TRANSFERRING FORDISM: THE FIRST PHASE OF THE OVERSEAS DIFFUSION AND ADAPTATION OF FORD METHODS, 1911-1939

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Recent years have seen numerous attempts to transfer best practice Japanese industrial principles to Western economies. Although the precise nature of those 'industrial principles' remains controversial, mainstream thought among industry, academics and government has stressed the imperative of learning from them, either through direct Japanese investment or through imitation by Western companies.

For some of the most sanguine advocates of the new system such as James Womack, Daniel Jones and Daniel Roos, the message is simple: "Lean production is a superior way for humans to make things.....It follows that the whole world should adopt lean production, and as quickly as possible".[1] In the early 20th century, these authors argue, Fordism provided a similar universally superior system of production. However, its transfer to the rest of the world was bungled and mishandled with unfortunate results. Comparing the transfer of Fordism with the current transfer of 'lean production' methods from Japan they conclude: "Early in this century, most Europeans were unable to differentiate the universal ideas and advantages of mass production from their unique American origins. As a result, ideas of great benefit were rejected for a generation. The great challenge of the current moment is to avoid making such an error twice.[2]

This essay examines the attempts by the Ford Motor Company to transfer its methods to its British operations, its largest European subsidiary in the interwar years. It looks at the feasibility and desirability of transferring Fordism in this period and reaches conclusions almost diametrically opposite to those of Womack, Jones and Roos. This conclusion, it will later be suggested, also casts doubt on their approach to the contemporary transfer of 'lean production'.

1. THE EARLY FORD SYSTEM

Much of the difficulty in analysing the diffusion of either Ford or Japanese methods rests on the prior difficulty of defining exactly what those methods consist of. Despite a great deal of research, the core of the Ford system is still surprisingly poorly understood. Many historians, perhaps most notably Lewchuk, Meyer and Gartman, have focused much too exclusively on the role of the assembly line itself, often stressing its role in the control of labour as well as its impact on technical productivity.[3] Other studies, however, have increasingly stressed that the assembly line was the tip of an iceberg, a final step which fully released the potential of a series of earlier related innovations.[4]

The assembly line was not in and of itself the key to mass production. Other automobile companies in Detroit such as Brush and EMF had adopted assembly lines some years before

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[1] James p. Womoack, Daniel T. Jones Daniel Roos, *The Machine That Changed the World* (New York, Macmillan, 1990) p 225

[2] Womack, Jones and Roos, *Machine That Changed the World* p. 10. They go on to emphasize that the geo-political significance of this failure was great: "because mass production hadn't progressed, the European economy stagnated, creating the conditions that helped lead to war" (p.234)

[3] Wayne Lewchuck, *American Technology and the British Vehicle Industry* (Cambridge UP, 1987); Stephen Meyer, *The Five-Dollar Day : Labor management and social Control in the Ford Motor Co 1908-21* (Suny, 1981); David Gartman, *Auto Slavery. The Labor process in the American Automobile Industry*, 1897-1950 (Rutgers UP, New Brunswick, 1986)

[4] David Hounshell, *from the American System to Mass Production*, 1800-193*2* (Baltimore, Johns Hopkins UP, 1984); Womack, Jones and Roos, argue that "the key to mass production wasn't as many people then and now believe - the moving, or continous, assembly line" *Machine That Changed the World* pp.26-7; Daniel M. G. Raff, 'Making Cars and Marking Money in the Interwar Automobile Industry: Economies of Scale and Scope and the Manufacturing behind the Marketing' *Business History Review* 65, 4, Winter 1991 p.727

Ford.[1] Moreover, it is important to remember that, even during the months before the first assembly lines were introduced in 1913, the Highland Park factory using stationary assembly work-stations was producing at a rate of one vehicle every 40 seconds or 800 per day, equivalent to 200 000 vehicles per year. It is chastening to note that no single European company attained such a level of output for another forty years.

This is not to deny the dramatic reductions in assembly labour time that the introduction of the line permitted. Chassis assembly was reduced from 134 to 67 hours: engine assembly was reduced from 36.6 to 23.07 hours). But, to keep this in perspective, the various assembly tasks to which Ford applied the moving assembly line represented probably less than a fifth of the total labour time in the manufacture of a car.

However, analysts who agree that the assembly line itself was a less central breakthrough for Ford differ in emphasizing the importance of varying elements in the system. The most commonly cited include innovations in interchangeability, new special purpose machine tools (especially those capable of working already hardened steel), standardisation and the single-model policy, simplification of design, radical de-skilling, and control of the flow of work. Hounshell perhaps best summarises these views in arguing that the assembly line was simply one element in a 'great flood' of innovations and changes during the crucial period 1912 to 1914. In other words, the real contribution of the line was to link together on a huge scale vastly increased amounts of high speed manufacturing capacity.

From this perspective, it would appear that insufficient attention has yet been paid to the huge wave of vertical integration between 1912 and 1914, when Ford brought nearly all its key manufacturing processes in house, achieving huge productivity gains by applying its methods to all the key components. Classic examples of this are the foundry described by Hounshell, or engine block grinding installation.[2] In this period, Ford invested a massive $14.5m, of which only $ 350 000 was on the assembly line in the chassis shop.[3] Ford was compelled to introduce a very high level of vertical integration because its needs ran far ahead of the ability of its suppliers to supply him in the volume and the rigorous quality he demanded. Centralisation of manufacture was a necessary step. Once this had been successfully achieved by 1913, the key problem became 'assembly' rather than the manufacture of the millions of parts. The high level of integration also made possible, both here and later at the Rouge, remarkably low levels of inventory and something very similar to modern just-in-time production.[4]

One implication of this was that Highland Park (and later the Rouge) were principally giant manufacturing plants which despatched kits for final assembly at US branch plants and overseas subsidiaries.[5] In 1921, for example, Highland Park assembled only 9.5% of the total company production of 928 000 vehicles.[6] Most of the branch plants in the US were relatively small at this stage (Ford opened 36 between 1912 and 1925). The two largest, at Chicago and Minneapolis had capacities of 200 000 and 225 000 cars per year, but most produced considerably less than 40 000 vehicles per year.[7] Many of these plants retained stationary assembly methods until 1919, and the major rebuilding program to fully convert them to flow production did not take place until a huge building program was carried out by Kanzler and

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1 Lewchuck, *American Technology* p.48

2 Hounshell, f*rom the American System ;* Womack, Jones and Roos, *Machine That Changed the World* pp.36.7

3 Wayne Lewchuk, 'Fordist technology and Britain: the diffusion of labour speed-up' in David Jeremy ed., *The international Diffusion of Technology* (Edward Elgar, 1992)

4 Allan Nevins and Franck Hill, *Ford: Expansion and Challenge,* 1915-1933 (Charles Scribner and Sons, 1963) p. 155, 166

5 Allan Nevins, *Ford. The Times, The Man, The Company* (Charles Scribner and Sons, 1954) p. 266, 285-6, 297, 358-9

6 Gerald T. Bloomfield, *The World Automotive Industry* (Newton Abbot, David & Charles, 1978) p. 292

7 Nevins, *Ford* p. 266; Bloomfield, *Automotive Industry* Fig 69 p.294

Edsel Ford between 1923 and 1925.[1] The pattern of Ford's core operations in the early years of its internationalisation was therefore one of a massive capital intensive manufacturing core with a periphery of generally modest sized and dispersed assembly plants. The huge cost advantage that the company enjoyed came not so much from low conversion costs in these branch plants as from the huge manufacturing economies of scale in its foundry, machining and components departments in its central plants.

2. THE INITIAL TRANSFER

Views on the extent and viability of the transfer of Ford methods necessarily vary according to the how different writers define the essential elements of the early Ford system. Probably the most influential view has been that of Lewchuk who sees it as a high productivity system based on production co-ordination and labour control, with the assembly line providing the key to the enhanced centralized managerial control that was vital to its effectiveness. Lewchuk notes that the assembly line itself involved very little new capital investment and argues that simply using the line to reorganize work could in and of itself be expected to have dramatic consequences for productivity because "management had taken direct control over the setting of effort norms and was using machine pacing to speed up work pace".[2]

Hence, for Lewchuk, Fordism was in essence cheaply and simply applicable and could be implemented at 'surprisingly low levels of output'..... "Fordism was capable of supplying massive markets. Whether massive markets were necessary for Fordism seems doubtful".[3] As a consequence of this, he argues, there were no significant technical, market or scale barriers to Fordism. What, therefore, accounts for the 'incomplete diffusion' of Fordism to Britain? Lewchuk points to sociopolitical factors as being determinant. Management's (mistaken) perceptions of labour attitudes meant that British management in other British automobile companies held back from attempting to implement the new methods and was "unwilling, as distinct from unable, to reorder authority relations on the American model, making other aspects of Fordism less attractive".[4]

Lewchuk is somewhat reticent on the actual reasons for Ford's rather modest performance in interwar Britain. However, his view is clearly that Fordism was a superior system that could (and implicitly should) have been transferred to Britain, but which was blocked by sociopolitical obstacles with unfortunate consequences. His view has been taken up, endorsed and, as we shall see later, elaborated by Womack, Jones and Roos.

In sharp contrast to this view, the position taken here is that the transfer of Fordism in the sense which these writers use it was neither feasible nor desirable in this period. It was not a case of sociopolitical obstacles preventing the adoption of a superior technical regime. It was a major error by Ford and others to think that the 'universal ideas and advantages of mass production' could be divorced from their unique American origin. A better path was a process of intelligent and selective application of elements of Ford methods in different national contexts and markets. The British manufacturers, in general, did so successfully in interwar Britain and generally outperformed Ford in the UK as a consequence. Hindsight about their post-War performance should not be allowed to obscure the fact that - despite undoubted deficiencies -

[1] Nevins, *Ford* p. 266
[2] Lewchuk, 'Diffusion' p. 14
[3] Lewchuk, 'Diffusion' p. 23
[4] Lewchuk, 'Diffusion' p. 7

they devised a system that was more profitable and productive in this period than the Fordist transplant.

British market conditions made it unlikely that Ford's American methods could simply be reproduced there. In the first place, the UK market was a stark contrast to the expansive, egalitarian market of the USA. While Ford alone produced nearly 2 million cars in the United States in 1923, total UK car production was only 182 000 in 1929, reaching a pre-war peak of 390 000 in 1937. No single firm sold more than 100 000 cars in any year before the War and no single model attained 70 000.[1]

These sorts of volumes of output had all been comfortably handled by pre-assembly line methods in the USA. But it is probably more relevant to ask whether the size of the market could have been dramatically expanded by a radical cheapening of the product by 'mass production' methods. In the first place, British car prices were dramatically reduced by British 'hybrid' methods in this period. By the mid 1930s, Morris, Austin and Ford all offered small cheap cars in the £100 to £120 bracket (roughly $350 to $400 at 1935 exchange rates).[2] In the US at this time the cheap entry-level cars of the day, Chevrolet, Plymouth and Dodge, all retailed between $475 and $695.[3] Ford and American producers pioneered the low price car for the mass market in the 1920s, but having opened up the market with low prices, they found that cheap cars yielded only small profits and re-oriented their competition towards price/quality competition. By the late 1920s, they were, in effect consciously abandoning the entry-level market to be served by second-hand cars, and retreating up market to less price sensitive segments. With the expansion of installment selling this pattern was reinforced by the adoption of a philosophy at GM and later at Ford and others that the retail price was of much less significance than the affordability of monthly installments.[4] By the mid-1930s it was the Europeans who were arguably the real front-runners in low-cost new cars for first-time buyers.

These points are underlined by consideration of income distribution patterns. US per capita average incomes were more than double UK incomes in this period, and while in the US income distribution was fairly even, British income distribution was severely skewed towards the wealthy. As late as 1938, there were only 2.5 million people in Britain with incomes of £250 or more, while registered car ownership had risen to 2 045 000.[5] The problems in diffusing car ownership more widely in Britain are further underlined by the question of running costs. At the end of the 1930s, the running costs on a typical 8 h.p. car have been calculated by Bowden as £57.10 or more than a third of the original purchase price for such a car. British and European manufacturers had made significant innovations in improving fuel economy and performance to reduce these costs (the running costs of typical cheap US cars would have been far higher), but even so, the running costs alone provided a road block to much wider sales in an income constrained economy.

Thus the British market was bound to be quantitatively smaller, and it was also qualitatively different. The work of Maxcy and Silberston and Church and Miller has demonstrated that

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1 George Maxcy and Aubrey Silberston, *The Motor Industry (*London, George Allen & Unwin, 1959)

2 SMMT, *Motor Industry of Great Britain* 1937 p. 11

3 Martha Olney, *Buy Now, Pay Later. Advertising, Credit, and Consumer durables in the 1920s (*Chapel Hill NC, University of North Carolina Press, 1991) Table 4.5, pp. 103-5; S. M. Bowden, 'Demand and Supply Constraints in the Inter-War UK Car Industry: Did the Manufacturers Get it Right?' *Business History* 33, 2, April 1991 p. 256, quotes average retail purchase prices of all cars in 1936 as L210 in the UK and L159 in the USA. But this reflects the much higher proportion of luxury cars in overall UK sales. In terms of opening up the market to new buyers it is the price of the comparable entry-level segment of cars that is relevant.

4 Arthur J. Kuhn, *GM Passes Ford, 1918-38: Designing the General Motors Performance-Control System (*Pennsylvania State UP, 1986) pp. 214-5, 279-80; Ralph C. Epstein, *The Automobile Industry* (Chicago, 1928; reprinted, 1968).

5 Bowden, '*Demand and Supply*', pp. 255, 245

through the 1920s, the UK market was a restricted quasi-luxury one dominated by the well-off who bought family cars of medium size and price. In the late 1920s this market was stagnating and sales almost stood still from 1925 to 1933. But the general recovery of middle class incomes in the 1930s boosted sales to a new higher plateau in the mid-1930s. A whole new income layer was tapped by small but diverse and well-equipped cars. Competition was by model and design, not primarily price, and the diversity of the market precluded the firms with the leading mass-produced models from exerting or increasing their dominance in the overall car market. Thus though Morris and Austin were able to build their combined market share up to 60% in 1929, they retreated under pressure from several vigorous smaller firms in the 1930s and in 1938 took only 45% of the market, with Ford, Vauxhall, Rootes and Standard all advancing to claim over 10% of the market each.[1]

British mass production, therefore, in contrast to the USA, emerged from a long transition period of intermittently enlarging quantity-flow production. The keynote of the market was quality and continuous improvement rather than quantity and price competition. Mere internal economies of scale could not guarantee market dominance and profitability depended primarily on bringing forward the right new models in an evolving market. The frontier of mechanization was, therefore, continuously shifting and rigorous machine-pacing was limited in its scope. Tasks were regularly reorganized and even in the most advanced flow systems of the 1920s and early 1930s, the separate operations at each stage still needed time and attention by individual workers for efficient completion. Firms therefore looked to adaptable payment systems with strong incentive elements to get the most out of their new machines and new forms of work organization.

The more limited levels of output and different goals of production still made possible the adoption of many important elements of Fordist mass production. Even smaller relatively specialized firms like Humber or Rover utilized many of these techniques, such as special-purpose machine-tools, the moving assembly line, work rationalization and the purchase of components from specialized outside suppliers. Especially important was the transfer of machine-tool technology. A tool uch as the Norton camshaft grinder did in 15 mins what had previously required 5 hours of skilled handwork and it was only such tools that could effectively deal with the lightweight hardened alloy steels that were central to automobile manufacturing.[2] The British and European manufacturers came to use them for their quality, precision and flexibility even though they did not require their speed. During the 1920s British machine-tool producers began to produce their own range of tools more adapted to British conditions.[3] All of these elements could be adopted gradually without launching a full-scale Fordist system. Indeed it would have been counter-productive to pursue the inflexible indivisibilities of American-style Fordism.

Many of Europe's leading automobile producers were seduced by the power and technocratic beauty of Ford's factories and sought to imitate them. But the conditions did not exist for them totransplant the integrated system of marketing, production and labour that characterized Ford in America. Ford himself, as we shall see, sailed close to disaster as a result of trying to graft its American strategy on toBritish conditions. In France and Italy, Berliet, Citroen and Agnelli

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1 Roy Church and Michael Miller, 'The Big Three: Competition, Management and Marketing in the British Motor Industry, 1922-1939' in B. Supple ed., *Essays in British Business History* (Clarendon Press, Oxford, 1979); Roy Church and Michael Miller, 'Motor Manufacturing' in D. Aldcroft and N. Buxton eds., *British Industry Between the Wars* (1979); Maxcy and Silberston, *Motor Industry*

2 R. S. Woodbury, 'Machine Tools' in `T. I. Williams ed., *History of Technology. Twentieth Century (*NY, 1978)

3 James Foreman-Peck, 'The American challenge of the 1920s: multinationals and the European motor industry' *Journal of Economic History* 42, 1982 p. 872

(Fiat), in particular, were "dazzled by the Ford spectacle" and nearly ruined themselves when their capital-intensive plants, designed for single mass-products, could not cope with the upheavals resulting from demands for more varied and changing models[1].

The history of Ford's determined attempts to transpose his methods intact to his British operations between 1911 and 1939 highlights the problems that Fordism faced in the context of other national markets. Only rather belated adaptation enabled a version of the system to survive.

Ford initially preferred to export to Europe, but transport costs for built-up cars were high and the threat of protectionnist tariffs loomed. As a result, Ford established manufacturing operations in Manchester in 1911, bringing in engines and chassis from Detroit and manufacturing their own bodies. Before the First World War, Ford enjoyed notable success with large-scale sales of the Model T in Britain, and by 1913 this was the largest car-producing factory in Europe. In that year, Ford's Manchester factory produced 6 139 cars, compared with the next-best European producers, Peugeot and Renault, with around 5 000 cars apiece, and the second largest British producer, Wolseley with about 3 000 cars[2]. Ford installed its first moving assembly line at Manchester in 1914, only one year after Highland Park.

In both France and the UK sales of cheap small cars stayed below 15% of total sales before the war, and the emphasis was on larger and generally more costly cars. Ford was able to penetrate the UK market dramatically by offering a similar-sized car at much lower prices. Most British producers concentrated on quality cars for this sector of the market, but Ford's vigorous marketing campaign was able to overcome resistance to 'cheap and nasty' American cars and uncover a potential market for rugged basic transportation in Britain, though the more nationalistic French market remained resistant to the Model T.[3]

Before the First World War, Percival Perry, the Ford-England Managing Director, had managed; to introduce a certain number of modifications into Ford product and distribution policies to adapt them to British conditions. These included some modest design changes, the introduction of Right-hand drive cars, and a non-exclusive dealer system which also allowed dealers to make further modifications to the vehicles for local tastes.[4] But following the War, Ford, Sorenson and Detroit insisted on a reversion to the most rigid adherence to Detroit standards. The Right-Hand drive version was withdrawn and, in conformity to American practice, Manchester produced only left-hand drive cars.[5] Discussing these policies, a frustrated Perry warned: "it is no use burying one's head in the sand and going ahead applying policies over here, no matter how successful they may have been in America, because conditions here are different".[6]

Shortly afterwards, Perry was forced out after a dispute with Detroit over dealership structures precipitated a rift with Henry Ford. Detroit wanted to introduce a system of exclusive dealerships to replace the standard British dealer pattern, which Ford-England had so far

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1 Sylvie Van de Casteele Schweitzer,"Management and Labour in France" in Tolliday and Zeitlin eds., Automobile industry and its workers; Yves Cohen, "The modernisation of production in the French Automobile Industry between the Wars: a photographic Essay" Business History Review 65, 4, Winter 1991; Duccio Bigazzi, "Management and Labour in Italy, 1906-1945" in Tolliday and Zeitlin eds.eds., Automobile industry and its Workers (1986); J.P. Bardou, J.J. Chanaron, P.Fridenson and J. M. Laux, The Automobile Revolution: The Impact of an Industry (Chapel Hill, Univ. of North Carolina Press, 1982) pp 91-139

2 James M. Laux, In first gear: the French Automobile Industry to 1914 (Liverpool University Press, 1976) p. 199.

3 Patrick Fridenson, 'French Automobile Marketing, 1890-1979' in Akio Okochi and Koichi Shimokawa eds. Development of Mass Marketing: the Automobile and Retailing Industries (University of Tokyo Press, 1980) pp. 127-143.

4 Nevin, Ford pp. 362-3; Mira Wilkins and Frank E. Hill, American Business Abroad. Ford on Six Continents (Detroit, 1964) p. 50

5 Perry to MacGregor, 28th April 1919 Acc. 6, Box 260

6 Perry to C. E. Sorenson, 30th September 1919. Acc 328 Box 1

employed, where dealers were permitted to sell the cars of several makers at the same time.[1] Insistence on this policy by Perry's successors caused serious stress and problems in Ford's distribution in early 1920s.[2]

At the end of the war, innovations by Austin and Morris showed that the main competitive arena for cheap cars in Britain had shifted to the area of diverse and well-equipped small cars. Ford, however, stuck rigidly to their cheap and basic single Model T. The period 1919-28 was the 'American era' in Ford of Britain. Detroit aimed to Americanize their British management, and after Perry's resignation, they put in a series of generally short-lived Managing Directors from the United States under instructions to introduce a complete imitation of American products and methods.

These managers were all trained in Ford branch plant operations in the US or Latin America and imbued with Ford methods. Nevertheless, once installed in Britain they invariably became the subject of torrents of abuse from visitors from the parent plant. Bate lasted only seven months; Warren was terminated abruptly by telegram from Detroit. Adaptation to local conditions was seen as a betrayal of the Ford creed, and managers sent over from Detroit to report on the progress of operations were invariably baffled or shocked by what they found. On one occasion they reported that local management 'did not understand automobile work'[3]: on another the visiting inspector expressed incomprehension: "You will remember we sometimes felt that there was a lack of organisation here or there, but imagine yourself in a place where the word organisation isn't even known, planning and scheduling is unknown".[4]

Managers schooled in the rhythms of Highland Park found it virtually impossible to understand the problems of a plant working below capacity, unable to sell its output and moving rapidly to local sourcing under pressure of rising tariffs. By 1924 Manchester had moved to 92% local sourcing. It was no longer simply assembling Detroit kits but had slipped into a manufacturing role on a pragmatic basis, relying on new local suppliers and struggling to deal with all the attendant problems of quality and product flow.

The rigidity of Detroit policy and management methods had clearly detrimental results, but most crucial in the developing crisis at Ford was the refusal of Detroit until the late 1920s to listen to continued appeals from European engineers and managers for a new smaller car to replace the hefty and outdated Model T. Local managers had no doubt from an early stage that radically different markets and motoring conditions required different products. Shorter average journies, higher petrol prices, more differentiated and restricted demand, and intrusive and costly taxation systems were all conducive to significantly smaller and more economical cars.

By 1925, a visiting Detroit engineer noted, "the entire Manchester organization are hoping that the company will give them a redesigned motor so that they can overcome the well-nigh impregnable sales resistance they now encounter".[5] Yet Detroit refused to listen with the result that by the mid-1920s, Ford sales in Britain were collapsing utterly during a period of rapid expansion of overall auto sales. (See Table 1) Between 1913 and 1929, Ford's share of the

[1] Wilkins and Hill, *American Business Abroad* pp. 50-1, 141
[2] Wilkins and Hill, *American Business Abroad* p. 141; Mira Wilkins interview with H. Mortimore, former Ford Sales Manager, 26 th August 1960
[3] Klann to Gehle 22nd December 1923
[4] Gehle to Gnau, 8th February 1924. Ford Archives.
[5] Report on Foreign Branches by W. S. Carnegie', n.d. 1925. Ford Archives. Acc. 157, Box 266

British market fell from 24 to 4 per cent. By 1926, their senior managers admitted that "we have been defeated and licked in Britain".[1]

Thus Ford's single-product model strategy proved quite inappropriate to Britain in the 1920s. It was accompanied by a parallel attempt by Detroit to introduce American-style methods of labour management into their British operations. In their early days at Manchester, Ford encountered considerable problems with the craft unions in thir body-making departments. In 1911-12, Percival Perry, the Managing Director, reported to Detroit that the Sheet Metal Workers' Union "have almost broken my heart"[2] with their activities. As a result, in 1912, Detroit sent in one of their leading managers, Charles Sorenson, to bust the unions with a deliberate campaign of scking unionists and wooing the remaining workers away from the union with high wages and promises of job security. The result was that by April 1914, Perry could report to Henry Ford that "the unionism which has always been cropping up heretofore has been absolutely broken up". Sorenson himself noted on a return visit to Manchester that, even though there was no other employer in Manchester "who is not obligated in some manner to labor organizations, I can also say that we are the only company in the vicinity who are absolutely free and independent and who are not having controversies any more with their men".[3]

In their account of Ford's British decline in the 1920s, Womack, Jones and Roos attribute a central role to a crisis in labour management relations. They argue that before the war Ford had effectively raised Manchester productivity close to Highland Park levels. "Seemingly, mass production had triumphed in a new setting". But, they continue, Ford's British management then succumbed to a common malaise of British managers: an unwillingness to get involved in "the nitty gritty of running anything". Moreover:

"they were persuaded that Englishmen, with a long experience of craft working, would not tolerate Ford methods. For a short period perhaps- under the whip hand of the American managers- but certainly not over the long term.
Consequently, managing the shop floor soon became, by default, the responsibility of the shop steward, who typically was a skilled craftsman highly suspicious of mass production. These front-line managers lobbied to retain traditional skills and piece-rate payment systems, which made no sense in continuous-flow production, where every worker's effort is paced by that of every other worker. The performance of Ford's English plants went backward to a point where an enormous gulf developed between practice in Detroit and in Old Trafford ... With the Ford Motor Company.... making such a poor showing, it's hardly surprising that Ford's English competitors embraced mass production with only partial success".[4]

This is nothing but wild fiction.[5] In fact, Manchester remained an almost union-free factory until it was closed after the opening of the big new greenfield Dagenham plant in 1932. During that period, Ford established and maintained a high level of unilateral control over their workforce. One senior manager from this period recalled how, "the men were treated like nothing.....we hired and fired so rapidly that it was hard to keep track of what was going on".[6] They kept out unions and maintained the pressure for maximum intensity of work from individual workers.

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[1] E. Kanzler, quoted by Nevins and Hill, *Ford* p. 410

[2] P. Perry to Henry Ford, 26 February 1913. Acc. 62, Box 59

[3] P. Perry to Henry Ford, 14th April 1914, Acc. 38 Box 52; C. E. Sorenson, 'Report to Henry Ford' 3rd June 1914. Acc. 62, Box 59

[4] Womack, Jones and Roos, *Machine That Changed The World* pp. 230-1

[5] They do not state where they got this wildly erroneous notion from, but context suggests that it may be based on a gross misreading of Lewchuk, *American Technology and the British Motor Vehicle Industry*.

[6] H. Mortimore, Sales Manager Ford Limited, interviewed by Mira Wilkins, 26 August 1960. I am grateful to Prof. Wilkins for allowing me to consult her interview typescripts.

The most dramatic manifestation of this policy was, perhaps, the work of the "Yougos", a selected team from Detroit who toured the European plants in the mid 1920s sacking any 'surplus' labour they could spot. (Their name derived from their practice of patrolling departments and sacking people on the spot: "O.K. You go, you go and you go!".)[1]

It was despite such high levels of authoritarian control and not because of their absence that Ford were unable effectively to Americanize production methods at Manchester. Without high levels of demand and throughput, American methods created serious problems for local management, who were shackled on overall labour policies by Detroit. In order to adapt the functioning of the factory to local conditions they had to improvise whenever they could evade Detroit's supervision. For instance, they needed to adjust production to erratic levels of capacity utilization, deal with irregular supplies of parts of sometimes inadequate quality, to cope with frequent interruptions of production, or to solve accumulated problems of detailed engineering. Local management often believed that this required a more stable and integrated workforce than a hire-and-fire system allowed. Hence local management sometimes sought to keep their workforce together, to stabilize fluctuations in employment when sales fluctuated wildly and even to operate their own informal seniority system for workers. At the same time they saw advantages in seeking a contented labour force through allowing self-help welfare activities in the factory or tolerating working practices such as smoking on the job or tea breaks.[2]

These working practices existed only as long as management tolerated them. A Detroit inquisition in the winter of 1923 was scandalized by these practices and overrode the wishes of local management to get them scrapped. There was no visible resistance from the men to these changes and the Detroit team's diagnosis of the situation stressed the fact that the problems they observed in the factory were not the result of worker resistance but of the attitudes and practices of management and supervision. They were scathing about the "bunch of clowns" who managed their British operations and the "stiff white collars" of supervision who refused to get their hands dirty and drive production. Periodically, Detroit decided to send someone "to go over and fire the whole bunch", as they did in 1924, but the new management that they installed invariably slipped into similar attitudes.[3]

Henry and Edsel Ford's dogmatic attempts to replicate their American 'formula for success' in very different conditions frustrated and bemused many of their British managers. Their desire to implement a high wages policy in Britain was a case in point. In the USA, high wages were linked to high output and high effort by strict job standards and supervision. But in the context of work organization at Manchester the link was more tenuous. In so far as high wages were part of their general European policy of paying 10-25% above local wage rates to make unions unattractive, the policy had some logic: but at Manchester, the high-wage policy was fetishized and the link to high productivity was quite absent. By 1928 Ford wages were up to three times as high asthose in neighbouring factories, and Henry and Edsel Ford regularly turned down appeals from British managers to be allowed to cut wages. When Perry returned as Managing Director in 1928, he severely criticized this practice and argued that, "High wages are a sound investment on our part, but only up to the point where we can use high wages as an inducement to greater industry and efficiency, and I am convinced that we have passed this point.....Our present rates are past even the limits of philanthropy". Eventually he got permission to hire new labour at reduced rates, though not to cut the wages of existing workers.[4]

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[1] Wilkins and Hill, *American Business Abroad* pp. 155-7

[2] Reports from E. C. Kanzler, T. Gehle, and W. Klann on Manchester operations, 1923-4, in Select File (Ford Archives); and W. S. Carnegie, 'Report'.

[3] Klann Reminiscences (Ford Archives) p. 141; Reports by Gehle and Klann, Winter 1923-4

[4] P. Perry to Edsel Ford, 7 August 1928 (Select File)

3. RELUCTANT HYBRIDATION: FORD 1928-1939

Ford's 1928 Plan marked an important shift in its policies towards its European subsidiaries. It retreated on 'Americanization' and provided for more European nationals in management and even some participation by local capital. In Britain, Percival Perry was brought back as Managing Director after nine years in the wilderness with a newly enhanced degree of branch autonomy.

Perry's first task was the introduction of the Model A to Europe. For the first time, the European model, which had a smaller engine (the AF), differed significantly in design from its US stablemate. But it remained essentially an American car. Ford cars remained distinctly bigger and more expensive than Austin or Morris, and the primacy of American methods was actually reasserted with the construction of a massive new works at Dagenham between 1927 and 1932, designed to be a one-tenth scale version of the River Rouge plant in Detroit. The plan was that Dagenham, like the Rouge and Highland Park but unlike Manchester, would be a massive manufacturing centre serving the smaller European assembly plants. Dagenham would have a similar relation to Europe as the Rouge had to the branch plants. In this way, it was hoped, by integrating the European operations Ford could at last tap the economies of scale that had hitherto escaped it. In the event, the extension of Dagenham's supplying role was largely frustrated by European protectionism in the 1930s and plans for Dagenham as an exporting base miscarried. The plant was originally planned to have a capacity of 250 000. This was finally cut back to 120 000. But the plant never produced more than 72 000 in any single year in the 1930s.

The challenge of GM and Sloanism in the United States during the 1920s had forced Ford firstly to introduce the Model A (1928) and then to accept the need for continuing model changes and improvements. In Europe, Ford allowed a modified AF engine to be installed in its UK car, but it was not until 1932 and the launch of the Model Y that Ford accepted the need for genuinely local models. Even so, the Model Y was engineered and styled in Detroit with only strictly limited British assistance.[1]

The success of the Model Y and its successors in the 1930s, however, enabled local British engineers to gradually win more initiative and almost surreptitiously insinuate local design modifications. On one occasion the Dagenham chief engineer, A. R. Smith, introduced some changes to the camshaft design to facilitate more economical working. Caught out, he received a cable from Sorenson that read curtly: "SMITH. ARE YOU AWARE THAT WE ARE CONTROLLING DESIGN OVER HERE. SORENSON" and only kept his job because of vigorous defence by Perry.[2] Nevertheless, growing design independence was steadily if somewhat perilously achieved, culminating in the launch of the primarily British-designed Anglia and Prefect just before the Second World War. When Patrick Hennessy took the designs and models to Detroit to seek approval he sailed close to the wind. Sorenson blew up and angrily told Hennessy to "Take an ax and chop them up" before finally being won over. Despite these successes, these developments remained exceptions to rather than a reversal of Ford policy that English activity in car design was "strictly forbidden".[3]

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[1] Wilkins and Hill pp. 240-1
[2] Cable CES to ARS 26th April 1932; Perry to Sorenson, 26th April 1932. Acc 38 Box 71
[3] Wilkins and Hill, *American Business Abroad* pp. 288-92

Despite these national adaptations, Ford's system continued to experience serious difficulties in the 1930s. Even with the revival of sales associated with the Y and the later Popular, Ford were never able to generate the volume of sales necessary to run Dagenham at more than half its total capacity. They were only able to sustain this volume by slashing their prices - notably with their £ 100 car in 1935. But these practices depressed profits too and the company went through the 1930s with a more or less constant cash crisis. Perry's launch of the £ 100 Ford in 1935 was a rather desperate gamble for profit through volume, forced by Dagenham's huge overcapacity. Though it increased market share, the overall demand conditions meant that even dramatically cheap models like these could not trigger the opening of truly mass markets and the experience was financially ruinous.[1] In contrast, the more measured and carefully rationalised operations of Morris Motors were able to produce a similarly cheap car in similar volumes at a good profit in these years.[2]

One consequence of Ford's financial problems was an unrelenting drive to intensify labour and cut costs, together with a reversal of the previous high-wage policy. In April 1932, wages were cut by 10 per cent. The result was a spontaneous strike and the first stirrings of union activity in the plant. Ford acted quickly to nip this in the bud. Twenty years after his first union busting mission to Manchester, Sorenson was again sent in to 'clean house' and again achieved the desired results.[3] The unions were driven out of the plant and kept out until late in the Second World War, despite considerable efforts by the TUC and the local Trades Councils to organize membership campaigns there in the late 1930s. Dagenham in the thirties had the reputation of a 'place of fear', with an extensive anti-union spy system, arbitrary layoffs and sakings, speed-ups and driving supervision. In the late 1930s, the company introduced rudimentary pensions and paid holidays, and began to let wages rise again - partly to forestall unionization attempts. But at no stage were there any incursions on Ford's managerial prerogatives.[4]

Thus the inflexibility of the Ford system was softened at the edges and a limited amount of national adaptation was introduced. But its core remained poorly adapted to British circumstances, and despite a partial recovery in the 1930s, Ford never really prospered before the Second World War.

4. EFFECTIVE HYBRIDATION: THE BRITISH PRODUCERS

It was the British firms, Morris and Austin that devised the most effective product and labour strategies to respond to the growong and shifting market. Unlike Ford, they attached a much higher priority to quality and improvements in their models and looked for continuous improvements in the production process rather than seeking to establish a system with a fixed level of productivity. They avoided excessive capital intensity in order to maintain flexibility, both for model improvements and so that they could respond to thes seasonal and cyclical fluctuations, which continued to mark the industry throughout this period, by layoffs and short-time working. In combination with this, they drove labour to intense efforts through tightly controlled piecework systems and took great pains to ensure that they retained a free hand continuously to rationalize the production process.

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1 Wilkins and Hill, *American Business Abroad* pp. 199-310; Church and Miller, 'Big Three' pp. 168-173

2 Richard Overy, *William Morris, Viscount Nuffield* (Europa Publications, 1976) pp. 45-66

3 C. E. Sorenson, 'Memorandum' 4 October 1933. Acc. 572, Box 18; P. Perry, transcript of interview with Mira Wilkins, August 1960

4 Steven Tolliday, 'Ford and 'Fordism' in Post-War Britain: Enterprise Management and the Control of Labour, 1937-87' in Steven Tolliday and Jonathan Zeitlin eds. *The Power To Manage?* (Routledge, 1991)

These practices can clearly be seen in the example of William Morris's factory at Cowley in Oxford. During the 1920s, Morris established a clear lead in the British industry. In the early 1920s, he annihilated competition by making high quality medium-sized cars at low prices. Between 1919 and 1928, the main Cowley plant was exclusively geared to the mass production of a single model, the 11.9 h.p. Cowley. In 1921 Morris made 3 000 cars: by 1925 this had risen to 55 000. Morris was fascinated by Ford's methods, and it might appear that this explosion of output provided a basis for imitating them. He did incorporate selected elements of Ford's methods into his factory, but he combined them with other practices to develop a distinctive system of his own. He had an assembly line of sorts at Cowley from 1914, with cars rolled along a track by hand to the next work station. But he did not mechanize it and make it a moving assembly line until comparatively late, in 1933.

Morris was willing to experiment with the most advanced forms of mechanization, notably the pioneer transfer machines introduced at his Coventry engine factory in 1923; but when it became apparent that this new technology was too rigid for his current requirements, he quickly abandoned it. Instead he focused on continuous incremental improvements in productivity within his own factory, and by buying in a greater proportion of his components from outside suppliers than the more vertically integrated Ford, was able to concentrate his attention on perfecting key component and assembly operations without tying up large amounts of capital in component production.[1] Thus, even after the great leap forward of the early 1920s, Morris was able to keep the size of his workforce stable at 5 000 to 6 000 and yet continue to increase his output of cars per worker from 6 to 11.6 between 1924 and 1934. This figure compared extremely well with the British average of 6 cars per worker in 1935.[2]

Morris's methods of labour organization in the 1920s were explicitly Tayloristic, based on the subdivision of tasks and the timing and measurement of jobs. But Morris did not aim in the 1920s to eliminate handwork or labour inputs that required a significant degree of care and attention. This flowed from the product strategy. While engines and chassis were standardised and changes kept to a minimum, Morris continually made body-styling changes which were greatly facilitated by the continuing use of labour-intensive methods. One consequence was that when visitors from the Dodge Motor Company in Detroit visited Cowley in the mid-1920s, they found Cowley machinery 'more complicated' and less based on single-purpose operations than anywhere else in Europe.[3] Morris rationalized and mechanized where possible, but beyond a certain point kept the whole system moving primarily by the driving use of a piecework system. Almost complete non-unionism and high pay levels facilitated the continuing manipulation of the payment system to keep levels of productivity high, and this situation continued to prevail through the 1930s, even while more of the factory became machine-paced.[4]

The Morris organization was not without its serious deficiencies in the 1930s. In the early 1930s, in particular, it unwisely proliferated too great a range of models and brought too many peripheral suppliers and marques within the boundaries of the organization, resulting in a short sharp decline in profits and market share. Nevertheless, much of this was remedied by managerial reform and reorganization in the mid 1930s and by the late 1930s Morris was a highly economical and profitable producer. Its cars were regarded as some of the best designed and finished and their record on innovation and new features was impressive. Its net profits in the late 30s, with net assets comparable to Ford, were some four times greater than those of

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1 On Morris' methods see, Steven Tolliday, 'Management and Labour in Britain, 1896-1939' in Tolliday and Zeitlin eds., *Automobile Industry and Its Workers*

2 L. Rostas, *Comparative Productivity in British and American Industry* (Cambridge, 1948) p. 173

3 G. S. Davison, *At the Wheel* (London, 1931) pp. 85-103

4 William R. Morris, 'Policies that have built the Morris Motor *Business' System* February 1924 (reprinted in *Journal of Industrial Economics* , 1954, p. 199

Ford.[1] Morris was arguably the master of model/price competition in this era. While there is not space here to make the case in full, it is certainly arguable that in the context of British conditions a firm like Morris (or the comparable Austin) had devised a system of production and competition significantly superior to the struggling Ford.

5. FORDISM AND TOYOTISM: REFLECTIONS ON TRANSFER AND HYBRIDATION

This account of the early transfer of Fordism provokes certain immediate reflections on the contemporary process of the transfer of Japanese methods. In a seminal article, Sidney Winter argued that firms develop a repertoire of business policies that might approximate to profit maximization under one set of conditions, but which may well not do so under another. Under very different or fluctuating conditions, the situation 'may present decision problems totally unlike those on which the selection process has been doing its work'. If environmental changes exceed the range of past experience, "the selection process may discriminate against those firms that would approach profit maximizing behaviour over a wide range of situations, and in favour of those which happen, by virtue of their rules of thumb, to achieve profit maximization in a restricted range of circumstances".[2]

Ford in the 1920s in the UK certainly seem to have selected the wrong elements from their 'repertoire'. They believed that the 'secret of their success' lay in rigid standardization, exclusive sales channels, their superior and unchanging product, and driving management. In fact none of these was conducive to success in their new environment. In the end they survived and prospered because of other strengths that they had not prioritized: their financial strength in depth, their design, development and technical capabilities, and their ability to recruit and ultimately integrate high quality local management.

Japan-in-America and Japanese transplants around the globe are currently in a similar first phase of transfer and are likewise making choices from their repertoire. The precise sources of Japanese advantage (and its extent) remain controversial,[3] and, as was the case with Ford, controversy over the source of advantage marks the debate on the nature and effectiveness of the transfer itself. While some scholars like Womack, Jones and Roos or Florida and Kenney argue that a clearly defined and universally superior set of industrial principles exist which can be systematically transferred, others like Karel Williams et. al., Dohse et. al., and Fucini and Fucini remain much more sceptical.[4]

It is not possible here to examine these debates in detail. Here I will confine myself to a couple of points. The confusion about the Japanese model and its transfer flows, at least in part, from the fact that the model is like the elephant that the blind men encountered. Depending on where

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[1] Overy, *William Morris* pp. 45-66

[2] (S. G. Winter, 'Economic "Natural Selection" and the Thory of the Firm' *Yale Economic Essays* 4, 1964 pp. 242-266; see also Tolliday and Zeitlin 'Employers and Industrial Relations: Between Theory and History' in Tolliday and Zeitlin eds., *Power to Manage;* R. Nelson and S. Winter, An Evolutionary Theory of Economic Change (Harvard UP, 1982)

[3] For a recent survey see Melvyn Fuss and Leonard Waverman, 'The extent and sources of cost and efficiency differences between US and Japanese Motor Vehicle Producers' *Journal of the Japanese and International Economies* 4, 3, September 1990

[4] Womack, Jones and Roos, *Machine That Changed the World ;* Martin Kenney and Richard Florida, *Beyond Mass Production. The Japanese System and Its Transfer to the US* (Oxford UP, 1993); Karel Williams and Colin Haslam, 'Against Lean Production' *Economy and Society* March 1992; Knuth Dohse, U. Jurgens and T. Malsch, 'From "Fordism" to Toyotism? The Social Organization of the Labour Process in the Japanese Automobile Industry' *Politics and Society* 14, 2, 1985; Joseph and Suzy Fucini, *Working for the Japanese* (Free Press, 1990)

they first touched it, they formed quite different images of what it was like. Undoubtedly, as Kenney and Florida, Abo and others have shown, there are clear set of recurrent repertoires that Japanese companies have frequently transferred to their US operations. But they are applied with different degrees of intensity according to circumstances. They use flatter managerial hierarchies and fewer job classifications. They appear to apply more visible status equality than in Japan, but less rotation, quality control circles, individualized pay systems or bonuses, or formal long-term employment commitments or lay-off avoidance procedures. All use careful worker selection and screening and emphasize socialization and group work, team work and physical fitness. Some, like Mazda and NUMMI, accept UAW in 'constructive partnerships' others are bitterly non-union. All are relatively high wage.[1]

There are wide variations between the practice of the Japanese auto firms in the US, some of which correspond to wide (but relatively unexplored) variations between their domestic practices. 'Japanization' has been pursued most intensely at Toyota (Georgetown) and NUMMI, least at Mazda and Nissan. The auto firms themselves are somewhat exceptional in their attention to 'transfer'. There are only modest efforts at transfer in most electronics transplants in the US (which are generally much less dominant firms in the local economy).[2] These firms resemble much more another solidly established tradition of Japanese transplants, the operation of low-wage, labour-intensive, off-shore assembly plants that they have run for many years in the ASEAN countries. A classic example might be Mitsubishi's operations in the Malay and Thai auto industries.[3] Here they have concentrated on putting out a limited range of low grade tasks and pursuing advantages in local labour markets using fairly ruthless hire-and-fire policies.[4] A similar adaptability and/or opportunism can be seen in Nissan's Mexican operations. At its older Cuauhnbunc plant it employs traditional methods with a large workforce, job demarcations and fairly low quality. Yet at its newer Aguascalientes engine plant it may well have gone further than it has in its Tennessee factory in introducing Japanized methods.[5]

The feature to note from these examples is that most of these transplants treat the parent's 'repertoire' of policies selectively. Even Toyota, which probably has the most coherent internal system and which is most conscious of the systemic nature of its productivity advantages, does not dream of setting up replicas of Toyota City around the world. Indeed, its awareness of the sources of its advantage seem to have made it generally reluctant to transplant its methods. Until it entered the NUMMI joint venture, Toyota had never even had a branch plant outside Toyota City. Indeed, it was only in 1992, after it had built its Georgetown plant in the USA and nearly completed its Derby plant in the UK, that it started to build its first two branch plants in Japan (at Hokkaido and Kyushu). In contrast to Ford, the Japanese companies appear to be much more ready to apply methods selectively, and indeed be open to the possibility that transplants could give rise to a hybrid form of production that might be even more vigorous than the parent.[6]

We have seen that Ford enjoyed a tremendous cost advantage in local US conditions, much of which proved untransferable to Europe. For several decades, Ford simply produced in Europe at levels of efficiency similar to the domestic producers. Will the Japanese follow the same trajectory? Some, like Williams et. al. believe they will. "The lesson of Ford for Toyota is that

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1 Tetsuo Abo, 'Japanese Motor Vehicle Technologies Abroad in the 1980s' in Jeremy ed., *The International Transfer of Technology* (1992); Kenney and Florida, *Beyond Mass Production*

2 Hiroshi Itagaki, 'Application-Adaptation problems in Japanese Automobile and Electronics Plants in the Us' in Kazuo Shibagaki, Malcolm Trevor and Tetsuo Abo eds., *Japanese and European Management: Their International Adaptability* (University of Tokyo Press, 1989)

3 Richard F. Doner, *Driving a Bargain. Automobile Industrialization and Japanese firms in South East Asia* (Univ of California Press, 1991)

4 Doner, *Driving a Bargain* pp. 224-8

5 Abo, 'Technology' pp. 179-180

6 This possibility is hinted at by Abo, 'Technology' and Itagaki, 'Application-adaptation' who speak of a 'third-form'.

market limitations finally limit the trajectory of high-flow manufacturing. If you want to see the future of Toyota, consider Ford's Rouge factory in Detroit: designed as the ultimate flow conversion apparatus.....whose potential could never be realised because the market would not buy the product in the necessary quantities". The Toyota system, they argue, is particularly vulnerable to erratic or below capacity working. It has grown up on basis of almost uniquely non-cyclical demand and continuous growth in the Japanese domestic market which it dominates. When it stops growing it will probably become more and more like other car companies.[1] A fuller appreciation of the errors made by Ford in its attempts at transplanting its methods might, however, suggest another conclusion. The Japanese companies seem to exhibit a tradition of selective transfer and a willingness to create hybrid forms radically different from the approach of Henry Ford and his colleagues in the interwar years. This may well provide a platform for creative success: but it will require them to avoid the illusion of a 'universal system' that some of their admirers promulgate.

Table 1
Ford-England and Morris Motors: Production of Cars and Trucks, 1912-1938

	FORD	MORRIS
1912	3 187	
1913	7 310	1 300
1914	8 352	
1915	12 291	
1916	16 204	
1917	12 767	
1918	9 293	204
1919	12 175	387
1920	46 362	1 932
1921	31 955	3 076
1922	27 303	6 956
1923	30 596	20 048
1924	27 497	32 918
1925	22 271	55 582
1926	21 859	48 330
1927	12 558	61 632
1928	6 685	55 480
1929	25 756	63 522
1930	27 861	58 436
1931	24 152	43 582
1932	25 571	50 337
1933	52 561	44 049
1934	53 613	58 248
1935	66 605	96 512
1936	94 180	90 000*
1937	94 165	90 000*
1938	76 705	80 000*

Source: *Ford Archives; Overy, William Morris* p. 128
* Estimates: exact figures not available

[1] Williams et. al., 'Against Lean Production' p. 43