

Worker Resistance and Taylorism in Britain

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SUMMARY: Worker resistance and employer conservatism in Britain are said to have combined to retard British economic development and frustrate the emergence of modern managerial structures based on Taylorism and/or Fordism. However, the notion of worker resistance is a deeply unsatisfactory one because it fails to distinguish different forms of resistance and their implications for the labour process. And if British employers were slow to abandon older tools and techniques, they nevertheless did so. Worker resistance secured better terms and conditions of employment but was incapable of altering in any fundamental way the new methods of organizing work and managing production.

In the labour process literature sparked by Braverman's *Labor and Monopoly Capital* the notion of worker resistance occupies pride of place. Where Braverman was concerned with "the shape given to the working population by the capital accumulation process"¹ his critics were near enough unanimous in insisting that capital accumulation was itself the product, in part, of the actions of the working population.² The working class, it was insisted, must have been part authors at least, in their own industrial history. All the more so in Britain because, according to Richard Price, "No other working class has so tenaciously or successfully elevated the phenomenon of workplace resistance to a central feature of its relations with the wider society".³

A parallel argument arising mainly from the literature of British economic decline also stresses the role of worker resistance in sustaining shop floor, craft organization with its retarding influence on the weak attempts at modernization by British capitalism. Craft resistance combined with employer conservatism to create "institutional rigidities", perpetuating older patterns of production organization.⁴ Even the failure to carry

¹ Harry Braverman, *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century* (New York and London, 1974), p. 27.

² Tony Elger, "Valorization and Deskilling: A Critique of Braverman", *Capital and Class*, 7 (1979); C.R. Littler and G. Salaman, "Bravermania and Beyond: Recent Theories of the Labour Process", *Sociology*, 16 (1982); D. Stark, "Class Struggle and the Transformation of the Labour Process", *Theory and Society*, 9 (1980).

³ Richard Price, "The Labour Process and Labour History", *Social History*, 8 (1983).

⁴ B. Elbaum and W. Lazonick, "An Institutional Perspective on British Decline", in B. Elbaum and W. Lazonick (eds), *The Decline of the British Economy* (Oxford, 1986); see

through the change to measured day work in the 1960s has been described as “the last chapter in a sequence of events which can be traced back to British management’s inability to break labour’s influence over the organisation of the workplace in the last decade of the nineteenth century”.⁵ And this largely because British employers had continued to rely on piecework systems which “resulted in a sharing of managerial authority and a crude form of industrial democracy, since labor was allowed control over the pace of work”.⁶

On this view, long into the twentieth century, the labour process and the peculiarly British class relationships which sustained it owed more to the traditions of craft workers and Victorian masters than Taylorism or Fordism. British employers, locked into fragmented product markets, unable or unwilling radically to reconstruct production methods, could be tough enough in defence of the right to manage but lacked strategic vision.⁷ A moderate, insular, backward looking, inefficient, ruling class, combined with an independent-spirited working class with its own strong sense of identity, produced a conservative symbiosis which purchased a degree of social stability at the expense of a more modern, meritocratic, bourgeois society.⁸

These issues, and these images of British capitalism, have, of course, been extensively discussed. Returning to them may nevertheless be worthwhile for two reasons. First, although employer conservatism and the degree to which employers’ strategies were constrained by product markets were important, both have been greatly overstated. It is clear, for example, that British employers were slow to adopt the managerial revolution spreading from the US, but in this respect they differed little from their continental counterparts.⁹ Taylorism, hotly debated before the First World War, had achieved the status of conventional wisdom before it ended. Managerial practice influenced by Taylorism developed more slowly and unevenly but was firmly established in planning and production engineering departments during the inter-war years. And between the wars

also Theo Nichols, *The British Worker Question: A New Look at Workers and Productivity in Manufacturing* (London, 1986).

⁵ W. Lewchuk, *American Technology and the British Vehicle Industry* (Cambridge, 1987), p. 215.

⁶ W. Lewchuk, “The Role of the British Government in the Spread of Scientific Management and Fordism”, *Journal of Economic History*, 44 (1984).

⁷ Paul Edwards *et al.*, “Great Britain: Still Muddling Through”, in A. Ferner and R. Hyman (eds), *Industrial Relations in the New Europe* (Oxford, 1992), p. 5.

⁸ Alan Fox, *History and Heritage* (London, 1985), p. 227; this view of the origins of industrial relations has many parallels with the critique of an “aristocratic establishment” in, for example, Martin J. Wiener, *English Culture and the Decline of the Industrial Spirit* (Cambridge, 1981); Perry Anderson, “Origins of the Present Crisis”, in P. Anderson and R. Blackburn, *Towards Socialism* (London, 1965); Correlli Barnett, *The Audit of War* (London, 1986).

⁹ S. Pollard, *Britain’s Prime and Britain’s Decline* (London, 1989), p. 54.

piecework was increasingly underpinned by more sophisticated time study, justified by their advocates in terms of which Taylor would have wholeheartedly approved.

Secondly, and this is the main focus of this article, the concept of “worker resistance”, now seemingly firmly established in the language of social science, is a deeply unsatisfactory one. It has been used indiscriminately to refer to everything from a refusal to work overtime to participation in the general strike, and includes the struggles of reactionary craftsmen, revolutionary engineers, and pragmatic pieceworkers.¹⁰ If employers were as disinterested in Taylorism as some have argued, it is fair to ask, in the context of the labour process debate, just what it was that workers were resisting, and why?¹¹ These are important issues if it is believed that worker resistance shaped the labour process and the character of class relations more generally, as well as helping to determine the trajectory of the British economy. As such the concept clearly has a much wider application than the labour process debate associated with Braverman. It has obvious relevance, for example, for the ways in which social, economic and industrial relations are being reconstructed at the end of the twentieth century and, implicitly, for the wider question of the extent to which the day-to-day struggles of the working class are capable of frustrating or even transforming capitalism. If Braverman’s working class appeared as a victim of capitalism, worker resistance inspires some of his critics to reverse the relationship.

The new production managers and work study engineers never secured the unfettered control envisaged in Taylor’s utopian schemes, and criticism of the weaknesses of production management surfaces again and again throughout the twentieth century.¹² But production engineers did come to dictate manufacturing methods to craftsmen and foremen; labourers and craftsmen were displaced by production workers; and rate fixers increasingly deployed Taylor’s weapons in the never-ending struggle over what constituted a “fair day’s work”. Worker resistance was completely incapable of altering in any fundamental way the direction of change. This does not mean that workers were powerless, or reduced to mere factors of production. In the new labour process, as in the old, workers fought their corner to good effect. But the ground on which the

¹⁰ Andrew L. Friedman, *Industry and Labour* (London, 1977).

¹¹ Tolliday notes that a loss of managerial control might simply lead to dog-eat-dog conflict rather than control passing to the union: S. Tolliday, “High Tide and After: Coventry Engineering Workers and Shop Floor Bargaining”, in B. Lancaster and T. Mason (eds), *Life and Labour in a Twentieth Century City* (Coventry, 1986). But for the most part, employer conservatism and worker resistance are simply added together as if they operated in the same way to inhibit the rationalization of production organization.

¹² H.F. Gospel, *Markets, Firms and the Management of Labour in Modern Britain* (Cambridge, 1992), p. 49; Political and Economic Planning, *Thrusters and Sleepers* (London, 1965).

struggle was conducted was largely determined by employers, and worker resistance was confined to the terms of labour's subordination to capital.

This argument is developed using evidence from the journals of the engineering institutions, and the records of employers and trade unions in the industry, in the period from the turn of the century to the Second World War. The engineering industry is, of course, familiar territory for writing about the labour process, and for good reason. It is, as Chandler remarked, the industry in which "the policies and procedures of modern systematic or scientific factory management were devised and perfected".¹³ In what follows I discuss the emergence of new forms of production management, changes in skill and division of labour, struggles over "the machine question", and new payment systems based on Taylorism. But I begin with a discussion of the limits of worker resistance within the labour process and the distinction, suggested by Braverman, between the labour process as the way work is designed and organized, and the wider social organization of work.

WORKER RESISTANCE AND THE LABOUR PROCESS

The labour process and the social organization of work are not synonymous. Essentially the same labour process, in the sense of the design and organization of work, is compatible with a variety of labour management policies and industrial relations practice. Quaker employers between the wars had highly developed personnel and welfare policies, but the labour process was similar in all essentials to that in Morris Motors, where the key to worker co-operation was thought to be a good night out on the town.¹⁴ Moreover, the degree of control which workers could establish over piecework rates, overtime rotas and the like, might vary widely without altering in any significant respect the nature of the work being done. In his *America by Design*, Noble remarks that "The most significant contribution of the scientific management movement, the one which had the most pervasive and lasting impact, was to secure managerial control over the production process and lay the foundation for the systematic reorganization of work". In his *Forces of Production*, he concludes that time-study men and other specialists "never truly succeeded in wresting control over

¹³ A.D. Chandler, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass., 1977), p. 244.

¹⁴ J. Child, "Quaker Employers and Industrial Relations", *Sociological Review*, 12 (1964); C.H. Northcott told the 36th Oxford Management Conference in 1937 that at Rowntree's cocoa plant in York, scientific management had been tested "with the workers educated to accept it as a procedure, philosophy and idea": *Scientific Management in Great Britain*, (Management Journals Ltd, 1937); Morris told the Institution of Automobile Engineers that if a man can go out on the town "and amuse himself, he will come to the works the next morning full of keenness" (*Proceedings, Institution of Automobile Engineers, XVIII* (1923-1924), p. 442. -

production from the workforce".¹⁵ Both statements are true. Engineers and scientific managers redesigned America, and workers fought back. The newly designed America became the site for new forms of an older class struggle. Similarly, the gang system at Standard's car plants in Coventry ceded, for a time, key controls to shop floor workers and their representatives.¹⁶ But the introduction of the gang system was preceded by a major time-study exercise in which hundreds of jobs were reclassified, and "craft union interests in particular job functions had to be overridden in the interests of securing the division of labour and allocation of work appropriate to the operation of a modern motor vehicle and tractor plant".¹⁷ This brings us back to the meaning of worker resistance for the labour process.

Paul Edwards argues that, "Once worker resistance is brought into the picture, and once this resistance is seen not as a residual category or as something which simply interferes with capitalist's goals, many of the issues raised in the debate have to be addressed in a new way".¹⁸ But this begs a number of critical questions. What form or extent of resistance constitutes a "residual category"? And if resistance does more than *interfere* with capitalist goals, at what point does it become incompatible with the continued existence of the system? Not all forms of worker resistance have the same implications for the labour process, nor are they intended to have.

Women, labourers and semi-skilled workers were just as much a target of the efficiency engineer and production manager as the skilled man. The triumph of improved machinery and administrative methods, noted a contributor to *Cassiers Magazine* in 1900, was the utilization of a vast resource, previously wasted, "the energy of the unskilled masses".¹⁹ The unskilled demanded access to semi-automatic machinery and semi-skilled work, but also fought the stop-watch to establish better conditions for themselves. The common interests they might have established with skilled men were too often obscured by a blinkered craft outlook, denounced, for different reasons, by employers and left-wing engineers. Additionally, while workers of all kinds resisted, their trade unions, often, did not. The union found it relatively easy to negotiate better conditions; almost inconceivable to conduct a struggle for a worker-determined division of labour. Change and "progress" were, as always, difficult to disen-

¹⁵ D. Noble, *America by Design: Science, Technology and Rise of Corporate Capitalism* (New York, 1977), p. 264; idem, *Forces of Production: A Social History of Industrial Innovation* (Oxford, 1986), p. 34.

¹⁶ D. Thoms and T. Donnelly, *The Motor Car Industry in Coventry Since the 1890s* (London, 1985).

¹⁷ S. Melman, *Decision Making and Productivity* (Oxford, 1958), p. 36.

¹⁸ Paul Edwards, *Conflict at Work* (Oxford, 1986), p. 45.

¹⁹ Francis H. Richards, "The Increasing Productiveness of Labour", *Cassiers Magazine*, 17 (November 1899–April 1950), p. 518.

tangle. The TUC rushed to compromise with the “Bedaux system”, a bonus scheme introduced to Britain from America by Chas. E. Bedaux, a disciple of Taylor, which was based on rigorous time study and a claim to have successfully measured worker effort. Communist engineers led the struggle against his system. But both were susceptible to the argument that the “mass production methods” on which Taylorism was based were progressive.

It is as well to remind ourselves at this point that neither workers nor employers were entirely free to choose their own historical route in any case. “Men (sic) make their own history but not in circumstances of their own choosing.” It is difficult to imagine what kind of resistance would have ensured the nineteenth-century millwright’s continued importance in the twentieth century, or a car industry between the wars which had not abandoned the bespoke methods of pre-war engineering. The great strength of Braverman’s account of the labour process is that it draws attention to the way the forces of production created by human beings appear for others as forces beyond all human control. It reveals clearly enough the reconstitution of the labour process as one conducted by management, and a deskilling dynamic which reverses the roles of labourers and craftsmen: a labour process in which the skilled man comes to service production workers rather than one in which labourers serve craftsmen.²⁰

At the same time, Braverman provides only a partial account of class at work because even if capital accumulation shaped the working class and its structure in general, class struggles and compromises gave classes and their relationships particular texture and meaning. Capitalism has meant not *only* the transition from the formal to the real subordination of labour; but *also* the mutual adaptation of contending classes. The social organization of production, if we can use this term to include all aspects of the employment relationship, is not reducible to the labour process as described by Braverman. If it were, it would be impossible to understand how, as Burawoy insists, the labour process generates consent as well as conflict.²¹ Burawoy is also right to insist that any “work context” involves a political, economic and ideological dimension, and that ultimately these are inseparable. However, his own distinction between relations *in*, and relations *of*, production does more violence to this unity than anything Braverman is responsible for. By making the organization of tasks in the labour process independent of the engine of exploitation which drives relations of production, Burawoy makes the labour process timeless, and therefore *ahistorical*.

²⁰ Bernard Doray, *From Taylorism to Fordism: A Rational Madness* (London, 1988), p. 62.

²¹ Michael Burawoy, *The Politics of Production* (London, 1985); despite all the sound and fury generated by Braverman’s use of the notion “class-in-itself”, both he and Burawoy appeal to E.P. Thompson’s notion of class-as-relationship! *Ibid.*, p. 39; Braverman, *Labour and Monopoly Capital*, p. 409.

These are not easy questions since ultimately they come down to the limits on human freedom set by the systemic nature of capitalism. Braverman follows Marx in seeing the labour process as the human activity of work, seized upon and transformed as labour power is consumed by capital in a value-producing process. The insights to be gained from deploying this theoretical framework are too valuable to be lightly discarded. But it is a highly *abstract* analysis of the fundamental character of the labour process, it is not a history. Labour process theory identifies immanent tendencies within capitalism. It does not, and could not, begin to describe the particular outcomes in a given, concrete capitalist formation where the level and development of production technique, history, culture and class struggle all play a part in shaping society.²² Peter Armstrong, citing Marx and Braverman, has explained this very clearly in a comment on deskilling. There is no inevitable, inescapable elimination of all skills at all places and at all times. There *is* a “deskilling dynamic – or ‘law of motion’ – intimately linked with the operation of the capitalist economy”.²³

Of course, immanent tendencies which never actually manifest themselves would be of little interest. That is why, so far as worker resistance is concerned, the key question remains that posed by Edwards, whether resistance did more than “interfere” with capitalist goals. Or to put it differently, whether worker resistance, or for that matter worker or employer co-operation, altered in any fundamental way the labour process spreading from America, based on the management of mechanization inspired by Taylor and Ford.

The evidence is that it did not. In a recent review of the debate Brown observes that “There does not yet appear to be, and may well never be, any comprehensive account of the circumstances under which workers, organised or unorganised, will resist management-initiated changes in the organisation and supervision of work, still less of their likely success”.²⁴ Littler claimed that a “major contribution” of his book, *The Development of the Labour Process in Capitalist Societies*, would be to explore “How much resistance to developing managerial control systems occurred in Britain, especially in the crucial inter-war period” (p. 3).²⁵ The result must have been disappointing. After criticizing Braverman for failing to take

²² Tolliday and Zeitlin are setting up straw men when they assert, against radical economists, Marxists and others that, “employers and managers must be treated as potentially autonomous historical actors whose substantive choices can modify as well as reflect their environment”; S. Tolliday and J. Zeitlin, “Employers and Industrial Relations – Between Theory and History”, in Tolliday and Zeitlin, *The Power to Manage* (London, 1991), p. 2.

²³ Peter Armstrong, “Labour and Monopoly Capital”, in Richard Hyman and Wolfgang Streeck (eds), *New Technology and Industrial Relations* (Oxford, 1988), p. 144.

²⁴ Richard K. Brown, *Understanding Industrial Organizations: Theoretical Perspectives in Industrial Sociology* (London, 1992), p. 208.

²⁵ Craig R. Littler, *The Development of the Labour Process in Capitalist Societies* (Guildford, 1982), p. 3.

account of worker resistance he finds that most union officials “had little conception that neo-Taylorite schemes would alter the structure of control over the labour process” (p. 189); that “trade union influence over the content of jobs and the hierarchy of the workplace has been insignificant” (p. 190); that rank-and-file resistance only tended to widen out the work of the systematizers and that “this lack of worker opposition was often influenced by the relative acceptance of Taylorism by the trade union officials of the 1930s” (p. 144). For all that Price urges that worker resistance poses an implicit challenge to capitalist domination he concludes that the dynamic of the labour process lies simply “in the continual search from both sides for a better bargain”.²⁶ Similarly, Batstone *et al.* dismiss Braverman’s argument about technology and skill because workers, though unable to affect the structure of capitalism, can acquire new rights (“industrial suffrage”) which “may significantly affect” their day-to-day position.²⁷ What is clear is that the search for a better bargain, a form of industrial suffrage which improves the day-to-day position of the worker, does not determine the labour process so much as negotiate the terms of the worker’s subordination within it.

Could worker resistance have done more than interfere with capitalist goals, made explicit the threat implicitly posed to capitalist domination? The answer must be “yes”, but the question really only takes us back to the inadequacy of the concept. Resistance at the point of production might constitute one element of a wider social crisis, but the resolution of such a crisis would be more likely to depend on political rather than industrial relations. Shop floor struggles can encourage class solidarities, but they can encourage sectionalism and division too. As Lenin noted a long time ago, the spontaneous struggle, to which the term “worker resistance” best approximates, tends to focus on demands for immediate improvements in industry and reforms in politics.²⁸ Skilled engineers, confronted by the dual threat of mechanization and new forms of management, did not engage in a struggle to defend a “craft mode of production”. They fought to retain job monopolies and higher rates of pay. Women workers at Rover and Lucas knocked the rough edges off Bedaux’s payment system and settled for better work targets and bonuses than they would otherwise have achieved. This was not simply a matter of pragmatism. There was no alternative programme of industrial management or work organization that had any currency. Quite the contrary. Scientific managers, and rationalizers of all kinds, represented “progress”. The appeal of science against rule-of-thumb impressed revolutionary engineers as well as the managers

²⁶ Price, *The Labour Process*, p. 62.

²⁷ E.I. Batstone *et al.*, *New Technology and the Process of Labour Regulation* (Oxford, 1987).

²⁸ V.I. Lenin, “What is to be Done?”, *Selected Works* (Moscow, 1970), pp. 119–270.

of discontent among trade union officialdom. "Worker resistance" was hopelessly ill-equipped to deal with this.

PRODUCTION MANAGEMENT IN ENGINEERING

Nevertheless, a considerable body of work now emphasizes the ability of skilled men to retain a grip on their status and functions. In engineering, it has been argued, the skill exercised by the craftsman on the eve of the First World War was "genuine",²⁹ and that employers failed to "break the back of craft regulation".³⁰ As late as 1935, it is suggested, "The continued centrality of skilled workers within the division of labour was the basis of the resurgence of workplace militancy".³¹ As evidence that the "deskilling pundits" got it wrong, Penn cites the numbers of skilled men in the engineering and electrical industries in 1966 and draws attention to the Leyland tool room revolt in 1972 to "remind us that skilled engineering workers are still very salient".³² The question of skill and division of labour on the shop floor is addressed below. But in the first place, the idea that skill remained "central" takes too little account of the rise of production engineering.³³

Taylorism in Britain only rarely appeared in the form of efficiency engineers like the Bedaux company, or the management consultancies which mushroomed briefly in the 1960s.³⁴ Its influence was felt, rather, in the management of mechanization by production engineers and planning departments which reconstituted the labour process as one conducted by management from the office. When Taylor's ideas for *A Partial Solution of the Labor Problem* were reported in Britain in the 1890s, the work of translating drawing office designs into production was still "left very largely to the knowledge and memory of the foremen and principal workmen, guided by tradition of previous similar work".³⁵ By the time Taylor

²⁹ C. More, *Skill and the English Working Class* (London, 1980).

³⁰ J. Zeitlin, "Labour Strategies of British Engineering Employers 1890-1922", in H.F. Gospel and C.R. Littler (eds), *Managerial Strategies and Industrial Relations* (London, 1983).

³¹ A. McKinlay and J. Zeitlin, "The Meanings of Managerial Prerogatives: Industrial Relations and the Organization of Work in British Engineering 1880-1939", *Business History*, 31, 2 (1989).

³² R. Penn, "Skilled Manual Workers in the Labour Process 1965-1964", in S. Wood (ed.), *The Degradation of Work?* (London, 1983), p. 78.

³³ I discuss some of the evidence for this in more detail in "Scientific Management and Production Management Practice in Britain between the Wars", *Historical Studies in Industrial Relations*, 1 (March 1996).

³⁴ P. Tisdall, *Agents of Change: The Development and Practice of Management Consultancy* (London, 1982).

³⁵ Alfred Herbert, "Machine Tools and Workshop Methods of a Former Period", *The Engineer*, 127 (March 1919), pp. 283-284.

died in 1915 that was ceasing to be the position even in Britain, and between the wars the rise of the “thinking departments” created new forms of production management with far-reaching implications for the work carried out on the shop floor.

The rapid pace of mechanization from the 1890s, and the dramatic development of high-speed steel tools “which at once rendered the machinists’ traditional knowledge of proper cutting feeds and speeds obsolete”, all created new possibilities for management.³⁶ “Modern methods are mental not mechanical in their essence”, declared *Engineering* in 1903, “They have their seat in the intellect of the manager”.³⁷ The worker, argued the editors, could no longer be allowed to decide what constituted a good fit and how it should be attained. “Modern manufacturing methods imply the laying down of principles to which all must conform [. . .] to make the heads of department think out each point completely and to prevent the workman thinking at all”.

By 1924 half the college-trained engineers could eventually expect to be employed on administrative work.³⁸ The most important initial location for the development of such new management functions was the drawing office. But the new production organizers also came from the works engineer’s or works manager’s staff, particularly from among the jig and tool designers. They were the “shop engineers”, the practical men who took the output of the works engineer to “study its manufacture”.³⁹ They formed the backbone of the Institution of Production Engineers which was founded in 1921 and which had a membership of a little over 2,000 in 1939. Their duties varied widely with the particular arrangements made in any given firm but could include “the organising and administrative work of production as it affects the factory”,⁴⁰ decisions on tooling, jig and tool design, methods and processes in fitting and assembly shops, and responsibility for rate-fixing departments.⁴¹ In some cases they were employed in the new planning and progress departments, “the first outward and visible sign of the application of scientific management to the factory”.⁴² Elsewhere they were grafted on to existing management structures.

³⁶ D. Montgomery, *The Fall of the House of Labour* (Cambridge, 1989), p. 231.

³⁷ “Modern Manufacturing Methods”, *Engineering*, 75 (February 1903), pp. 181–182.

³⁸ “Industrial Administration”, *Engineering*, 117 (March 1924), p. 311; see also, “Engineers of the Future”, *The Engineer*, 136 (December 1923), p. 672.

³⁹ J.D. Scaife, replying to the toast at the Third Annual General Meeting, Institution of Production Engineers, *Proceedings*, 4 (1924–1925), p. 9.

⁴⁰ W.J. Hiscock, “The Production Manager and the Progress Chief”, *Machinery*, 14 (1919), pp. 693–694.

⁴¹ Max Lawrence, “Production and the Engineer”, *Proceedings, Institution of Production Engineers*, 1 (1921–1922), pp. 23–41.

⁴² W.J. Hiscock, “The Progress Department – Does it Pay?”, *Machinery*, 16 (1920), p. 335.

Traditional craft-based, shop floor routines could not survive the rise of production engineering. Its first victim was the foreman. Once a “Czar in his own department”,⁴³ he was obliged to give ground on all sides to the new specialist departments. This process, already under way before the First World War, was more or less complete before the Second.⁴⁴ With the “separation of the preparation from the execution section of the work”, remarked one observer in 1921, much of the foreman’s job was now in the planning department and his real role was one of “patrolling supervision”.⁴⁵ He had less to do with managing production and more to do with managing workers. The job of the foreman was to give instruction to the men, not “instructions”, which now came from specialist departments.⁴⁶ He should consider himself, suggested T.H. Burnham, who devised many of the early training courses for foremen, as “doing an engineering job on material which consists of human beings”.⁴⁷

Its second victim was the craftsman. There is some question whether it is appropriate to speak at all about a “craft mode of production” at the end of the nineteenth century.⁴⁸ But in so far as it is still reasonable to see craft as the crucial component in workshop organization and management at the beginning of the 1890s, it is clearly no longer so at the end of the First World War. Between the wars the full effects of mechanization and management on skill and the structure of the engineering workforce made themselves felt.

SKILL AND DIVISION OF LABOUR

“On all hands science is working to reduce skill, not to increase it”, wrote *The Engineer* in 1909, “and whilst we are adding enormously to mental

⁴³ H. Maplethorpe, “The Foreman and His Job”, *The Foreman*, 34 (1923).

⁴⁴ J. Child and B. Partridge, *Lost Managers: Supervisors in British Industry and Society* (London, 1982); National Institute of Industrial Psychology, *The Foreman: A Study of Supervision in British Industry* (London, 1951).

⁴⁵ “The Duties of the Foreman”, *Cassiers Engineering and Industrial Management*, 5 (January 1921), pp. 11–12.

⁴⁶ “Report on Education for Foremanship”, *The Foreman*, 36 (July 1923).

⁴⁷ T.H. Burnham, *Modern Foremanship* (London, 1937), p. 55.

⁴⁸ Chris McGuffie, *Working in Metal: Management and Labour in the Metal Industries of Europe and the USA, 1890–1914* (London, 1985), p. 8. The case for the persistence of “craft control” can only be made by mixing up control which flows specifically from the deployment of highly specialized craft knowledge with the effects of partial job monopolies, and job controls of all kinds, by workers who may or may not be skilled, and with the effects of collective bargaining on the freedom of action of employers. Lazonick, for example, equates craft control with “the management of production”, but it is clear that by craft he means job controls, and the latter are certainly not “management”. The fact that pieceworkers have had to chase up materials late coming from the stores does not mean that employers have been willing to leave the control of work organization to the shop floor. Nor does the involvement of shop stewards in overtime schedules and staffing on jobs mean that they are “managing production”, though they may be laying down

ability at one end of the scale we are reducing at the other the value of manual dexterity.” This increasing differentiation of labour was reflected in (the largely unsuccessful) attempts to adapt the ramshackle practices of the apprenticeship system to supply the engineering managers, office staff, men with “craft-type” skills, and “skilled machinists” of all kinds that were now needed. Three categories of apprentice based on age and qualifications at entry was quite usual and it was also common enough for the lowest grade of apprentices to remain in one shop during the whole of their apprenticeship, as they did at the Midland Railway Company, a development that caused *The Engineer* to bemoan the fact that the process of modern manufacturing depended for its success “upon the degradation of the intelligence of the operator”.⁴⁹ Differentiation was also reflected, at the other end of the skilled labour market, in the “continuous migration of qualified trade apprentices to junior positions in the drawing offices, testing departments, and to rate fixing, inspection and assistant foremen positions”.⁵⁰ Craftsmanship had not been destroyed, argued an article in *Machinery*, “It is merely transferred from the many to the few”; in particular it had been transferred “to the engineer and the trained Executive while the workman is free to specialise in his own sphere”.⁵¹

Figures for the skill composition of any industry are notoriously unreliable because of the problem of definition and what *Engineering* called the “vicious practice” of classifying work on automatic machines as skilled because of the level of earnings achieved.⁵² Nor do they capture the key shift in control from shop floor to office. But all such figures tell roughly the same story. The proportion of engineering workers classified as skilled fell by nearly half, from 60 per cent of the total in 1914 to 32 per cent in 1933.⁵³ By 1931 there were twice as many machinemen as turners employed by federated companies. And throughout the inter-war period the engineering industry moved south, to the Midlands and London, out of the older trades into the newer ones, with their higher proportions of women and semi-skilled pieceworkers. By 1935 half of all engineering

conditions for those who are: W. Lazonick, “Employment Relations in Manufacturing and International Competition”, in Roderick Floud and Donald McCloskey, *The Economic History of Britain since 1700, vol. 2: 1860–1939* (Cambridge, 1994), p. 100.

⁴⁹ Reports on apprenticeship and training in *The Engineer*: “Education of Apprentices”, vol. 97 (January 1904), p. 43; “The Training of Managers”, vol. 99 (March 1905), p. 320; “The Midland Railway Co. System”, vol. 107 (April 1909), p. 399; “Unskilled Labour”, vol. 108 (October 1909), p. 372.

⁵⁰ A.P. Fleming, “Training of Apprentices for Craftsmanship”, *Engineering*, 143 (March 1937), p. 274. Metropolitan Vickers was unusual among big companies in having an apprenticeship scheme at all. The percentage of apprentices moving into the office cannot be taken as typical but indicates a trend.

⁵¹ “Skill and the Machine Age”, *Machinery*, 36 (August 1930), p. 625.

⁵² “Apprenticeship and Training”, *Engineering*, 126 (July 1928), pp. 107–108.

⁵³ J.B. Jefferys, *The Story of the Engineers* (London, 1945), p. 207; M.L. Yates, *Wages and Labour Conditions in British Engineering* (London, 1937), p. 32.

workers were employed in the motor industry and electrical engineering. By the late 1930s it was only on the periphery of the job that skills could be found that would stand comparison with the pre-war crafts. On one account in the AEU journal, "the only people near the work who may accurately be classed as skilled being the foreman, chargehands, markers out, machine setters and tool makers".⁵⁴

Worker resistance could hardly *begin* to engage with the rise of new forms of production management and focused almost exclusively on the "machine question", that is, the attempt by skilled men to monopolize work on new machinery. The "guerrilla war" in the workshops, which the Engineering Employers Federation (EEF) had feared would follow its victory in 1897, was soon under way. There were "encroachments" on the terms of settlement in 1898 in Newcastle and Bradford and strikes to remove handymen from machine tools in 1900 in Hull, Oldham and Bolton.⁵⁵ Few strikes succeeded directly but employers could be forced to make concessions. A circular letter from the Manchester District of the Engineering Trades Employers Association in 1907 chided its members for putting skilled men on "turret, capstan, semi-automatic and automatic machines generally".⁵⁶ But the ability of skilled men to resist machine shop change has been greatly exaggerated. In the first place the struggle was largely confined to the older industrial areas in the North East and Lancashire, and the challenge assumed serious proportions only in the years of widespread and general labour unrest before the war. The EEF responded with considerable sophistication, restricting disputes to the shop in question and avoiding a lockout.⁵⁷ A series of special conferences on the machine question were conceded in 1911 but were never intended by the EEF to resolve any of the issues. Victory in the second set-piece confrontation in 1922 reinforced the "right to manage" which the EEF had substantially secured in 1897.

The result, between the wars, was a degree of employer discretion which led to wide variations in machine staffing policies and pay between different companies and districts. On a range of machines, skilled or semi-skilled men might be employed, and at overlapping rates of pay. For example, in 1926 twelve firms reported skilled men paid between 44s and 56s on surface grinders, six firms employed skilled or semi-skilled labour, as appropriate, and paid between 30s and 48s, and 32 firms used semi-skilled labour paid between 31s and 43s. East Anglia summed up its use of vertical millers in 1935 with the phrase, "used by Tradesmen or

⁵⁴ "The Status of Engineering Workers", *Amalgamated Engineering Union, Monthly Report and Journal* (February 1937).

⁵⁵ Engineering and Allied Employers National Federation Minute Book, Modern Records Centre, University of Warwick, January, May, August, October (1900).

⁵⁶ Engineering and Allied Employers National Federation, Microfilm Records, Modern Records Centre, University of Warwick, MSS 237/1/161.

⁵⁷ EEF Microfilm Records, MSS 237/1/160.

labourers as required".⁵⁸ Some employers continued with their tacit agreement to union rates for men operating certain machines and the EEF continued to complain about it.⁵⁹ But for the most part, the right to manage meant the employer's right to determine pay according to "the skill required of the operator, the machine he is working, and the work upon which he is engaged".⁶⁰

Despite an absolutely inflexible commitment to "the right to manage", the EEF displayed a certain "constitutional" frame of mind advising members to give the required notice of any change and recognizing that "in Engineering there are certain classes of work belonging to the skilled men, other classes of work belonging to the semi-skilled men, and the unskilled work upon which labourers are employed".⁶¹ However, this was seen as wholly consistent with a deskilling strategy based on "the penetration of semi-skilled male labour" by retooling the job. This strategy the EEF distinguished from dilution which they defined as placing women or semi-skilled men directly on skilled work. The question of dilution would not arise, argued the EEF, "so long as managements introduce these semi-skilled men on suitable work provided through deskilling the operations and by the supply of jigs and tools". A similar position was taken with respect to trainees from government centres. Members were urged to avoid direct substitution "and to see that the penetration of semi-skilled men in the industry is carried on in the proper way – by de-skilling the work and making it a semi-skilled job before the semi-skilled man is put on it".⁶²

The technological bias of EEF deskilling policy, and its constitutionalism, may have provided unintended supports for claims by skilled men to particular sorts of work, or even for the skilled rate on work which had effectively been deskilled. There was room for compromise on details of staffing and pay. At a more fundamental level there was little the union could do. At Coventry Chain in 1913, following the separation of roughing from finishing operations, the Amalgamated Society of Engineers (ASE) tried to argue that the subdivision of labour could not be treated as an improvement in methods of manufacture. But the argument was about earnings on the finishing operation, not the subdivision of labour. Workers, and even more so, their unions, "are obliged to specify their grievances in a form which permits resolution *in negotiation with employers*".⁶³ At Armstrong Siddeley in 1935 the Amalgamated Engineering Union (AEU) organizer reported a works conference, "to consider the question of the splitting up of jobs in the aero engine fitting shop". It was the union's

⁵⁸ *Ibid.*, MSS 237/13/4/5.

⁵⁹ EEF Minutes, March 1925.

⁶⁰ *Ibid.*, October 1929.

⁶¹ *Ibid.*, July 1936.

⁶² *Ibid.*

⁶³ Richard Hyman, *Strikes* (London, 1977) p. 124.

contention that “unreasonable reductions in prices had taken place during this arrangement”, not that the jobs should not be split up.⁶⁴

Worker resistance could not halt or reverse the changes taking place in the nature of the work or way it was organized and executed. For many of the more far-sighted in the union, “resistance” was complicated by the recognition that the union, its members and its methods needed to change. “Our lives are at stake”, wrote Jack Tanner, in 1925, arguing that an industrial union “must not be held back any longer by ancient traditions”.⁶⁵ Unions for the unskilled, the semi-skilled and women, demanded and secured an agreement in 1924 for an increase of 2s an hour above the district rate for labourers put on machines in Lancashire and Cheshire.⁶⁶ In October 1926 the editor of the AEU journal told his readers that, “Standardisation and mass production wherever it can be introduced is the order of the day, and these new methods of manufacture are making interchangeability of work more possible – teaching us that the interest of all workers is identical”.⁶⁷

However, such appeals to the solidarities of industrial unionism fell on deaf ears as the craftsmen retreated to strongholds of skill like the tool room, and fought a rearguard action “to preserve as much work as possible for members of the craft”.⁶⁸ Resistance of this sort certainly enjoyed a degree of success. The category of machineman disappears from EEF records in the 1930s, many of them now reclassified as skilled.⁶⁹ Entry to many jobs still required a skilled ticket irrespective of the requirements of the job. In 1946, for example, slotters, planers and shapers in the Midlands and the South were promoted from the shop floor but union restrictions in the North ensured the continuation of apprenticeship for this work.⁷⁰ The *earnings* of skilled men, whether in skilled work or not, generally stayed ahead of the semi-skilled, although the earnings of skilled men on time work failed to match those of semi-skilled workers on piecework.⁷¹

⁶⁴ *AEU Journal*, February 1935.

⁶⁵ Jack Tanner, “Our Next Steps – Left Foot First”, *AEU Journal* (April 1925); Frank Smith from the AEU Branch in Battersea wrote pointing out that, “As the instruments of progress the operative engineers have been used first, to dilute and simplify the labours of all other workers. Parallel with this we have greatly simplified and diluted our own, and in the very nature of things this process must continue. Progress demands and insists on the simplification of the methods of production” (September 1923).

⁶⁶ EEF Minutes, February 1924.

⁶⁷ *AEU Journal*, October 1926.

⁶⁸ G.D.H. Cole, *British Trade Unionism Today* (London, 1945), p. 354.

⁶⁹ In 1920 a rough estimate by the EEF classified 25 per cent of machinemen as skilled, but a higher percentage will have been paid as skilled workers in the 1930s: EEF Microfilm Records, MSS 237/13/3.

⁷⁰ EEF Minutes, May 1946.

⁷¹ R.A. Hart and D.I. McKay, “Engineering Earnings in Britain 1914–1968”, *Journal of the Royal Statistical Society*, ser. A, 138 (1975); K.G.J.C. Knowles and D.J. Robertson, “Earnings in Engineering 1926–1948”, *Bulletin of Oxford University Institute of Statistics*, 13 (1951).

Such compensations enabled the skilled man to negotiate some sort of place in the new industrial order. But even as skill shortages developed with rearmament and short-lived economic recovery in the late 1930s, the craft union was obliged to make long overdue adjustments to the underlying realities. In 1929 the AEU formally accepted the EEF's criteria for machine staffing as the basis for negotiations on grading, and in 1936 the union finally abandoned its refusal to co-operate with the National Union of General and Municipal Workers (NUGMW) and the Transport and General Workers Union (TGWU) in attempting to persuade the EEF to agree a grading structure for the industry. By 1937 the numbers of semi-skilled members finally exceeded the numbers of skilled. The machineman had been absorbed into a new hierarchy of skill, but one largely divorced from the "knowledge, dexterity, power of decision and judgement in combination" associated with craft skill of an older type.⁷²

PAYMENT BY RESULTS

In his *Artisans and Labour Aristocrats?* Hobsbawm pays tribute to a group of "younger historians" whose influence is apparent in the argument that job monopolies and workshop controls provided an extended lease of life for craftsmen, and in the assertion that the shop floor position of engineers had been strengthened "because the system of payment by results, which employers preferred to Taylorist or Fordist strategies, laid the base for endless shop floor conflicts and, in consequence, shop steward power".⁷³ There are two confusions here. Firstly, the new payment systems on which employers relied were increasingly based on Taylorist principles. Secondly, the criticism of British employers for relying on piecework usually depends on a distinction between Taylorism and Fordism in which the latter serves as an alternative "machine-paced" labour strategy.⁷⁴ But this distinction cannot be sustained. Taylor thought the motor industry an excellent example of the implementation of his principles. And if Ford did not use piecework, most American employers in the first half of the twentieth century did.

Premium bonus schemes, which linked earnings to time saved in completing a job, were introduced around the turn of the century. They fell a long way short of Taylor's demands for rigorous time study and "task management". Indeed, they were initially popular among employers because their regressive bonus returns appeared to offer a safeguard against inadequate rate fixing. But premium bonus nevertheless entailed

⁷² C.G. Renold, "Mass Production and Skill in Industry", *Cassiers Industrial Management*, 15 (May 1929), p. 157.

⁷³ E.J. Hobsbawm, "Artisans and Labour Aristocrats?", in idem, *Worlds of Labour: Further Studies in the History of Labour* (London, 1984), p. 269. Hobsbawm refers to, among others, Lewchuk, McLelland, Reid, Melling, Price and Zeitlin.

⁷⁴ Lewchuk, *American Technology*.

new attention to work standards and time study. Its advocates stressed the value of the system for bringing "management into touch with the methods of the workshop".⁷⁵ Its critics at the Federation of Engineering and Shipbuilding Trades denounced it as "an adaptation of the most pernicious and degrading condition of employment in modern industrial history – the task work system".⁷⁶ If premium bonus was altogether less scientific than Taylor's plan, it was nevertheless designed as a means of making the worker "disclose the real time required for the execution of a piece of work about which the management has shown its complete ignorance".⁷⁷ It was for this reason that, despite fierce opposition among engineers, there were also fears that once established the scheme might be abolished! The ASE had insisted in Clause 4 of the Carlisle memorandum that no firm should establish a premium bonus system without intending to adhere to it. The fear was that the system would be introduced to find out what workers could do and the firm would then revert to day work.

The struggle against premium bonus, as with the machine question, was fiercest in the North East where only 7 per cent of fitters and turners worked under the system in 1913, and least controversial in Coventry and London where 43 per cent did so.⁷⁸ Though premium bonus was most common among the newer machine trades and often associated with works reorganization, the struggle was overwhelmingly defined by questions of work rate and pay. "At Barrow", reported Cole, "the workman has usually been able to earn a good percentage on his day rate, because the time allowances give a good margin. This being so, he has not bothered his head, as a rule, about the fundamental justice or injustice of the system under which he is working."⁷⁹ On this score, worker resistance made its mark. Rowan abandoned the practice of paying the premium in steps of 5 per cent because the men had worked out whether or not they could make the next bonus payment and if they could not, made the job last. As premium bonus spread during the war, so did criticism that its regressive feature, far from safeguarding the employer, only led to renewed restriction of output. A correspondent pointed out to *The Engineer* in 1917 that the system "was not as perfect as you would have us believe". The return to the worker fell after saving 50 per cent of the time, but "if the men are awake, they take care not to reach this point. They figure it all out to a half penny".⁸⁰

⁷⁵ Professor Barr, of Barr and Stroud, responding to Rowan's paper on premium bonus, *Engineering*, 75 (March 1903), p. 411; William Rowan Thompson thought premium bonus brought to light defects and shortcomings in the management and organization of the works: EEF Microfilm Records, MSS 237/3/1/205.

⁷⁶ *Ibid.*, MSS 237/3/1/204.

⁷⁷ Carl Barth, "Premium Systems as Applied to Machine Shops", *The Mechanical Engineer*, 25 (1910), pp. 112–113.

⁷⁸ EEF Microfilm Records, MSS 237/13/3/4.

⁷⁹ G.D.H. Cole, *The Payment of Wages* (London, 1918), p. 53.

⁸⁰ Letters, *The Engineer* (January 1917), p. 45.

War completed the conversion of the engineering establishment to the principles of scientific management and focused renewed attention on rate fixing, and as this grew more sophisticated between the wars, premium bonus declined.⁸¹ Sam Mavor, of Mavor and Coulson, described how his firm replaced it after the war by “a system based on F.W. Taylor’s work on time study”, which ceded no control to the shop floor, shop stewards or anyone else.⁸² If he shared Taylor’s illusion that time study would remove rate fixing from the “region of opinion, argument and bargaining”, he very clearly understood that payment by results depended on proper workshop organization and planning by the “thinking organs” of the factory. Formerly, Mavor argued, no one knew what a fair day’s work was: “now the firm knows and the men know that the firm knows”.

Payment by results schemes generally were not as systematic as the scheme at Mavor and Coulson’s. Indeed, Mavor was sharply critical of contemporary standards of rate fixing. But the preference for piecework among production engineers and managers, among those who wrote about such things, was for piecework backed by time study in the Taylor tradition, the purpose of which was precisely to *secure* control of labour.⁸³ This was most obviously the case with self-consciously Taylorite schemes such as Bedaux. But it was just as true for the piecework system that operated at Austin’s Longbridge plant.⁸⁴

Worker resistance was fiercest, however, when the Bedaux system was introduced. And the first thing to note is that Bedaux, like Taylor, was concerned with all kinds of labour, not just that of skilled men. And that it was semi- and unskilled women and men, at Rover and Lucas, at Wolsey Hosiery and Vanesta, who carried the fight against Bedaux, even if they were often inspired by skilled AEU members operating in their capacity as Communist Party activists. The skirmishes between the skilled men and the efficiency engineers were less frequent and, for the craftsman, less important, than the management of mechanization.

Labour gains against Bedaux were impressive. Although the TGWU settled a strike against Bedaux over the heads of the women trimmers at Rover, the agreement ensured that the notorious “B values” of the Bedaux scheme were to be “treated as piecework prices and dealt with under the

⁸¹ Yates, *Wages and Labour Conditions*, p. 86.

⁸² S. Mavor, “Payment by Results and Ratefixing”, *Journal of the Institute of Engineers and Shipbuilders in Scotland* (October 1930), pp. 11–53; idem, “Time Study in Engineering”, *ibid.* (October 1931), pp. 53–72; idem, “The Mavor and Coulson System of Time Study and Rate Fixing”, *ibid.* (October 1932), pp. 13–53.

⁸³ See the debates among production engineers between 1930 and 1932: *Proceedings, Institution of Production Engineers*, vols 10 and 11.

⁸⁴ Austin’s works manager, C.R.F Englebach, claimed that each job was graded according to skill, that possible piecework earnings were worked out theoretically in advance by the efficiency department, and that inefficient operatives were weeded out: “Some Notes on Reorganising a Works to Increase Production”, *Proceedings, Institution of Automobile Engineers*, XXII (1927–1928), p. 510.

recognised rules of procedure”, as well as securing rates of pay for the women which outraged the EEF.⁸⁵ A revolt of women workers at Lucas forced the withdrawal of Bedaux engineers, and even though the company replaced Bedaux with a “shadow scheme”, it seems to have modified work targets sufficient to quell unrest. The defeated strikers at Henry Hope returned to work with only a promise that there would be no extension of the system until local conferences had been held. But in this case the employer seems to have won an uncertain victory because the firm found the men working on Bedaux “working at only half the speed they did before the strike”.⁸⁶ The EEF estimated that 10 per cent of strike days lost in 1933 were due to time study and work measurement and it was said that “there was scarcely a Federated firm which has introduced the Bedaux system without having a stoppage of work”. The EEF promptly disowned Bedaux.

The Management Board of the EEF, meeting in July 1933, resolved that the Federation could take no responsibility for trouble which arose from the introduction of the Bedaux system, since the Federation agreements demanded that any system be agreed directly between the management and its workforce and not by outsiders. This stance was not, however, entirely the consequence of strikes. It was also influenced by a certain conservative insularity which was increasingly the hallmark of the organization. The EEF reissued an earlier circular from 1928 which advised members to resist inducement to “institute in their works systems of payment by results which do not conform to the terms of the national agreements which are in existence or the practices observed between the Federation and various trade unions”.⁸⁷ The objection, repeated in 1945, was to those consultants who “on occasion failed to have regard for the psychology of the British workman, and have made ostentatious and unnecessary display of the stop watch in their assessment of times”.⁸⁸

Worker resistance forced Bedaux to concede a degree of “mutuality”, that is, mutual agreement between worker and employer with respect to the time allowed for a job. At Taylor Bros in Manchester, the Iron and Steel Trades Confederation (ISTC) reported modifications “which are considered to give satisfactory results”; the Amalgamated Weavers claimed to have destroyed its undesirable features in the Lancashire Cotton Corporation Mills so that “the scheme is not now the Bedaux system at all”; and the Amalgamated Hosiery Union at Wolsey told the TUC that the system had been modified after the strike at Wolsey in Leicester and now had some “good features”. The Wolsey agreement provided that studies

⁸⁵ EEF Microfilm Records, MSS 237/3/1/235; Laura Lee Downs, “Industrial Decline, Rationalisation and Equal Pay: The Bedaux Strike at the Rover Automobile Company”, *Social History*, 15 (1990).

⁸⁶ EEF Minutes, June 1933.

⁸⁷ *Ibid.*, July 1933.

⁸⁸ *Ibid.*, June 1945.

would be done on good, bad and indifferent work to find a fair average; that the premium would be 95 per cent; and that values, once established, “would be altered from time to time as conditions varied, by arrangement between management and the worker”.⁸⁹

Bedaux’s managing director, Norman Fleming, described the 1930s as a decade of stagnation for the company as a result of the backlash from Bedaux-inspired labour troubles in America as well as strikes in Britain.⁹⁰ The company was, therefore, delighted by the muted criticism in the TUC pamphlet on Bedaux published in 1933. The TUC denounced all systems which reduce “the worker to the status of machines”, but thought “Bedaux is capable of being applied, in a manner, and with modifications, that may make it less harmful than many other systems”.⁹¹ The following year, the TUC advised the Leather Workers, who were inclined to encourage “some cussedness” among members faced with Bedaux, that the system was “simply a particular method of payment by results based upon a certain method of work measurement”.⁹² Will Thorne, of the NUGMW, wrote to Vanesta, where his members were on strike against Bedaux and fighting pitched battles with police and strike-breakers, offering his services as a “disinterested person” to help resolve the dispute.⁹³ The settlement, when it was achieved after more than a month, was based on an offer rejected by a mass meeting two weeks into the strike. Even so, it was a qualified victory for the strikers. The Bedaux experiment in the tin-foil department would continue but a joint committee would be established to study the operation of the system and a worker was to be trained in the Bedaux system to act as a representative of the men. There would be no extension of Bedaux without the agreement of the Joint Committee and any difference arising would be referred to a conference of the company and the union.⁹⁴

No one should underestimate the significance for the workers concerned of partial victories over the Bedaux engineers. At the same time it is a fact that total Bedaux assignments stood at 280 in 1936, at 540 in 1943 and 3,200 in 1959.⁹⁵ Time and motion study, in its modern work study form, spread more rapidly during and after the Second World War. After

⁸⁹ Records of the Trades Union Congress (TUC), Modern Records Centre, University of Warwick, MSS 292/112/2.

⁹⁰ Brownlow Papers (undated); private collection held by Ms Mildred Brownlow, former research director for the Bedaux Company (hereafter Brownlow).

⁹¹ Trades Union Congress, *Bedaux: The T.U.C. Examines the Bedaux System of Payment by Results*, TUC MSS 292/112/2.

⁹² TUC to W. Collingson of the National Union of Leather Workers, 15 February 1934, TUC MSS 292/112/3.

⁹³ McConnell, 28 April 1933, Ministry of Labour Reports, Public Record Office, London, LAB2 149/IR404/1933.

⁹⁴ Institute of Personnel Management Records, Modern Records Centre, University of Warwick, Vanesta MSS 97/5/17.

⁹⁵ Brownlow, undated.

a generation of full employment and amid unprecedented levels of shop floor organization and activity, a survey of manufacturing plants found 64 per cent used some form of work measurement, and 41 per cent of them used work study in connection with schemes of payment by results.⁹⁶ Battles on the ground continued, as ever, but the scope of trade union co-operation *widened* as work study techniques became more commonly used. "We could never have achieved what we did at ICI", wrote the leading British work study authority, R.M. Currie, in 1964, "but for the increasing understanding and confidence of the British trade union movement".⁹⁷ Worker resistance failed to root out Bedaux and time study but did succeed in negotiating the kind of adjustments which made it possible to "humanize" what Braverman had described as the increasingly dehumanized prisons of labour created by scientific management.

CONCLUSIONS

Clearly, not all employers used time study or relied on production engineers. Most were slow to abandon older tools and techniques which still made money. But some did, and more followed, more often in the newer industries than the old and in the Midlands and the South where the new industries were increasingly concentrated. Differences among employers are evident from tensions within the EEF, between those pressing for more extensive "dilution" and their more cautious, constitutional colleagues, distrustful of outside consultants and anxious to proceed without excessive conflict. Nevertheless, as the inter-war period drew to a close production engineering was more generally established, and the pre-First World War artisan was now increasingly relocated on the periphery of the production process, either in a shop floor support function or into new production management functions in the office.

Direct assaults on the skilled man in which the production process was radically reconstructed were relatively rare. New technologies, new industries, new managers, and new rules, routines and procedures which taken together create quite new production organizations, are, more often than not, experienced in a partial, piecemeal, incoherent way by the people whose lives are changed by them.⁹⁸ It is relatively simple to engage with this process by defending sectional interests, seeking improvements in pay and limits to demands for more effort or output. It is quite another matter to determine the general character of the labour process itself, or defend

⁹⁶ M. White, *Payment Systems in Britain* (Aldershot, 1981), p. 70.

⁹⁷ R.M. Currie, "Work Study – The Basic Management Service", *Time and Motion Study* (November 1964).

⁹⁸ Littler makes a similar point, observing that craft deskilling has occurred in a non-confrontational way with the growth of new industries, geographical locations and "the development of new production processes", *The Development of the Labour Process*, p. 141.

older production methods against the corrosive effects of change. Worker resistance was largely directed to achieving a "better bargain". Its considerable successes helped determine the nature of the accommodation which workers made with a process that lay beyond the reach of everyday life.

That is why it is necessary to see the labour process from two sides. Braverman depicts labour as a value-producing process, driven by the demands of exploitation, and one in which the tendency to deskilling and degradation of labour took a particular, Taylorist, twentieth-century form. Seen from this vantage point the contours of this process are represented faithfully enough by Braverman, for the UK as well as the US. But the labour process which he describes does not coincide with the social organization of production in all its rich historical detail, any more, incidentally, than did the analysis of the labour process in the nineteenth century provided by Marx.⁹⁹ It abstracts from the details of the production process as lived, as experienced by workers and employers, managers and trade unionists, to depict the social and industrial consequences of a new phase of capital accumulation. And so long as the settlement of struggles such as those at Rover in 1930 and at Vanesta in 1933, or the outcome of countless shop floor battles over the machine question over half a century, did not halt or reverse the processes set in train by the scientific-technical revolution, the insights provided by this perspective remain indispensable. We are led to understand how the labour process, while being the creation of human beings, takes on the appearance of a natural, irresistible force.

At the same time the working class and their trade unions, employers and their managers, also made themselves. It is out of events like those at Rover and elsewhere that industrial relations and, in part, class relationships, are forged. The bargains struck by pieceworkers, successes and failures in extracting the skilled rate on machines employed on semi-skilled processes, the restriction of entry to particular groups on certain jobs, and the consequences for working-class unity as well as employer control, all constituted part of a wider social organization of production that its participants *actually* become conscious of, and the events out of which its history was also made. The relationship between the labour process and the social organization of production could produce curious results. Paul Thompson notes that the work of Coventry car workers has been deskilled but, "Paradoxically, Coventry engineers took a pride in the very specialisation which was in a more general sense a sign of their own deskilling".¹⁰⁰ This leads to an interesting discussion of shop floor culture but the odd conclusion that "Coventry

⁹⁹ Paul Thompson argues that Marx too, "failed to reconcile adequately his analysis of the transformation of work and the form and content of workers' struggles", *The Nature of Work* (London, 1983), p. 58.

¹⁰⁰ Paul Thompson (Snr), "Playing at Being Skilled Men", *Social History*, 13 (1988), p. 58.

skilled men of the 1970s had already survived by a full half century the dire collapse of the labour aristocracy portrayed by Hobsbawm".¹⁰¹ But whatever it was that had survived into the 1970s, it wasn't Hobsbawm's labour aristocracy! Much of the confusion running through the labour process debate is founded on the paradox of Coventry's skilled men. If they *were* a late twentieth-century labour aristocracy, they were an aristocracy produced by a Taylorist labour process.

There is some evidence here for the conservative symbiosis said to constitute the core of British class relationships. "Slack masters make slack men", observed Bertram Austin and W. Francis Lloyd, following a trip to America in 1925.¹⁰² But the idea that employers and unions "became locked into a relationship in which each could frustrate the other in the workplace but could not achieve a larger victory",¹⁰³ seriously understates the power employers actually exercised throughout the twentieth century in determining the conditions under which shop floor struggles were conducted. Worker resistance scarcely touched the development of new forms of production management directed from the office. On the shop floor workshop controls and trade union job monopolies provided some lingering protection for "craft" privilege, though this proved easier to sustain in the tool room than the machine shop. But even during what Hobsbawm describes as "the last triumph of the Victorian trades" in the late 1930s, the AEU was obliged, at long last, to make a *joint* approach with the general unions on the issue of machine staffing and grading, only slowly, and belatedly, recognizing the writing that had been on the wall since the First World War, if not from the turn of the century. Artisans had become "merely one set of workers among many others".¹⁰⁴

What then is the balance sheet of worker resistance to Taylorism? In sum, workers were unable to resist the transformation of the labour process but they did modify its effects and shape its character, in ways which were real and historically significant. E.P. Thompson recounts in his essay, "Time, Work-Discipline and Industrial Capitalism", how "The first generation of factory workers were taught by their masters the importance of time; the second generation formed their short-time committees in the ten hour movement; the third generation struck for overtime or time-and-a-half. They had accepted the categories of their employers and learned to fight back with them".¹⁰⁵ Suitably rephrased this would not be a bad guide to the real history of worker resistance

¹⁰¹ *Ibid*, p. 67.

¹⁰² Bertram Austin and W. Francis Lloyd, quoted in Geoff Brown, *Sabotage* (Nottingham, 1977), p. 228.

¹⁰³ Edwards, "Muddling Through", p. 6.

¹⁰⁴ Hobsbawm, "Artisans", p. 266.

¹⁰⁵ E.P. Thompson, "Time, Work-Discipline and Industrial Capitalism", in *idem* (ed.), *Customs in Common* (London, 1991), p. 390.

in the labour process. Artisans became one set of workers among many others, but their unions and shop floor traditions secured some compensating advantages. And the semi-skilled women and men, who fought the Bedaux efficiency engineers in the midst of depression, went on after the Second World War to construct a whole new range of job controls of their own.¹⁰⁶

¹⁰⁶ Jacques Belanger and Stephen Evans, "Job Controls and Shop Steward Leadership Among Semi-Skilled Engineering Workers", in M. Terry and P.K. Edwards (eds), *Shop Floor Politics and Job Controls* (Oxford, 1988), p. 151.