), etc.

[32] N. A. Hans, *New Trends in Education in the Eighteenth Century* (London, 1951).

[33] A legal history of the industrial revolution and its background has not

result was to incorporate into law the ideas and practices of the merchants and manufacturers, so that legal practice as regards contracts, negotiable instruments, bankruptcy, insurance, etc., was regularized and made certain. Thus wages and rents, the price of capital and the price of land, the price of raw materials and manufactured goods, all ceased to be determined either by custom, by market restrictions, or by natural disasters (such as harvest failures), and were determined, increasingly, by the relationship between supply and demand in a free market.

This picture, however, is too idyllic! Whatever their considerable advantages, the early entrepreneurs also faced formidable obstacles. If industrialization enhanced the chance of gain, it also increased the chance, and the cost, of failure. Increasing opportunities meant increasing risks: as new industries grew and localized, old industries declined and, with them, some areas;[34] firms were larger, with more capital equipment and longer inventories, so that more was at stake and failure was a more fearful prospect;[35] to crises induced by weather were added crises produced regularly as a by-product of the new industry and trade;[36] the horizon of enterprise was greatly extended, and distant markets, often across fearful seas, made the production-sale cycle longer, the period of waiting for returns drawn out, expensive, and nerve-wracking;[37] there was a growing demand for goods not of basic necessity, whose demand was more elastic and uncertain, and was subject to changes in taste and fashion, so that any particular manufacturer's market could fluctuate wildly;[38] there was increasing technological uncer-

been written, although volumes X, XI, and XII of Sir William Holdsworth's *A History of English Law* (London, 1938) comes closest to such a history. See, for example: vol. X, on "Local Government," p. 158 *et seq.* (for price and wage controls, turnpikes, improvement commissioners, etc) and "The Royal Prerogative," p. 400 *et seq.*; vol. XI on "Colonies," p. 84 *et seq.*, on "Statute Law" as regards manufactures and trade, p. 411 *et seq.*; vol. XI, on "Equity" and the "Common Law," especially as regards "Commercial Law," p. 383 *et seq.*, and "Maritime Law," p. 524 *et seq.*

[34] The textile industry in East Anglia all but perished; Durham became "the home of lost industries;" Glasgow declined as a cotton center; etc. See G. C. Allen, *British Industries and their Organization* (London, 1933), Ch. I.

[35] See, for example, T. S. Ashton, *Iron and Steel in the Industrial Revolution* (Manchester, 1924) on the increasing capital commitments of the ironmasters; pp. 227–32.

[36] See, T. S. Ashton, *Economic Fluctuations in England, 1700–1800* (Oxford, 1959) for an account of the eighteenth century cycle.

[37] See R. Davis, *The Rise of the English Shipping Industry in the Seventeenth and Eighteenth Centuries* (London, 1962), for the risks of the shipping trade; pp. 375–76.

[38] Cotton textiles of varying fiber content and print design enabled, for the first time, a wide choice to the poorer consumers of textiles.

tainty, as the rates of invention and technological improvement increased, and as the technological obsolescence increased;[39] there was, above all, increasing competition All these factors can be summed up as increasing uncertainty and increasing risk; speculation became an essential component of businessmen's calculations.

To such general obstacles should be added some specific problems which have been discussed in some detail by the historians. The shortage of coin is a good example: many manufacturers had difficulty in getting sufficient currency, especially small-unit coins for the payment of wages, for day-to-day commitments. Arkwright, for example, was forced to issue token coinage and to have Spanish dollars overstamped at Soho for use in his factory.[40] Shortage of coin was reinforced, often, by the difficulty of getting adequate short-term credit, a problem solved in the long run by the development of country banks, many of which had their origins in manufacturing.[41] There were also continuous technical problems, such as the servicing of new machines, the inadequacy of water power, and the imbalances caused by the differential technical progress of various processes.[42] The problem of labor discipline, of converting the agricultural laborer into industrial proletariat, has been sympathetically analyzed by a number of historians who have tended to overdramatize the problem but, nevertheless, have demonstrated its formidable magnitude.[43]

Many of these specific problems were new or substantially new; there was no "heritage of improvement" to guide the entrepreneur in his strange new world; there was no advantage of "the late start," no "engine of growth" abroad to stimulate and prompt English growth, no important "lessons of history" to be learned. There was also, for many individual entrepreneurs, disapproval. As Mantoux has written: "For its first eighty years the factory was

[39] See W. E. G. Salter, *Productivity and Technical Change* (Cambridge, 2nd Ed. 1966) for discussion about technical change and "the rate of improvement."

[40] See Fitton and Wadsworth, *op. cit.*, pp. 242–43 and Ashton, *Iron and Steel . . . , op. cit.*, pp. 228–29, for examples of currency difficulties. Fitton and Wadsworth write (p. 244): "New Lanark countermarked a 5s. Spanish dollar, a 2s.6d half-écu of France, a farthing on a William III Scottish bodle; Deanston used half-écus, Charles II bawbees, and George III halfpennies (countermarked 4s.6d.); Ballindalloch and Rothesay had Spanish dollars, and so on. McConnel and Kennedy bought casks of coin from Boulton and Watt . . and in 1812 their agents were scouring the country for silver."

[41] For example, see Ashton (*Iron and Steel . . , op. cit.*) on "The Ironmasters."

[42] *Ibid.*, p. 99.

[43] See the works of S. Pollard, E. J. Hobsbawm, and E. P. Thompson.

on the defensive. It seemed to many an unnatural ogre."[44] Opposition was both social and aesthetic. At first, however, the new factories were centers of interest and wonder. "Coalbrookdale exercised a peculiar fascination over all who approached."[45] "The cotton mills [of Arkwright] of the Derwent Valley became one of the wonders of the Peak."[46] Soon wonder mixed with disapproval; the dales at Coalbrookdale lost "all their beauties" as a "variety of horrors" spread out from the original factory buildings;[47] some entrepreneurs were insensitive to old rights: for example, Arkwright as he "intruded brusquely into the countryside" without first considering the interests of the Duke of Rutland.[48] The rich were able to buy their way into social approval; the less affluent found it more difficult. But neither was greatly inhibited by apparent lack of social status, and neither was faced by impenetrable social barriers. Wealth in England had always been as good as blood in opening doors; the industrial revolution made it even easier.

Can a balance sheet be drawn? In aggregate, yes. Since the industrial revolution did occur, obstacles to industrialization in eighteenth century England must have been surmounted or else must have been too slight to have inhibited growth significantly. However, the listing and balancing of obstacles and inducements may not be as revealing as considering the general social and economic maturity of England before the industrial revolution. If the presently accepted tests of economic backwardness are applied, the England of 1750 can be seen to be advanced rather than backward, so it is little surprise that entrepreneurs could thrive there. Taking H. Leibenstein's thirty-five characteristics of backwardness,[49] only six, and some of these doubtfully relevant, applied to eighteenth-century England: of these six, three are demographic (high fertility rates, high mortality rates, rudimentary hygiene and public health), two are social (child labor and inferior status of women), and one technological (inadequate technical training). England before the industrial revolution was no backward country; rather it provided an environment in which enterprise could and did thrive.

[44] Mantoux, *op. cit.*, pp. 403–408, for an account of the social status of the entrepreneurs.

[45] F. D. Klingender, *Art and the Industrial Revolution* (London, 1947), p. 93.

[46] Fitton and Wadsworth, *op. cit.*, p. 97.

[47] Klingender, *op. cit.*

[48] E. L. Jones, "Industrial Capital and Landed Investment: the Arkwrights in Herefordshire, 1809–43," *Land, Labour and Population in the Industrial Revolution*, ed. E. L. Jones and G. E. Mingay (London, 1967), p. 52.

[49] H. Leibenstein, *Economic Backwardness and Economic Growth* (New York, 1957), pp. 40–41.