Chapter Five

NEW ZEALAND AND UNITED STATES LABOUR MOVEMENTS: THE VIEW FROM THE WORKSHOP FLOOR

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In a recent article I try to explain why Britain, Australia and New Zealand ended up with mass-based parties of the Left, whereas the United States did not.[1] I concluded that "The decisive difference between the United States and other societies in the period 1877-1920 was the fact that the unskilled remained ununionized'. The reasons for this are complex, but the central fact was the influx of 25 million immigrants into the United States. As a result the working class, and especially the unskilled, was fragmented. Ethnic divisions and racism not only complicated the task of organising unskilled workers but greatly increased the divide separating the skilled from the unskilled. In other societies racism frequently helped to forge working-class unity; in the United States it worked the other way. Even as immigrants poured into the United States other changes occurred which also contributed to American exceptionalism. The rise of the modern corporation and the introduction of new technologies of production also created obstacles to the organisation of the unskilled. Simultaneously a new political system emerged, shaped in part by the influx of immigrants and the new corporate economy, and that new political system was characterised by declining rates of political participation. This decline in political participation undoubtedly reflected and reinforced the disorganisation of the unskilled. Comparative studies which take the nation state as the unit of analysis

inevitably confront a phalanx of variables. In this paper a micro-approach is preferred and the focus will be on the role of mechanization at the point of production.

Mechanization represents technological change. The second industrial revolution – which occurred roughly between 1890 and 1920 – accelerated technological change. Transformation of work was most marked in the engineering industry and the metal trades.[2] In this industry the new machines allowed employers to attack the apprentice-based crafts and the culture of the workshop. The simultaneous arrival of 'New' immigrants and the new machines allowed employers to substitute unskilled immigrants – both male and female – for skilled workers. Helen Hill pointed out that this coincidence, if it was a mere coincidence, diluted skill, disrupted worker control of the job-site, and explained the American Federation of Labor's vehement and persistent hostility to immigrants and political unionism.[3] Moreover, the cultural divide between skilled and unskilled, a feature of all industrial societies, became much larger in the United States. Jurgen Kocka, in an interesting and important study, has argued that this process explains much that seems unique in American society. In the United States the division between unskilled and skilled was much larger than the division between the skilled and the lower middle class.[4] This is radically different to the situation that existed in New Zealand during this period although it has some obvious similarities with what happened in South Africa.

BACKGROUND

The simplest way of illustrating the different impact of the second technological revolution is to focus on workshops in the two worlds, that of the United States and that of New Zealand. The comparison has been difficult. Sometimes the very jobs and their names differ. Although comparative history has often been extolled, few have attempted it and comparative studies in labour history are even more rare.[5] In this paper we shall try to explore the differences between the engineering-metal industry in two cities of approximately the same size, Waterbury, Connecticut and Dunedin. In Dunedin by 1901 almost thirty per cent of the workforce worked in foundries and machine shops; in Waterbury it was roughly the same percentage. Both cities had been founded by Protestants. Late in the seventeenth century

Puritan settlers had arrived in Western Connecticut and 180 years later a group of Free Church Presbyterians established Dunedin. Like the settlers in Connecticut the first settlers in Otago represented both religious dissent and the fringe of expansion to the British Empire. Both societies imported from Britain the skilled workers and the technology required for metal work.

Not only did the two cities share much in common but the two societies also shared several traits. Both, to varying degrees, have perceived themselves as New World societies and distinguished themselves from the Old World of Europe. Both shared a British and Protestant background. Both were formed by migration to rich, undeveloped lands occupied by relatively small, indigenous populations. Both were free of a feudal past. Both had early communities with strong collectivist elements but evolved rapidly towards economic individualism. Both established settler democracies with an emphasis on self-government. Both also had a strong belief that they were in some respects unique experiments. In this period most New Zealanders and quite a few Americans concluded that New Zealand was "the social laboratory of the world". Americans, by contrast, saw their own society as the last best hope of the world.[6]

Despite these similarities the two societies and the two industrial cities developed very different labour systems. To explore these differences we chose to compare the largest industrial employer in each city: Waterbury's Scovill Manufacturing Company and Dunedin's Hillside Railway Workshop. Although these two manufacturers produced different products the firms were about the same size in the late nineteenth century. The basic activities also had much in common: both combined foundries, tool-rooms, assembly departments and machine shops. In the 1880s both also employed men with the same skills who, by and large, were told what job had to be done and then decided for themselves how best to do it. Not only that but the skilled men in both workshops had almost invariably served apprenticeships. In brief both the Scovill Manufacturing Company and the Hillside Railway Workshops belonged to what Daniel Nelson has called "the old factory system".

The technological changes of the second industrial revolution led onto "scientific management". They are worth some attention because in the

United States they transformed the old factory system and destroyed shop culture; in New Zealand, by contrast, shop culture survived and enabled the skilled men to preserve key elements of the old factory system. Under the old system the skilled men planned the work to be done and decided who would do it; they hunted up their own tools, borrowed them if necessary, or even made them; they drove their planes and lathes at the speed they deemed appropriate; and left their tools where they last used them when they finished a job. Employers tried to extract more work by introducing piece work, but it was resisted. In the 1890s, however, new machines made higher productivity possible. Milling machines, capstan and turret lathes, grinding machines and gear-cutting machines, new jigs and fixtures became widely available. In the next decade high-speed machine tools were introduced and many companies established specialised tool-shops. Electricity made possible many of these innovations. As a result, for instance, in the United States the turner's job became much less skilled. Only the largest firms could afford these new machines, let alone the cost of generating electricity, but both Scovill's and Hillside moved with the times. The varied nature of jobs in the workshops, here as elsewhere, limited the usefulness of some of the new machines. Only large production runs justified the expense.[7]

The technological revolution initially produced only small gains in productivity. A number of engineers – products of the workshop – were puzzled. One, Frederick Taylor, hit on a solution which later became known as "scientific management" or "Taylorism". In essence this involved the reorganisation of workshops and a high degree of centralised managerial control over all aspects of production. The skilled men could no longer decide how much work could be done in a day or how the work should be organised. Production control, cost accounting, planning, the functionalisation of management, and increasingly refined sub-divisions of work characterised Taylor's system. The most contentious aspects, because they aroused union hostility, were Taylor's proposals for time and motion studies (in order to determine how much could be done in a given period) and his differential piece rate. More significant, however, was his invention of technological improvements that reduced the need for and the role of skilled workers. Neither Scovill nor Hillside adopted many of these ideas; indeed

they ignored them until the 1920s. Yet in the United States the new machines allowed employers to successfully defeat the skilled, first by ignoring the craft's desire for apprenticeships and then by substituting unskilled for skilled men. By 1904 the International Association of Machinists was admitting to membership men who had not served apprenticeships but could operate certain machines. In New Zealand this did not happen.[8]

Partly as a result of this the two societies began developing in dramatically different ways. In Dunedin, the pattern of small independent factories persisted, self-employment remained a widespread opportunity, and the state emerged as a major industrial employer. In Waterbury, a city that specialised in brass and brass-related products, production grew enormously but was increasingly concentrated in rapidly-growing factories which were controlled by large corporations. The single most important difference undoubtedly was that the Waterbury brass industry produced for a continental and even a global market whereas Dunedin's engineering firms produced at best for a New Zealand market (that is for no more than one million people compared to over one hundred million in the United States). Thus Dunedin's industrial structure continued to be based on small capital and local production; the brass industry in Waterbury developed on the basis of large-scale corporate capitalism. Simultaneously millions of immigrants were arriving in the United States from eastern and southern Europe whereas the much smaller flow into New Zealand – about one hundred thousand persons between 1900 and 1914 – were recruited mainly from skilled trades in Britain and Australia.

Despite this divergence it must be stressed that Hillside was a good-sized engineering shop, even by world standards. In the 1890s management also modernised production processes. For instance a bessemer furnace was introduced into the foundry in 1901 and electric power in 1902. Neither Hillside nor Scovill pioneered the second technological revolution, but nor were they backward. It should also be noted that, despite the divergence between the two societies, Hillside was an integral part of a very large system, New Zealand Railways; it belonged to the capital-intensive export sector and was not involved in small-scale commodity production for a local market.

WATERBURY

The ability of Waterbury's manufacturers to substitute unskilled labour for skilled labour when mechanisation made this profitable can be traced back much earlier than the 1880-1920 period. The Scovill Manufacturing Company, which became the largest in the region, began as a household-button shop in 1802 with two partners. By the 1840s, however, they were beginning to introduce a degree of uniformity into the production process that permitted assembly from mass-produced components. Women workers had been a large part of Scovill's workforce since the factory was established. The growth of this system allowed Scovill's to substitute women for skilled men on the repetitive tasks of "cramping and charging". The skilled brassmakers, invariably of British birth in this period, retained their techniques and refused to take on Yankee apprentices. In the post-Civil War period, however, a skilled stratum of Yankee and British workers emerged. By the turn of the century the skills of these men were also becoming diluted and the manufacturers began substituting immigrant workers.

Under the authority of the factory managers, foremen ran their own departments more or less as they chose. As one of the leading brass-manufacturers, M.L. Sperry put it in 1887:

> Each department is under the direction of a foreman, in whom we trust and who sees that the hands are industrious and attend to their business.... The managers do not deal directly with the hands. They simply deal directly with the foreman and if they do not like the way the hands under a foreman work, they bounce the foreman and get another.[9]

This system generated many complaints of having to bribe or do favours for foremen in order to get or retain jobs. Such a pattern was typical of the old factory system. At Hillside a very similar system operated except that all supervisory personnel were recruited from the shop floor.[10]

With the increasing introduction of mass-production techniques into the metal trades and the engineering industry it became possible to attack the apprentice-based crafts which undertook the skilled work. In general this attack was made easier because almost all skilled metal workers in the nineteenth century required the assistance of one unskilled worker. As new technology began to erode the importance of skill, these unskilled workers came to be described as "helpers" or "improvers". In some trades, such

as blacksmithing, the helper often became as skilled as the blacksmith. Nothing but convention or the solidarity of the blacksmiths could then prevent the helpers from taking over the job of the skilled.

In the post-Civil War period a wave of immigration from Ireland saw most unskilled positions in the brass mills captured by the Irish. By 1890 the majority of brass workers, as of Waterbury's population, were Catholics, most of whom were Irish. This wave of immigration was followed between 1890 and 1917 by further waves of immigrants from Russia, Lithuania, Italy and dozens of other countries in eastern and southern Europe. These immigrant workers now took over almost all the unskilled and semi-skilled jobs. The Irish moved further up the occupational ladder or set out to obtain small businesses or land. Blacks were almost entirely excluded from the vast mills until the end of World War I when a trickle began.

By the late nineteenth century ethnicity had become the principal basis for hiring and for the stratification of the labour force. Managerial jobs belonged almost entirely to men of Yankee origin. Skilled workers were predominantly British, German, or Swiss. Those directly supervising the unskilled and semi-skilled were increasingly Irish. Semi-skilled and unskilled jobs were by now filled primarily by eastern and southern European immigrants. In Waterbury, as in other places which have been studied, most of the "New" immigrants were hired via personal acquaintance with members of their own ethnic group already employed in the factory. It might be noted that ethnic divisions also permeated politics although a large proportion of the "New" immigrants expected to go home and did not take part in American politics. By 1900 the Republican party in Waterbury and Connecticut was overwhelmingly led by Protestants of British origin. The Democratic Party was overwhelmingly led by Irish Catholics. Other ethnic groups tended to ally with the Democratic party but there was a countertendency for those ethnic groups in direct competition with the Irish, notably the Italians, to ally with the Republican Party. The small Socialist Party had a predominantly white middle class leadership and little support from immigrant workers.

Trade Unions developed in Waterbury's brass mills during the 1880s largely under the aegis of the Knights of Labor. Many brass workers joined mixed assemblies and many strikes occurred in the 1880s. Most of these

were conducted by individual crafts or specific production departments. With the collapse of the Knights several unions of brassworkers struggled on into the twentieth century when a big new upsurge in unionisation occurred. In 1901, indeed, the Lady Brassworkers of Waterbury was established. A trolley strike in 1903 saw the employers counter attack with an open-shop drive. By 1904 the unions had been driven from the brass industry. Unions survived only in the service and construction sectors in Waterbury.[11]

World War I and the demand for increased brass production generated a period of exceptionally rapid growth in the industry. Scovill's labour force grew by three hundred per cent. Such spectacular growth compelled the employers to set up new ways of managing their work force which were inspired by the ideologies of "welfare capitalism" and "scientific management". Scovill established a health service, a school, an association for foremen, and an employment office. Scovill also established a small planning office. This managerial bureaucracy functioned alongside, rather than replacing, the foremen. It was, however, an omen.

During the early decades of the twentieth century the brass employers made a concerted effort to destroy the power of skilled workers. Traditionally the skilled men had been left to their own devices. They decided how the work should be done, who should do it, and how quickly it should be done. For instance, the handcasters, the most powerful group of skilled workers, had exercised almost complete control over their work practices in the late nineteenth century. Now they were simply eliminated by the introduction of new casting equipment specifically developed for that purpose at Bridgeport Brass, a neighbouring company. The new casting equipment allowed the firm to replace all its hand casters with unskilled men. In the mid-1920s Scovill's hired an engineering firm to instruct their managers in the techniques of time and motion studies. They also investigated the potential use of incentive pay systems such as Taylor's incentive piece-rate.[12] The engineers from the Planning Department played a very large role in this consultation and then set out to reorganize production in all departments of the plant. The broad tendency was towards a redivision of labour in which both skilled and unskilled were replaced by semi-skilled workers. One historian of the industry, who had described the sharply

defined division between skilled and unskilled workers in 1909, noted in his revised edition (published in 1926) that "at present this line tends to disappear".[13]

Despite the attempt by management to destroy the power of skilled workers, and despite the absence of unions in the brass factories, output restriction remained the norm throughout the first half of the twentieth century. There is a large body of evidence to suggest that the absence of unions has never affected the ability of workers to control the general level of productivity; other aspects of their work-life were more difficult to protect. Despite the lack of permanent organisation the workers in the brass industry occasionally struck. There were two enormous general strikes which affected all brass plants in 1919 and 1920. They were initiated by local workers organised in ethnic groups. Their goals included minimum wages, the abolition of piece work, and recognition of shop floor committees. Favouritism and blacklisting were among the strikers' principal grievances. The first strike ended when the employers gave a substantial wage increase but the second ended in rout for the workers. The oppression of these strikes was thorough and effective. Labour spies, raids and deportations, police harrassment of union meetings, the use of private police, and the occupation of the city by National Guard Units all helped ensure not only the failure of the 1920 strike but the complete destruction of any form of organisation among the workers. The next strike in Waterbury would not occur until 1952, although the union itself won recognition, thanks to the intervention of the Federal Government, in 1942.

THE HILLSIDE WORKSHOPS

The contrast between the experience in Waterbury and that in New Zealand could not be more dramatic. By focussing on the Hillside Railway Workshops it is possible to get some insight into why the experience of these two groups of workers diverged so dramatically. Indeed that divergence helps explain the remarkably different types of society which developed in these two New World nations.

One crucial distinction needs to be noted at the beginning. At a time when almost all American industry, including railways, was controlled by

private capital, New Zealand developed a sizeable state sector of industrial ownership. The railway system, for instance, was almost entirely owned by the state and operated by the state and in 1909 the last large private railway company was nationalised. The railway system in New Zealand was seen as a vehicle for supporting the economic development of the colony and especially of the agricultural sector. This was made clear by one Minister for Railways after another. J.G. Ward put the matter in a nutshell in 1905, when he was the Minister for Railways:

> The policy of the Government has been throughout to regard the Railways as adjuncts to the settlement of the country, and to look upon the earning of a large profit as of minor importance compared with the incalculable benefits that accrue to the State by giving the settlers a convenient and cheap means of transporting the produce of their farms to the markets....[14]

By the 1890s, the Government also considered it a legitimate if secondary function of the railway system to maintain its skilled workforce in regular employment. As Ward explained, again in 1905: "The Government had fully determined to build all rolling-stock required for the railways of the colony, within the colony, and thus find further remunerative employment for its artisans." Although the brass manufacturers of Waterbury were more anxious to get rid of their skilled workers than to guarantee them regular work, some railway companies in the United States did recognise the high turnover of skilled labour as a major management problem during the 1870s and 1880s. A small number of companies did adopt a similar policy to that which the New Zealand Government adopted, but it was not widespread.[15]

Within the context of a state run industry the Railway Workshops developed a specific and interrelated system of work organisation. This was done in conjunction with the union. The key to understanding this process, however, was the election of John Ballance and a Liberal Government in 1890. At that point the railways were managed by three commissioners, who had set out to break the railway union and introduce piece rates for all skilled work. The Liberal Government, largely due to the intervention of the future Prime Minister, Richard Seddon, rejected this policy and established ministerial control of the state railways in 1894. Not only was ministerial control re-established but the Liberal Government recognised the

railway union, the Amalgamated Society of Railway Servants (ASRS), and consulted with it closely about the main principles on which the railway system was to be run in future. It is almost certainly more than a coincidence that Seddon himself had served an apprenticeship as a fitter, and had worked in that trade for a number of years both in Liverpool and Melbourne. He too had absorbed the culture of the old factory system and of the metal trades.

In close consultation with the ASRS the Liberal Government introduced a Classification Act in 1894. This measure not only gave legal recognition to the existing division of labour but recognised two principles which men in the metal trades tried to achieve not only in North America but in Britain: seniority and the need for apprenticeship. Seniority acknowledged the right of all employees to have length of service taken into account when questions of promotion, dismissal, or discipline were considered. Seniority had another function, however, which was of the essence: it greatly reduced the freedom of foremen. The autonomous foreman disappeared from New Zealand railways, including the workshops, in this period. Within a generation New Zealand foremen were quite content with their powers because they no longer remembered how large their powers had once been. The foreman may have been happy, however, to give up their autonomy in return for job security.[16]

Apprenticeship was undoubtedly more important than seniority in allowing the skilled crafts to preserve their position. The need for apprenticeship recognised the pre-industrial principles of craft training and craft status. Young lads, usually in their early teens, were taken on by the railway workshops to train in the wide variety of skilled metalwork that was undertaken in the workshops (for instance fitters, turners, blacksmiths, tinsmiths etc.). Only those who had served apprenticeships could enter a skilled trade. This principle of recruitment was maintained throughout the next sixty years. Unskilled men were unable to break into skilled trades even when in the course of their work, as with the blacksmith's helper, they learnt enough to do the work of a skilled man. The only route which would allow them into a skilled craft was that which began with an apprenticeship. For an adult unskilled worker, with a wife and children, the drop in wages involved in doing an appreniceship would have ruled out the idea.

This vital sector of the metal-industry – the construction and repair of locomotives and wagons – set the pattern for the private sector. Although more research needs to be done it seems quite clear that the Railway Workshops, and indeed the entire railway sytem, provided an arena in which Government established guidelines for the private sector. For instance, between 1896 and 1908 the differentials between skilled and unskilled were reduced to a far narrower margin than was true in the United States and a minimum wage was established. Indeed by 1905 it is possible to see the emergence of what later became a standard principle of wage-setting in this industry, the core rate for all skilled work. Minimum wages, regular employment, seniority and the recognition of the monopoly enjoyed by skilled men were demands of metalworkers in all English-speaking countries during this period; only in New Zealand, however, did they establish these new rights.[17]

The Arbitration Court, set up in 1894, began translating some of these principles into the private sector in the early twentieth century. In particular the Court recognised that an apprenticeship marked the most desirable path to a skilled trade. Although it tried to make allowance for less-skilled work to be done by men who had not served apprenticeships, these constituted exceptions (although unionists frequently expressed intense rage). The Court not only recognised the apprenticeship as a prerequisite for admission to a skilled trade, but acted to exclude women and to limit the number of boys who could be taken on as apprenitices. Given the role that women played in breaking down the monopoly of some skilled crafts in the United States this almost un-noted aspect of the Arbitration Court's work becomes of critical importance. Indeed no women have been admitted to the metal trades in New Zealand, even during the emergency of war. In the 1960s, to cast our searchlight forward a couple of generations, the Railways Department insisted that women be admitted to apprenticeships. Only one ever applied at Hillside and she was subjected to so much harrassment that she abandoned her proposed career. It was the same in the private sector.[18]

In the 1920s, when Reform governed New Zealand, an effort was made to modernise the country's railways and the railway workshops. The Department brought in a consultant from the Canadian Pacific Railway, one of the first to systematically adopt "scientific managment". This New

Zealand-born production engineer, E. T. Spidy, visited all the workshops and wrote a report which damned them as slow and inefficient. The equipment was outdated, much work was wastefully duplicated, and the scale of operations in most shops was too small to permit efficiency. Most damning, he concluded that "costs, as a means of management, are no factor at all".[19]

Spidy was especially critical of the way in which the skilled men controlled all aspects of work in the workshops. This pattern of control, it must be said, was in part underpinned by the continuance of the practice of recruiting all supervisory personnel out of the skilled crafts. Spidy proposed a number of immediate reforms. He could not easily grasp, however, a solution to the most complicated problem: how could management determine the number of hours required for each task? This issue, of course, had led the famous American engineer, Frederick Taylor, to pioneer the development of "scientific management" and to promote his methods as a solution to all the ills of an industrial society. In essence Taylor's scheme proposed that knowledge be shifted from the shop floor into management bureaucracies recruited from colleges and universities. If Spidy considered such a system he decided to drop the idea. The men in the workshops were already highly disgruntled by the lack of consultation over this great shake up and he may have concluded, given that he wanted permanent employment in New Zealand, that it might be wisest if he avoided an overt confrontation. As a result of Spidy's work the workshops were modernised, but the autonomous industrial craftsmen survived. Shortly afterwards management (in Wellington) proposed to institute time-and-motion studies; a united front of workers and foremen defeated the proposal.

CONCLUSION

This study has looked at the impact of the second industrial revolution by focussing on two similar industries in two towns of roughly similar size. In both societies most industrial work was organised through an employer-employee relationship. Both societies developed ways to integrate working men and women into political and economic life – ways that went beyond the employment relationship itself. But these differed dramatically. In Dunedin, from 1890 onwards, the working class was organised in unions

and these unions enjoyed considerable political power. That political influence played an undeniably large role in determining the fact that skilled men remained more powerful within New Zealand than they did in the United States. It was possibly of equal importance that the different size of the two markets, and hence of most engineering firms, meant that the most efficient and productive methods were less necessary to the viability of firms in New Zealand than was the case in the United States. Hence skill dilution and the destruction of craft monopolies, perhaps central to maintaining a competitive edge or expanding market shares in the United States, were scarcely imperatives at all within New Zealand. Further study would be necessary to be confident that this was so as the Railways may have been atypical. It was also of considerable importance that Dunedin, like New Zealand, was a racially homogeneous society. The Maori, about five per cent of the population in 1900, were almost all rural. The unskilled and semi-skilled belonged not only to the same broad culture as their employers but all groups within the workforce had been socialised into the same norms, values, and aspirations. This was never the case in Waterbury.

In Waterbury the working class became a mosaic of ethnic communities and organisations. These were represented within the political process but the various ethnic communities never united. Each ethnic community negotiated separately with the leaders of the two main parties. Workers as such, or unions as such, only occasionally and briefly had any political leverage. Only in the 1930s and in the post-World War II period did American governments intervene to insist that employers accept unions as part of the social structure. Ethnicity and gender also provided the employers of Waterbury with a superb tool for breaking down the privileges of skilled workers and depriving them of control over the shop floor. The rest of the story follows from these simple facts, but the fact that the stories differed in the two societies also contributed to the creation of two radically different social systems.

Both these New World societies have recognised equality of opportunity and freedom as central values, yet the experience of these two factories in these two towns suggests the different ways in which these broad concepts were given meaning. In the United States the notion of equality of opportunity, and in particular of each man's (or should it be person's)

right to move from rags to riches, became an important dimension of equality. And this was how the social universe of the brass factories was organised. At Hillside and in New Zealand, by contrast, belief in the possibility of moving from rags to riches never played such a large part, or any part at all, in the nation's sense of what made it distinctive. Even the notion of equality of opportunity has been tempered by another belief in another form of equality, a form of equality which is perhaps suggested better by the word levelling. The core rate and the minimum wage gave tangible expression to the view of equality. So did the practice of recruiting all supervisory personnel, including the manager of the workshops, from the shop floor. This view of equality has coloured New Zealand life at every level from national policy to the shop floor.

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8 Selig Perlman, *The Machinists a New Study in American Trade Unionism*, Cambridge, Mass., 1961, p. 9.

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11 *Brass Valley*, ch. 13.

12 Piece rates are extremely old. Workers often resisted them because if they increased productivity the actual rate was cut. Taylor proposed a system that ensured workers were not penalised for increasing productivity, or such was the theory. His differential piece rate included a base rate which even the slowest worker was guaranteed and then a piece rate for all work over and above this minimum. Regardless of the system, however, it is probably true that "Piecework was not merely payment by results. It was predominantly a new concept of the job which transferred many decisions, based on skilled judgement, from the individual craftsman to the industrial engineer". In the process artisans lost a sense of worth and much of their bargaining power; see Perlman, *Machinists*, p. 28 and Nelson, *Turner, Passim.*

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