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APPRENTICESHIP AND DE-SKILLING IN BRITAIN, 1850-1914*

The publication of Harry Braverman's seminal study – *Labor and Monopoly Capital* (1974) – marked a turning-point for labour and social historians. Since then they have increasingly concerned themselves with the nature of the labour process in industrial capitalism. Central to this concern has been the debate on de-skilling and the destruction of craft control over the labour process and its subordination to the needs of capital.[1] Braverman has been heavily criticised for the one-sidedness and simplicity of his account of this development. Among the weaknesses identified in *Labor and Monopoly Capital* is the omission of any mention of class struggle, or worker resistance to technical change;[2] the failure to grasp how de-skilling can be mediated and, therefore, modified through labour, market and product particularisms;[3] the lack of a detailed analysis of the transformation of formal to real subordination (in the Marxist sense) of labour to capital – the process seems to occur automatically;[4] and, the failure to realise how formally skilled workers can continue to occupy a privileged position in the

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[1] The Degradation of Work?, ed. by S. Wood (1982), and B. Elbaum et al., "The Labour Process, Market Structure and Marxist Theory", in: Cambridge Journal of Economics III (1979), pp. 227-30, for a useful discussion of the important issues, themes and weaknesses of Braverman's thesis.

[2] T. Elger, "Braverman, Capital Accumulation and Deskilling", in: The Degradation of Work?, pp. 23-53; A. L. Friedman, Industry and Labour. Class Struggle at Work and Monopoly Capitalism (1977), pp. 80-82.

[3] J. Zeitlin, "Craft Control and the Division of Labour: Engineers and Compositors in Britain, 1890-1930", in: Cambridge Journal of Economics, III, p. 272; R. Penn, "Skilled Manual Workers in the Labour Process, 1856-1964", in: The Degradation of Work?, pp. 99-100.

[4] Elger, "Braverman, Capital Accumulation and Deskilling", loc. cit., p. 28.

workforce through either the mechanism of custom, or by their strategic placing in the production process, or both.[5]

There seems little doubt that the Braverman thesis, because it views de-skilling simply as the result of the imperatives of capital accumulation, is open to the charge that it is crudely deterministic, with little or no appreciation shown of the actual historical development of work in the nineteenth and twentieth centuries. In saying this, one has to appreciate that his thesis, although set within the framework of the transformation of complex (skilled) to simple (unskilled) labour, is time-specific – it deals mainly with the second half of the twentieth century. This makes it a natural complement to the work of Baran and Sweezy on the economics of monopoly capital.[6] Even although Braverman draws on the work of Babbage, Marx and Ure, as R. J. Morris points out, he regards these nineteenth-century observations as anticipations, rather than statements, of technological reality.[7] Moreover, Braverman shows that in the early stages of the application of machinery to a job, the demand for skill may increase, but the overall tendency is towards the breakdown of all-round skills and their replacement by cheaper disassociated elements. In spite of this, it remains true that as regards the nineteenth century Braverman rarely rises above the level of generalisation, and thus it has fallen to others to develop his thesis in a more historically based manner.

Foremost among those influenced by Braverman's writings is Richard Price. However, Price rejects the former's technological determinism and his one-sided emphasis on managerial autonomy, and instead views the whole process from the vantage point of class struggle. In his detailed study of labour relations in the nineteenth-century British building industry[8] and, more recently, in a more general piece on the labour process itself,[9] Price argues that the control of work has been the most central feature of class conflict. Changes in work organisation and technology have resulted from recurring "crises in the social relations of production" and these, according

[5] Ph. Sadler, "Sociological Aspects of Skill", in: British Journal of Industrial Relations, VIII (1970), pp. 29-30. Sadler argues that, while compositors in the modern newspaper industry have effectively become de-skilled, custom and strategic placing in the production process continues to afford them high wages and an ability to counter in an effective way managerial autonomy.

[6] P. A. Baran and P. M. Sweezy, Monopoly Capital (1966).

[7] R. J. Morris, review of Ch. More, Skill and the English Working Class, 1870-1914 (1980), in British Book News, 1981, p. 23.

[8] R. Price, Masters, Unions and Men (1980).

[9] Id., "The Labour Process and Labour History", in: Social History, VIII (1983), pp. 57-75.

to Price, can be identified: the early nineteenth century; the later nineteenth century and early twentieth century; and the period of the mid 1960's to the present.[10] Price further argues that the overriding tendency of the nineteenth century, particularly the later period, was to threaten skilled labour with total subordination to capital through profound changes in the productive processes. This had the effect of leading the skilled worker to question the very autonomy of capital itself, and in doing so take him in the direction of socialism. Price's views, then, are based on the idea of de-skilling as an imperative of capital accumulation – a position he shares with Braverman –, but the outcome is never certain as it has to be fought out in the arena of class struggle at the very "frontier of control".

This interpretation has been challenged on a number of fronts, most notably by Patrick Joyce. Drawing on an important article by Samuel on the uneven development of industrial capitalism in nineteenth-century Britain,[11] Joyce has emphasised the haphazard and disjointed nature of work patterns as the logical outcome of developmental disequilibrium. Joyce argues that given the uneven development of industry managerial structures were weak, there was an abundance of skilled labour, and these factors, among others, meant that "employers were often motivated neither by the desire to deskill or subordinate the worker, nor to introduce the most advanced technologies".[12] Joyce also goes on to claim that the mutual dependency of labour and capital led invariably to compromise over industrial matters, and in such circumstances "capital often ceded to labour the 'control' [over the labour process] Price so persistently sees as grounds for conflict".[13] As apprenticeship was one of these crucial areas of conflict, Joyce, drawing on the work of Charles More,[14] claims that employers and employees co-operated to "encourage skill" development. More himself argues in several places that apprenticeship survived and skill was maintained because it was economically rational on the part of both employer and apprentice – the former saw it in his interest to ensure that the apprentice was well taught in order that he could benefit from skilled apprenticed labour at low wages; and the apprentice had a desire to learn a skill which would give him secure earnings and employment at the end of

[10] Ibid., p. 65.
[11] R. Samuel, "Workshop of the World: Steam Power and Hand Technology in mid-Victorian Britain", in: History Workshop, No 3 (1977), pp. 6-72.
[12] P. Joyce, "Labour, Capital and Compromise: A Response to Richard Price", in: Social History, IX (1984), p. 69.
[13] Ibid.
[14] More, Skill and the English Working Class, op. cit.; id., "Skill and the Survival of Apprenticeship", in: The Degradation of Work?, pp. 109-21.

his apprenticeship.[15] More rejects the idea of skill as a social construct and the role of trade unions in determining skill.[16] What this amounts to is a rejection of the Marxist view of de-skilling as articulated by Braverman, and also a denial of the concept of the class struggle as the determinant of power and authority in the sphere of production. This involves a shift of emphasis away from the arena of class conflict to the terrain of compromise.

While it is not possible simply to break down these views into pro- and anti-Braverman, they can be counterpointed on ideological grounds. Thus the study of skill assumes a dimension which is non-technical and highlights the subjectivity of much of the debate surrounding Braverman's thesis. This paper wishes to take some of the issues raised by Joyce and More, as well as Price, and subject them to critical analysis within the context of three important areas of debate: firstly, as they relate to the notion of skill as a social construct; secondly, as they affected the relationship of the employer to the apprentice; and, lastly, as they relate to the changing role of the apprentice in the occupational structure of four industries, namely, engineering and shipbuilding, construction and printing. These craft industries were not only the most important in size, they were also the classic representatives of artisanal culture and values; therefore, they are, perhaps, the most useful when examining the complex questions of skill. In contrast to More and Joyce, this paper hopes to show that there is an inherent tendency within industrial capitalism, at least within these industries, towards the specialisation of skill, but that the genesis of the process cannot be explained, as Braverman does, on a monocausal basis, rather it is multidimensional and complex.

I

The drive towards the specialisation of skill has been a continuous and noteworthy feature of the development of industrial capitalism. Under the impact of supply-side innovations and the expansion of the market, the years prior to 1850 witnessed the emergence of new productive processes and techniques which fundamentally altered the mode and organisation of work. The traditional all-round skills of the pre-industrial craftsmen were broken down into a series of detailed and precise operations. These developments were most vividly associated with the new dynamic industries of cotton and engineering, but were also evident in less technologically

[15] Id., Skill and the English Working Class, pp. 151-52, 166-67; but see also pp. 70, 81, 152 for a contradictory point of view.
[16] Id., "Skill and the Survival of Apprenticeship", loc. cit., pp. 111-13.

advanced sectors of manufacturing industry.[17] Specialisation and sub-division of work was the major threat to the hitherto privileged and secure position of the artisan as it had the potential to swamp trades with semi- and unskilled labour. It therefore became of paramount importance to skilled workers to control the supply of labour and, ultimately, the labour process itself. The early trade societies all established, where possible, strict apprentice/journeyman ratios in order to restrict entry to the trades.[18] Therefore, from the early stages of industrialisation artisans were aware of the pressures of specialisation and took steps to control the pace and impact of technological change.

The period after 1850, and up until what some have called the "Second Industrial Revolution" of the late nineteenth and early twentieth centuries, did not experience technological change of the same magnitude. However, significant changes in the level of skill occurred through the reorganisation of production, which intensified the division of labour, and the introduction of new materials, particularly steel. The industries most affected were engineering and shipbuilding and, to a lesser extent, building.

The engineering shop was re-designed into separate compartments, each housing its own particular skill. The twin trade of fitter and turner was split into distinct elements in the process. Firms also tended to become associated with one product, a development noted by the president of the Institute of Mechanical Engineers, when he remarked that "within the last few years [. . .] the business of mechanical engineering has divided itself into distinct branches so that a locomotive builder is little more than a locomotive builder."[19] The new trade of iron and steel shipbuilding drew on a class of specialised workers including angle-smiths, borers, caulkers, patternmakers, platers, riveters, as well as the traditional skills of the shipwright, although the latter as a woodworker was to lose his status and

[17] For engineering see E. P. Thompson, The Making of the English Working Class (1963), pp. 270-77; K. Burgess, "The Influence of Technological Change on the Social Attitudes and Trade Union Policies of Workers in the British Engineering Industry, 1780-1860" (Ph.D., Leeds University, 1970), pp. 143-44; for shoemaking see R. Q. Gray, The Labour Aristocracy in Victorian Edinburgh (1976), pp. 40-42; for hatmaking see P. Giles, "The Felt-Hatting Industry, c. 1500-1850, within particular reference to Lancashire and Cheshire", in: Transactions of the Lancashire Antiquarian Society, LXIX (1959), pp. 51-52; for the London cabinetmaking trade see The Unknown Mayhew, ed. by E. P. Thompson and E. Yeo (1971), p. 277; for others see Knox, "British Apprenticeship", op. cit., pp. 25-30.

[18] For evidence of a wide range of trade-society practices governing the regulation of the labour supply see Report from Committees: Artisans and Machinery [Parliamentary Papers, 1824, V], and the Select Committee on the Combination Laws [PP, 1825, IV].

[19] Proceedings of the Institute of Mechanical Engineers, August 1874.

importance in the occupational hierarchy.[20] Thus metal shipbuilding was highly specialised from the outset, and this was intensified by further specialisation within the trades and by the introduction of steel shipbuilding. Platers' squads specialised in "light, heavy and ordinary work, while within each squad the individual workers tended to specialise in particular tasks."[21] With the move towards steel boilermakers were no longer expected or called upon to manipulate hot plates as steel was easily worked in a cold state. This development struck at the heart of the boilermakers' skill, which had been historically bound up with "the firing of furnaces, the heating of metal and the experience of when, where and how to strike it".[22]

Employers in the building trade also reorganised work through greater sub-division of labour. By 1862, the preparatory work of the plumber was reduced through the prefabrication of components; no longer was he expected to make his own pipes.[23] In carpentry a similar process occurred with the saw-mills taking over some of the preparatory work, and in the 1870's and 1880's greater use was made of machine-fabricated parts, such as doors, staircases, windows, and so on.[24] Printing, however, remained relatively untouched, particularly on the composing side. But even here, the 1870's in Edinburgh saw the introduction of female compositors on lower rates of pay,[25] and everywhere the perennial problems of boy labour still plagued the trade.[26]

These developments were experienced in different ways in various parts of Britain. Some workers were extremely pessimistic about their effects on

[20] W. Abell, The Shipwright's Trade (1948), p. 77; J. E. Mortimer, History of the Boilermakers Society, I: 1834-1906 (1973), p. 27.

[21] K. McClelland and A. Reid, "Wood, Iron and Steel: Technology, Labour and Trade Union Organisation in the Shipbuilding Industry, 1890-1914", in: Divisions of Labour. Skilled Workers and Technological Change in Nineteenth Century England, ed. by R. Harrison and J. Zeitlin (1985), p. 175.

[22] Although the shift to steel had reduced the skills of the boilermakers, they did not experience a significant decline in their material standard of life, due to the ability of the boilermakers' union to control the displacement of labour and new wages scales. Ibid., pp. 174-76.

[23] The Book of Trades (1862), p. 30.

[24] J. H. Clapham, An Economic History of Modern Britain (3 vols; 1926-38), III, p. 195-96.

[25] Edinburgh Typographical Society, Minutes, 13 June 1879, National Library of Scotland, Acc. 4068.

[26] The London Compositor, ed. by E. Howe (1947), p. 310; J. H. Richards, "Social and Economic Aspects of Combination in the Printing Trade before 1875" (M.A., Liverpool University, 1956), p. 368; S. C. Gillespie, A Hundred Years of Progress. The Record of the Scottish Typographical Society, 1853 to 1952 (1953), p. 97.

the standard of workmanship, others were less so, seeing in them a qualitative improvement, although in the building industry, even among the higher trades of masonry and joinery, the mood was one of general despondency. This is clearly shown in the evidence presented by trade unionists to the Royal Commission on the Depression in Trade and Industry (1886). The London representative of the Operative Stonemasons Friendly Society claimed he had "never seen work worse done than it had been in the last five years", a view endorsed by the Nottingham representative of the Amalgamated Society of Carpenters and Joiners, who despairingly commented: "it gets worse and worse."[27] The Glasgow respondent of the Amalgamated Society of Engineers took the view that "the quality of the work [. . .] is not equal to what is was twenty years ago", and this was echoed by the Neath and London Branches, although Coventry and Oldham were more optimistic.[28] On the whole, the Boilermakers' Society shared the views of Coventry and Oldham, but this trade, being of more recent origin, had less of a tradition to draw upon when making comparisons.[29]

Falling standards of workmanship were linked to apprenticeship by those involved. The specialisation of the apprentice and the general decline in the use of legally binding indentures were felt to be the root causes of the deterioration in skill. The Oldham delegate of the ASE, who was, as we have shown, by no means pessimistic about the quality of the product, also spoke of the practice of employers of keeping the apprentice to "one particular department of the trade", and a similar comment was made by the Shipley Branch of the Society.[30] Few of the ASE branches spoke of indentured apprenticeships – the relationship was one of mutual agreement, with the employer enjoying the right to dispense with apprentices in slack periods, and the latter being allowed to "turn over" for better pay. It was a development which signalled the emergence of the proletarian apprentice by removing his dependent social-legal status. The engineers also mentioned the failure of the ASE to control the labour supply; in most areas there was no recognised proportion of apprentices to journeymen, at least, not one which was enforceable.

The building trade too shared similar experiences. The London stonemasons complained of the lack of interest employers took in apprentices; in

[27] Royal Commission on the Depression of Trade and Industry, Second Report, Pt II [PP, 1886, XXII], Appendix D, pp. 49, 59-60, and see also pp. 47-62.
[28] Ibid., pp. 7-16.
[29] Ibid., pp. 18-20.
[30] Ibid., pp. 12, 14.

Dundee the ASCJ reported the excessive practice of boys "turning over"; and in Nottingham the Branch complained that in some cases boys "were driven to keep up with the men".[31] All the building-trade respondents highlighted the virtual disappearance of indentures, except in plumbing, where it was still extensively used. In most trades there existed a staggering array of different periods of apprenticeship, anything from three to seven years in carpentry and joinery. Printing proved an exception, with regular periods of service, that is, seven years; although the Edinburgh and Dundee Branches of the Scottish Typographical Association could claim that there were "no indentured apprentices, and employers have no system of training apprentices."[32] The well-organised shipbuilding trades were not much better off. Apprentices in Liverpool were discharged in slack times, and there were no indentured apprenticeships to speak of, nor apprentice regulation.[33]

From this brief analysis of the development of skill in the period 1850-90 several features stand out. Firstly, the trend towards specialisation, through greater sub-division of labour and, in building, the extensive use of prefabricated parts; secondly, the collapse of the system of indentured apprenticeship, which necessarily involved the partial proletarianisation of the apprentice, as witnessed in high incidence of "turning over" in certain trades; and, finally, the erratic nature of skill acquisition, which makes it difficult to talk with any confidence about general levels of competence in British industry. However, these trends should not be interpreted in such a way as to indicate that we had reached the crucial moment in the development of industry, in which planning and execution were separated.[34] The application of science to industry was still in its infancy. "Rule of thumb" methods were still largely employed in manufacturing industry. As a Sheffield employer put it in 1884: "The finest steels in the world are made in Sheffield [at this moment], but we do not know why it is."[35] The element of "craft mystery" was still in many trades a tangible factor in the production process, giving the tradesman a measure of craft control.

[31] Ibid., pp. 59-60. This presents a rather different picture of the employers to the altruistic one painted by Joyce, "Labour Capital and Compromise", loc. cit., and More, Skill and the English Working Class, pp. 151-52.
[32] Royal Commission on the Depression of Trade and Industry, Second Report, Pt II, pp. 89-90.
[33] Ibid., pp. 18-20.
[34] H. Braverman, Labor and Monopoly Capital (1974), p. 126.
[35] Royal Commission on Technical Instruction, Second Report, Vol. III [PP, 1884, XXXI], q. 7689.

II

The period 1890-1914 saw Britain experience a "Second Industrial Revolution". The chief characteristics of this high phase of technological development were: firstly, the introduction of new semi-automatic machines in engineering and shipbuilding; secondly, the increasing use of unskilled and semi-skilled labour in trades hitherto the exclusive preserve of the skilled man; thirdly, the adaptation of a rudimentary system of standardised and interchangeable parts; fourthly, the predominance of the factory over the workshop as the unit of production; fifthly, the introduction of aspects of Taylorism, particularly the premium-bonus system, and new specialist categories of labour concerned with the design and planning of production processes, that is, draughtsmen, production engineers, and so on.

These changes had a widely varied impact on skilled workers. In engineering, the introduction of semi-automatic machinery, particularly the capstan or turret lathe and the specialised boring and grinding machines, had important consequences for fitters and turners, with the latter being the most seriously affected. Previously turners had exercised a wide variety of skilled functions, but the introduction of the new lathe reduced their work to preparation, that is, fixing the precise rotation of the cutting edges. Ancillary tasks such as "marking out" of work, the determination of the "feeds and speeds", and the grinding of cutting tools, were taken from the turners and given to a range of specialist workmen.[36] The Engineering Employers' Federation claimed that by 1906 "out of 46 [Federated] districts employing [capstan] lathes, there were [. . .] only 7 where these lathes [. . .] were manned by skilled men. The whole of the 39 other districts were manned by handymen."[37] Even the fitters, whose work of rectifying inaccurate workmanship was less affected by the new machinery, found themselves under pressure. The growth of a system of interchangeable parts made for greater tolerances; hence, there was less need for a precise and lasting fit. Moreover, the emergence of semi-skilled assemblers of engineering parts (erectors) usurped the assembly work presumably done by the fitters.[38] The overall effect of the new technology was to further increase the specialisation of engineering skills.

Shipbuilding experienced technological change on a less than even basis. Trade fluctuations made employers reluctant to invest heavily in machinery

[36] A. L. Levine, "Industrial Change and Its Effect on Labour" (Ph.D., London University, 1954), pp. 156-57.
[37] Amalgamated Engineers' Monthly Journal, September 1906; see also W. F. Watson, Machines and Men (1935), pp. 12-13.
[38] Levine, "Industrial Change", op. cit., pp. 462-63.

and tools, and this led to an emphasis on labour-intensive production. However, in the larger yards, the increasing size of ocean-going liners had made the construction of the hull by hand-work extremely difficult and expensive. These problems were in large measure solved by the introduction of pneumatic rivet machines and electrically-powered drillers. The impact of the new machinery was felt most keenly by the least-skilled handworkers, that is, the riveters and the caulkers.[39] The pneumatic rivet machines were so sophisticated that they could simulate handwork, and even perform the difficult task of counter-sinking rivets, which the old hydraulic machine failed to do. As McClelland and Reid point out, there was "no intrinsic reason why [the] operator should have been a skilled riveter".[40] A Glasgow factory inspector observed in 1903 that "Jobs formerly done by journeymen can now with [pneumatic] tools be undertaken by apprentices."[41]

Building and printing also underwent a process of far-reaching technological change. In the former, the wood-working trades witnessed the extension in the use of prefabricated fitments and the increased use of ferro-concrete process for floors and beams, developments which threatened to abolish the "rougher carcase work" of carpenters.[42] Similarly the mass production of manufactured earthenware sanitary products decreased the demand for plumbing by removing the need for lead fittings and made "easier and very much [simpler] the task of putting the work together".[43] In stone work, the practice of dressing stone at the quarry, the arrival of the pneumatic chisel, and other cutting devices, undermined the work of the mason to no small degree.[44] The invention of the linotype composing machine in the newspaper trade removed from the compositor the skill of producing justified lines of type and replaced it with the less demanding skill of keyboard operation. Monotype did the same in the book trade.[45]

The new machinery of production encouraged the drive towards larger units of production at the expense of the workshop. For example, by 1907 only 2.7 per cent of engineering workers were employed in workshops.[46]

[39] McClelland and Reid, "Wood, Iron and Steel", loc. cit., p. 174.
[40] Ibid., p. 173.
[41] Levine, "Industrial Change", p. 431.
[42] N. B. Dearle, Problems of Unemployment in the London Building Trades (1908), pp. 46-48.
[43] Ibid., pp. 50-51.
[44] Levine, "Industrial Change", p. 106; "Working Man", Reminiscences of a Stonemason (1908), p. 255.
[45] J. Zeitlin, "Engineers and Compositors: A Comparison", in: Divisions of Labour, op. cit., pp. 207-08.
[46] Levine, "Industrial Change", table 4.

This change to factory production quickened the pace of, and made more methodical, the work of the journeymen, and also allowed the application of scientific management, such as the premium-bonus system, based on predetermined levels of output. As Craig Littler points out,

> This meant that knowledge of effort levels and of work performance was lifted out of the work group or shop and made accessible to a wider range of superiors. In sum, the beginnings of task measurement increased the observability of work behaviour. The establishment of time standards for jobs, while providing the details necessary for premium bonus schemes, also acted as the basis of a new structure of control.[47]

Engineering employers were not slow to see the benefits accruing from the system and by 1914, 46 per cent of fitters and 37 per cent of turners were on piece rates,[48] compared to only 5 per cent of all engineering and boilermaking workers in 1886.[49]

These changes had the effect of making the worker feel "a loss of control over the methods of working",[50] but their impact was felt most keenly on apprenticeship, which became more intensively exploitive and much looser in form, corresponding more to an employer/employee relationship – a development noted earlier, but increasingly universal. Specialisation of skill meant that in a short time the labour of the apprentice could be turned to profit.[51] The Shipbuilding Employers' Federation estimated in 1904 that in caulking work an apprentice using a new machine could achieve a reduction in labour costs of between 50 and 60 per cent; in riveting, it was found that a rivet squad, comprising an apprentice, a holder-on and a heating boy, using a pneumatic machine, produced a saving of 54.3 per cent as compared with list prices, in other words, instead of paying the rate of 13/6d per 100 punched rivets, the employers now paid somewhat under 7/–.[52] the Board of Trade commented in 1910 on the spread of the premium-bonus system in shipbuilding, which allowed second-year apprentices to

[47] C. Littler, "Deskilling and Changing Structures of Control", in: The Degradation of Work?, p. 135.
[48] Zeitlin, "Craft Control and the Division of Labour", loc. cit., p. 271.
[49] E. J. Hobsbawm, "Custom, Wages and Workload in Nineteenth-Century Industry", in Labouring Men (1963), p. 360.
[50] Littler, "Deskilling and Changing Structures of Control", loc. cit., p. 137; More, Skill and the English Working Class, p. 237.
[51] More, Skill and the English Working Class, pp. 159-60. More claims that it was not necessarily "cheap labour", although in direct contradiction he argues that the apprentice was a source of profit to the employer, which gave the latter the economic rationale for maintaining the apprenticeship system (see p. 81).
[52] Shipbuilding Employers' Federation, Minutes, 2 June 1904, Maritime Museum, London.

earn an average 35 per cent below standard rates for adults.[53] Again systematic overtime working was commonplace in shipbuilding establishments. In the engineering industry, a similar picture emerges. One London employer summed up the impact of the new machine tools on apprentices, when he remarked that "the development of specialisation is a great pressure; the introduction of automatic machines incurs speedy training on one particular machine for apprentices and in no time they are highly competent."[54] And this view was echoed by a Glasgow employer who said to R. H. Tawney that "to put an apprentice on a valuable machine is a waste of money unless he is specialised to it, and in all trades the longer the boy is kept at the process the sooner does he become economically profitable."[55] The narrowing of wage differentials between first- and last-year apprentices was a reflection of this, from 50 per cent in 1865, to 33.3 per cent in 1915 (London).[56] The practice of excessive overtime working was also a feature of engineering apprenticeship, so much so that in 1901 the ASE complained that it militated against an apprentice adding to his "store of technical knowledge" by attending technical-education classes.[57]

Accompanying specialisation was an increasing disinterest in work. A Glasgow shipyard manager said of apprentice riveters: "they come and go as they please. They are as bad as the men at staying off and stopping the work of the squad"; and this complaint was also made by a Glasgow builder who declared that "we find the greatest difficulty in getting boys to apply themselves. They stay away frequently in the morning".[58] Money became, perhaps as a result of the premium-bonus system, as much an incentive to the apprentice to apply himself as acquiring a trade – an important indicator of job dissatisfaction. James Jack, general secretary of the Associated Iron Moulders of Scotland, in evidence before the Royal Commission on Labour (1892) said that employers were not able to keep boys to a seven years' apprenticeship as they will "shift about to where they can get more money",[59] and this was also true of building, shipbuilding and printing. Dr Alexander Scott, certifying surgeon of Glasgow, some fifteen years after

[53] Board of Trade, Report on Earnings and Hours [PP, 1911, XXXVIII], p. 112; see also S. Pollard and P. Robertson, The British Shipbuilding Industry, 1870-1914 (1979), p. 184.
[54] Amalgamated Engineers' Monthly Journal, September 1904.
[55] R. H. Tawney "The Economics of Boy Labour", in: Economic Journal, XIX (1904), p. 521.
[56] Knox, "British Apprenticeship", p. 158.
[57] Amalgamated Engineers' Monthly Report and Record, July 1901.
[58] Tawney, "The Economics of Boy Labour", loc. cit., p. 523.
[59] Royal Commission on Labour, Minutes of Evidence, Group A [PP, 1893-94, XXXII], q. 23459.

Jack estimated that not more than 50-55 per cent of engineering and shipbuilding apprentices completed their time.[60]

As part of the process of proletarianisation strikes became a part of the workplace behaviour of apprentices. The North West (Scotland) Engineering Employers' Association in the period 1893-1914 in its "Record of Cases" noted a total of twenty-three industrial disputes involving apprentices, the major portion of which were concerned with wage demands.[61] Most of the actions were short-lived and relatively small-scale, but in 1912, in protest against the reductions in wages associated with contributions to the new national insurance scheme, apprentice strikes broke out in all the major engineering and shipbuilding concerns in Scotland, the North-East coast of England and Manchester.[62]

It may seem paradoxical that, although apprentices were in many trades being transformed into learner-employees by increased specialisation, capital and labour were becoming more concerned with the whole question of their training and regulation. Technical education was being provided, even if not by all employers, at least, by progressive ones like Cadbury, Brummer Mond, Armstrong, Whitworth, British Electric Plant Company, and others. Trade Unions were also favourable to the idea. Various joint industrial committees were set up to lay down the basis of a uniform national system of training and regulation. The shift in focus is not simply explanable, as More tries to do, in terms of the sustained high-level demand for skill, or in the employer demands for cheap labour to recover the cost of training.[63] Much of it has to do with the changing needs of capital, the power of trade unions, and, most important, the changing role of the apprentice within the occupational structure of industry.

III

As Pollard and Robertson have shown for shipbuilding,[64] and Harley for engineering,[65] the product market for British goods was highly differenti-

[60] A. Scott, "The Training of Youth", in: Proceedings of the Philosophical Society of Glasgow, XXXVIII (1906-07), p. 167.

[61] Uncatalogued manuscript, Engineering Employers' Federation, Glasgow.

[62] W. Knox, " 'Down with Lloyd George': The Apprentices Strike of 1912", in: Journal of the Scottish Labour History Society, No 19 (1984), pp. 22-36, discusses why similar strike activity did not occur in the building industry, which was also affected by the National Insurance Act of 1912.

[63] More, Skill and the English Working Class, pp. 151-52.

[64] Pollard and Robertson, The British Shipbuilding Industry, pp. 165-66.

[65] C. K. Harley, "Skilled Labour and the Choice of Technique in Edwardian Industry", in: Explorations in Economic History, II (1973-74), pp. 391-414.

ated. This made it difficult for entrepreneurs to implement the techniques of mass production; ships, machines, railway engines had to be constructed according to the needs of the purchaser. The consumer orientation of house building and jobbing printing work imposed limitations on the use of labour-saving technology. Because of this a certain amount of training was necessary even to master the more specialised processes, although how much was dependent on custom and the ability of labour to delimit skill, rather than on the actual skill requirements of the job. As Hinton points out in his study of rank-and-file militancy on Clydeside during the First World War, the Ministry of Munitions found that "unskilled men could be trained to set up and keep in order straightforward tools in four to six weeks".[66] Even More recognises that the five years' apprenticeship was less the result of skill requirements, than of custom – a fact borne out by the new industries, such as electrical supply, where "five years was the most favoured time".[67] Neither is it entirely acceptable to argue, as More does, that as the need for manual dexterity declined more complex skills associated with technical knowledge replaced it, ensuring that the general level of skill remained high.[68] In a period that witnessed a significant reduction in the scope for individual initiative by the workman, the separation of planning and execution of work, the greater specialisation of work, which for the engineer meant that his competence was minimised to preparation of tasks and maintenance of machines, it seems a little odd to argue that the overall level of skill remained high. As Braverman points out, skill has sometimes more to do with the subjective values of the academic observer than with objective technological reality.[69]

Changing technologies not only specialised the labour of the apprentice, and hence cheapened his cost to the employer, but they also enhanced his strategic importance in the occupational structure of industry. As an engineering employer put it: "in strikes or disputes [apprentices] can keep a factory going and disrupt the 'turnouts'."[70] The use of apprentice labour as a disciplinary mechanism was amply demonstrated in the 1883 engineering strike on the North-East coast of England,[71] and again in the 1897 lock-out.[72] The strategic importance was recognised by employers and moves

[66] J. Hinton, The First Shop Stewards' Movement (1973), p. 64; Watson, Machines and Men, op. cit., pp. 12-13.
[67] More, Skill and the English Working Class, p. 70.
[68] Id., "Skill and the Survival of Apprenticeship", p. 120.
[69] Braverman, Labor and Monopoly Capital, op. cit., p. 430.
[70] Amalgamated Engineers' Monthly Journal, September 1904.
[71] J. B. Jefferys, The Story of the Engineers (1945), pp. 102-03.
[72] Knox, "British Apprenticeship", p. 340.

were made to bind them more closely. George Barnes, secretary of the ASE, spoke of the revival of indentures in his evidence to the Royal Commission on the Poor Laws (1910).[73] These indentures were more in the form of private contracts, which gave the employer all the disciplinary benefits of the traditional indenture, but did not include any reciprocal duties towards the apprentice. Crucially, they made it possible for the apprentice to be laid off in times of slack trade. In shipbuilding the 1893 agreement between the Boilermakers' Society and the Shipbuilding Employers' Federation prevented apprentices from taking part in an industrial dispute or from joining a trade union. This was further consolidated after a strike on Clydeside in 1899. The shipbuilding employers were quick to realise that with the new machine technology apprentices were an important bargaining counter. A strike, for example, by adult riveters at the yard of Messrs Cran Leith, Edinburgh, was broken "by employing four squads of apprentices".[74] It was for good reason that the Middlesborough delegate of the Boilermakers complained to the Royal Commission on the Poor Laws that an

> increasing amount of the work is now being performed by boys, who are normally apprentices, but who are in reality involuntary blacklegs, who perform the same work as men at about one-fourth the pay. Up to 1899 the number of apprentices was strictly limited to the proportion of one apprentice to five journeymen, but in that year the employers forced an agreement upon Boilermakers' Society which removed that restriction, by which the trade is now gradually being swamped by boys who practically perform the whole of the interior work of the ship.[75]

Employers in other industries faced different situations and consequently adopted strategies which suited their needs. The printing industry was not threatened with the problem of overseas competition, but was plagued by anarchic internal-market rivalry. The economics of the industry were such that small firms, through the use of cheap apprentice labour, which as the *Printing News* noted in 1893 was increasingly specialised,[76] could compete on favourable terms with the larger firms, even to the point of undercutting them. Thus the big concerns saw the reduction in internal competition as a paramount objective – a point emphasised by the president of the British Federation of Master Printers, Walter Hazell, who stated that the goal of the Federation was to establish "a standard of reasonable conditions" and

[73] Royal Commission on the Poor Laws [PP, 1910, XLVIII], qq. 82944-46.
[74] East of Scotland Association of Engineers, Minutes, 28 August 1901, Glasgow.
[75] Royal Commission on the Poor Laws, Appendix XIV, p. 512.
[76] Printing News, June 1893.

to deal with "those employers [. . .] who are injuring the workmen by paying sweating wages, and injuring their fellow-employers by unreasonably low prices".[77] Therefore, by regulating the ratio of apprentices to journeymen and by improving the training of the former, the "fair" employer could strike a hammer blow at their unscrupulous competitors by raising the cost of labour. In Edinburgh in 1912, by agreement of both employers and unions, an Apprentice Training Scheme was established. One of its consequences was that "small employers would be more inconvenienced than large employers".[78]

Building suffered from the same anarchic industrial structure, and it was here also that the leading firms took the initiative on the apprentice question. A number of developments had forced this upon them, including the relative decline of the sub-contractor, which forced contractors to concern themselves with the supply of labour and its control;[79] the tendency to contract for work outside the firm's immediate base of operations, which required a uniform pay-and-conditions structure; the erratic nature of recruitment and the poor quality of workmanship; and, lastly, the success of the building unions in London in prohibiting the use of "sub-letting" on School Board and County Council contracts. But the employers were also interested in using these developments to bureaucratise industrial relations and reduce the autonomous power of the work group.[80] Control over labour could only be had by standardising methods of recruitment and training. This culminated in 1916 in a "Scheme of Apprenticeship" drawn up by the Institute of Builders, the unions and the Ministry of Labour, for general use in the industry. The scheme provided for indentured agreements and technical training in the employer's time "for a minimum of eight hours per week".[81] However, owing to the disruption of the First World War, the scheme was stillborn, and by 1919 it was said that it had only attracted "inconsiderable" support. The building trade with its unique structural features and the predominantly small-scale character made regulation and standardisation difficult to achieve.

What is clear from this brief discussion is that employer initiatives in regard to apprenticeship were neither altruistic nor were they simply economically rational. More complex issues were involved concerned

[77] A. E. Musson, The Typographical Association (1954), p. 162.
[78] Evidence of W. Hazell, Departmental Committee on Juvenile Education [PP, 1917-18, XI], p. 20.
[79] Littler, "Deskilling and Changing Structures of Control", p. 152.
[80] Price, Masters, Unions and Men, op. cit., p. 118.
[81] Board of Education, Day Classes for Building Apprentices (1928), p. 5.

with the balance of power within the site of production, and without. But whatever the motivation of management, the course it pursues in implementing its objectives is counterpointed by the conflicting goals of labour. As Bryn Jones points out, "management cannot construct, *de novo*, the conditions under which labour is to function",[82] there is always a "bargained" context, which is fluid and dependent on the balance of power and authority within the workplace. The growth of the trade-union movement in the last decades of the nineteenth century and the opening years of the twentieth placed constraints on the autonomy of employers over a range of issues, including apprenticeship.

Notwithstanding periodic setbacks due to short-term unemployment, trade unionism, as Clegg *et al.* have shown, among all workers was growing from the late 1880's onwards.[83] Training and skill acquisition became areas of importance to the increasingly influential labour movement. This may have been a result of the influence of socialist ideology, but was more a reaction to the threat posed to the status of the journeymen from the lower ranks of semi- and unskilled labour. It also demonstrated a concern that greater specialisation of apprentice labour would make it more competitive with the adult workman. Hence, the production of the "superior" worker was not intended only to give the apprentice an all-round training, but to raise the cost of his labour. As I. C. Cannon, in his study of London compositors, noted, improved training was favoured by the print unions because it was felt that "this would slow down the productive output of the apprentice and would minimise the extent to which they were employed on more profitable work to the detriment of the journeyman".[84]

Thus the motivation to control the apprentice was the product of the complex interaction of changing technologies, which increased the value of apprentice labour; the enhanced role of the apprentice in the occupational hierarchy; and the new importance of the apprentice as a counter in the bargaining process. It was those factors which moved apprenticeship, from simply being a question connected with the labour supply, on to the wider terrain of skill acquisition. More's view of economic rationality as the ultimate determinant in the maintenance of apprenticeship would appear, given the evidence, to be too simplistic and monocausal.

[82] B. Jones, "Destruction or Redistribution of Engineering Skills? The Case of Numerical Control", in: The Degradation of Work?, p. 199.
[83] For data see H. A. Clegg, A. Fox and A. F. Thompson, A History of British Trade Unions Since 1889, I: 1889-1910 (1964), p. 468.
[84] I. C. Cannon, "The Social Situation of the Skilled worker: A Study of the Compositor in London" (Ph.D., London University, 1961), pp. 78-79.

IV

What conclusions can we draw from this study of the development of skilled work and its relationship to apprenticeship in nineteenth-century Britain? Firstly, there would appear to be a general tendency as an imperative of capital accumulation towards the specialisation of skill, and that this process has gained momentum in periods of crisis, particularly in the early and later decades of the century. In this sense Braverman's thesis is to the point, although the process is infinitely more complex than he suggests. Specialisation inevitably meant some degree of lost skill, but its origins are by no means one dimensional. Decomposition of labour into subdivided units was the result primarily of change in technical processes and the organisation of work. However, this was motivated not simply by the pressure to increase capital accumulation, but by other factors including the existence and virulence of class struggle and the strategic industrial considerations of management, particularly of large employers in industries where small-scale capital was important and highly competitive. These factors could also act as mediating forces, as did the market for the product, and the force of custom to which both management and men alike were subjected to. But the overall tendency was to move from complex competences to simpler competences, and this was reflected in the growing dissatisfaction and disinterest in work shown by the apprentice, as well as in his more acquisitive behaviour in respect of money wages.

Secondly, the wide variety of practices in regard to recruitment, length and quality of training within trades and throughout the country should make us sceptical when confronted with definitive statements concerning levels of skill. Basing the criteria on the continued existence of apprenticeship is not enough, as we have seen how service bore no relation to actual skill requirements and was sustained by the social force of custom and economic calculation. Moreover, there seems little evidence to suggest that employers actively promoted skill among apprentices; rather they sought to specialise them at an early stage. Therefore, although the origins of the process may be multidimensional, the tendency of industrial capitalism is towards the specialisation and sub-division of skill.

This said, it must also be pointed out that a great deal more work has to be done in explaining skill in different geographical and social contexts before the history of apprenticeship or, indeed, skilled work can be properly written. From what evidence we have it would appear that the acquisition and application of skill involved a process that was qualitatively different in rural as against urban areas. The former placed a greater pressure on all-round skills than did the latter, where specialisation was more normal.[85]

This observation might equally apply to the small/large-town divide. A detailed analysis of this division and its impact on the general level of skill would make a useful contribution to the whole de-skilling debate. Similarly, the discrete nature of some working relationships and their implications in the process of defining skill have to be examined. Littler has highlighted the role of the sub-contractor in defining skilled work,[86] but an investigation of the impact of patrimony on skill could also be useful, given its importance in the building trades.[87] Likewise, the nature of the "honourable" and "dishonourable" sections of trades would seem to imply a wide disparity of levels of skill, but outside of discussion on the "labour aristocracy", this topic remains unexplored when it comes to discussing the labour process. The list is by no means exhausted, but those mentioned would appear to be in need of urgent investigation before we can arrive at a more objective view of the changing nature of skilled work at both the level of acquisition and application in the second half of the nineteenth century.

[85] Knox, "British Apprenticeship", pp. 385-87.
[86] Littler, "Deskilling and Changing Structures of Control", p. 126.
[87] Knox, "British Apprenticeship", p. 405; Board of Trade, Report on Apprenticeship and Industrial Training (1915), pp. 9-20.