'ALL A MATTER OF TIMING':
WORKPLACE RESTRUCTURING
AND CULTURAL CHANGE IN
THE NSW RAILWAYS AND
TRAMWAYS PRIOR TO 1921

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Interest in Australia's experience of scientific management was initially inspired by the extensive debates that followed the publication of Harry Braverman's *Labour and Monopoly Capitalism* in 1974. Particularly persuasive was Braverman's argument that scientific management increased control over workers and led to deskilling because it separated the conception of work from its execution.¹ Indeed, his attention to the labour process established the parameters within which subsequent Antipodean scholarship in this area was conducted.² Given the influence of this 'technicist' conceptual framework most Australian studies of scientific management focused on its more obvious technical components, notably time and motion studies and incentive payments. And since these were not widely adopted by Australian enterprises during the early decades of the twentieth century many historians concluded that the system's industrial impact was far from great at this time.³ This now widely held view pays little heed to those studies which extended the


conceptualisation of scientific management by assessing its significance as an ideology.\(^4\)

In adopting this broader analytical framework the following discussion presents an alternate strategy for evaluating how F.W. Taylor's managerial innovations affected Australian workers during the second decade of the twentieth century. This is no straightforward task. In the first place, there is little agreement about the nature, degree and long-term significance of scientific management ideology among those scholars who have studied its transmission in these terms. Rose and Fox, for instance, represented Taylorism as a failed management ideology.\(^5\) On the other hand, Bendix argued that Taylor's 'social philosophy rather than his techniques became a part of prevailing managerial ideology.' Merkle agreed with this view, adding that it had a profound influence on 'the ideology of the modern state and its industrial and business enterprises'. While Stark explained the way scientific management functioned as an ideology of technical expertise which assisted the professionalisation of those occupations linked to the 'new middle class', most notably in the engineering sector.\(^6\) But how did this ideology affect workers? Bryan Palmer went some way towards considering this question in his study of scientific management as 'the cutting edge' of the early twentieth century 'efficiency movement' in North America. Workers' militant reactions, coupled with employer resistance to its rigorous implementation, according to Palmer, 'contributed to the


demise of the crude Taylorism of the pre-World War I years'. Nevertheless, he concluded that the scientific managers did leave 'their imprint' in the 'realm of ideas'. The theory of scientific management succeeded where Social Darwinism had failed; it undermined the dominant 'populist' view of labour which had sustained the autonomy of skilled workers.  

These interpretations certainly introduce a new angle for considering Australia's early experience of this system of management. But they fail to provide a useful methodology for exploring how scientific management ideology pervaded the workplace. As Littler points out, both the technicist and ideological frameworks failed to relate scientific management ideology to the structuring of work. To overcome this omission, this paper inscribes scientific management within even broader parameters. Instead of simply tracing 'an abstract ideological flow,' I juxtapose both conceptual frameworks in order to consider the way that scientific management ideology informed the redesign of task performance, the adoption of new modes of control and the employment relationship.  

The combination of techniques and ideology, I argue, provided a means for influencing the culture of work. As a totality, scientific management was used to replace the 'collective effect' of workers' formal and informal relations with 'a collection of separated individualities.' In short, I propose that during the second decade of the twentieth century, Taylor's philosophy, principles and methods were adopted by the managers of the NSW Railways and Tramways Department to restructure workplace practices and relations. Such restructuring was intended to eliminate those prevailing rituals and attitudes which were informed by a collectivist ethos and which were enforced by collective action.

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I. INTERPRETING COMPETING REPRESENTATIONS OF SCIENTIFIC MANAGEMENT

Scientific management entered Australian labour history as the cause of the NSW General Strike of 1917. Yet no studies have identified precisely how the card system of recording work times and performances which sparked this strike in the workshops of the NSW Department of Railways and Tramways related to the system of management disseminated in the USA by F.W. Taylor and his apostles. Nor has serious attention been given to the dissension over the card system's identity which accompanied the strike throughout its two month duration: Was it equivalent to scientific management or not? The significance of this question for the strikers and their political and industrial representatives has been under-rated in labour historiography because early accounts of the General Strike focused exclusively on broader industrial and political machinations.

Ian Turner's treatment is indicative of this trend. For although he acknowledged that contemporaries regarded the issue which caused the Strike 'as both crystal clear and very important,' he concluded otherwise:

The card system was a small issue to precipitate such a big strike... The introduction of some means of recording jobs was not unreasonable, and, even after the strike had been broken and the men forced to go back under the system, they still had no substantial complaints about the way it worked: there was only the rankling

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suspicion that there was worse to come, that eventually the attempt would be made to force all to measure up to the pace of the fastest.  

Because of this view of the strikers' position, Turner neglected to critically assess their collective perceptions of the system; perceptions that inspired mobilisation beyond usual industrial activity. The traditional institutional focus of labour history effectively obscured the subjective responses to this management innovation. Yet subjectivity is significant for any understanding of labour mobilisation. As Bertaux points out subjectivity 'is central to an understanding of action,' especially when it 'is not just norm-abiding behaviour but innovative and risky.'

How can such subjectivity be effectively investigated? The competing representations of scientific management, made public in a variety of media during the General Strike, provide a useful tableau for interpreting perceptions of the system and its likely affects. Hence, a preliminary examination of these representations throws light on the underlying attitudes and beliefs that inspired the actions taken by workers. On this basis the paper identifies the precise ways in which the NSW Railways and Tramways Department's managerial innovations related to scientific management. It then considers how working conditions were affected, after the strike failed to achieve its aims.

The controversy over the card system's identity, I suggest, reflected an ideological struggle between managers and workers. On one side of the battlefield workers claimed that it represented 'the thin end of the wedge, the first instalment of what is termed the Taylor Card System of America'. On the other side, the Railway Commissioners and their supporters went to great lengths to stress to the public that

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13 This Strike involved approximately 97,500 workers, 77,350 of whom were located in NSW Coward, op. cit., p.387; L. Taksa, 'Defence not Defiance: Social Protest and the NSW General Strike of 1917,' Labour History, No.60, May 1991, pp.16-33.
16 Daily Telegraph (DT) 13/8/1917, 25/8/1917; Sydney Morning Herald (SMH) 8/8/1917, 9/8/1917; Justice Curlewis, Royal Commission of Inquiry into the Effects of the Workings of the System known as the Job and
workers were 'being grossly and wickedly misled' by their leaders. On a daily basis, the Commissioners and the Government placed advertisements and manifestos in all the major newspapers denying any intention of introducing 'the Taylor or any other system of speeding up'. The cards simply embodied a new 'system of bookkeeping,' a 'costing system', declared the Chief Commissioner for Railways, James Fraser. Their use was intended to increase efficiency and obtain 'the best work in the interests of the community'. By improving the records kept 'of time spent on certain classes of work' the system would show 'whether any worker was consistently and deliberately a slow worker'. In essence then, this innovation was designed to deal with what the Acting Premier referred to as the 'question of "go slow"'. And those who equated it with scientific management were labelled 'extremists' and accused of 'deliberately conspiring against the public interest'.

At the same time, the strikers' Defence Committee presented counter-arguments in these media, in their own labour papers, as well as in public speeches made in a range of traditional working class meeting places. For them there was no question that Fraser wanted to implement the 'American Taylor system.' On 8 August, E.J. Kavanagh MLC, a member of the Strike Defence Committee (SDC), described its major features as: the employment of gang bosses 'to supervise and strictly watch every few men' and to 'exhort men to further effort' according to the results allegedly obtained 'by other workmen'; the restriction of workers' movements to certain machines and benches where they would be 'provided with the means of communication with the tool store' so that any required tools or materials could be brought to them, and finally, the timing of every movement of the operator 'with the clock.' As will be seen these features were integral to the card system's operation.

James Fraser, however, immediately repudiated such pronouncements by commenting:

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The American Taylor System is referred to at length in Mr. Kavanagh's communication to the Press, but if he had been a student of the system he must be aware that there are certain auxiliaries connected with it - clocks, records, &c. - which make it a more complex arrangement than this Department proposes to use.

The card system, he noted was 'practically identical' to 'those used in some of the most up-to-date workshops in Australasia'. Its introduction was essential, argued Fraser because 'no progressive business' could 'be satisfactorily conducted without from time to time making all possible improvements in methods so as to ensure the maximum of efficiency at a minimum of expenditure.'

Why then did workers equate the card system with scientific management? And further, why did they believe that in dealing with 'alleged slackers' it would penalise 'all reliable workers' and undermine their collective right to define what constituted 'a fair day's work'?

In part, at least, their response was determined by knowledge of overseas trends. In his statement to the press on behalf of the SDC, Claude Thompson informed readers that the card system's potential for 'speeding up' was well known to 'those who have studied American industrial history.' From American precedents, Australian unionists knew that scientific management sapped 'the last ounce of vitality' from the individual worker. But their more immediate concern was expressed in another statement in which the SDC pointed out to the public that 'the crushing of the strikers on this occasion is a starting point to the ultimate smashing of trades-unionism in this State. Workers... Be loyal to yourselves, your comrades, and your homes!' This view was neither misconceived nor inappropriately conspiratorial. Rather, it demonstrated an astute judgement that scientific management (or a variant thereof) directly challenged the social cohesion which allowed labour to collectively enforce protective standards both informally and

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20 Holme, ibid., Appendix No.9, pp.66-67. In fact, a different version of the card system had been used by the Government for the construction of Fisher Library at the University of Sydney in 1913. In 1917 a similar time recording system was being used at the State Quarry at Maroubra. NSWPD Vol.67, 1917-1918, p.480.


22 SMH 9/8/1917; Holme, ibid., Appendix No.15, pp.70-71.

formally through industrial and political organisations. From this perspective, the
President of the Amalgamated Society of Engineers’ asserted that the card system
would ‘rob the workman of the brotherhood of man’ and so return workers to the
conditions of ‘the middle ages.’

Those American Government officials who investigated scientific
management for a House of Representatives inquiry in 1912, recognised that its
technical features undermined labour’s capacity for collective action. Similarly,
during his investigation of scientific management for the United States Commission
on Industrial Relations in 1914, Professor Robert F. Hoxie concluded that it
‘prevented the formation of groups of workers within the shop with recognized
common interests,’ weakened those groups which did exist, and tended ‘to repress
the development of group consciousness’. It displaced ‘harmony and cooperation
among the working group’ by destroying solidarity. Bernard Muscio, who read
Hoxie’s book on the subject in Australia, drew the same conclusion. The system’s
introduction produced ‘a spirit of jealousy and opposition’ among workers ‘who before
faced the employer as a united body’, he wrote. Unionists in the USA, as
elsewhere, drew the same conclusions about the system’s effects on organised
labour.

To effectively analyse whether the card system produced such results, it is
pertinent to consider how it related to Taylor’s philosophy, principles and methods.

\[\text{[T]his whole combination, he wrote in his} \text{ Principles of Scientific Management, in} \]

25 F.W. Taylor, Taylor's Testimony Before the Special House Committee' (1912) in F.W. Taylor, Scientific
University Press, Massachusetts, 1955, pp.87-89; Robert Franklin Hoxie, Scientific Management and Labor, D.
28 John P. Frey (International Association of Molders) and James Duncan (Vice-President of the American
Federation of Labor) amongst others, thought that it weakened ‘the cohesion of organized labor.’ C.B.
Thompson, The Theory and Practice of Scientific Management, Houghton Mifflin Company, Boston, 1917,
p.92, p.267. Such judgements were not limited to the USA. Swedish workers also concluded that the
introduction of scientific management involved them in a fight ‘for principles of importance for the whole
labour movement’ and its ‘position in the society as a whole.’ A. Johansson, Arbetarrörelsen och taylorismen:
Olofstrom 1895-1925. En studie av verkstadsindustrin och arbetets organisering [The Labour Movement and
cited in Lars Ekdahl, ‘Review Article - From Class Struggle to Class Co-operation: Taylorism and the Origins
1911, could be summarized as: 'Science, not rule of thumb. Harmony, not discord. Cooperation, not individualism. Maximum output, in place of restricted output.'

Again and again Taylor reiterated that his system should not be represented as 'any bunch or group of efficiency devices'. Mechanisms such as time and motion studies and incentive payments were, he stressed, simply 'useful adjuncts to Scientific Management'. Of far greater importance was the system's underlying philosophy, its:

conviction that the true interests of the two [employers and employees] are one and the same... and that it is possible to give the workman what he most wants - high wages - and the employer what he wants - a low labor cost - for his manufactures.

But the focus of this consensus ideology was not restricted to these two classes. Taylor also emphasised the needs of consumers on the grounds that the 'rights of the people are ... greater than those of either employer or employee (sic)'. This 'third great party should,' he thought, 'be given its proper share' of the higher productivity, lower labour costs and lower commodity prices allegedly obtainable from the implementation of scientific management methods. Because of this ideology scientific management was accepted by groups of people who ostensibly had little direct involvement in industrial production. Middle-class reformers supported Taylor's efforts to increase productivity because they wanted to believe his claim that it would enable working people to 'live as well and have the same luxuries, the same opportunities for leisure, for culture, and for education as are now possessed by the average businessmen of this country.'

As a means of promoting this vision, Taylor equated the essence of scientific management with 'a complete mental revolution' on the part of workers, managers

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and employers toward each other and 'all of their daily problems.' To affect this revolution, and thus to ensure industrial peace, Taylor advocated the substitution of exact scientific investigation and knowledge for the old individual judgement or opinion, either of the workman or the boss in all matters. Scientific methods would, he argued, foster 'hearty, brotherly cooperation' and 'mutual confidence' between workers, managers and employers, as well as justice for consumers.

The advocacy of a mental revolution, incorporating an acceptance of scientific methods, was integral to Taylor's ideological arsenal. Through these devices he heralded a conflict free utopia at a time when theories of class conflict were gaining increasing popularity. The mental revolution was the ideological prong of Taylor's attack on workers' informal output restriction or what he called systematic soldiering. Indeed, his most vociferous and recurrent criticisms of the existing industrial culture centred on such collective regulation of work performance. Taylor disparaged its practice not only in the USA but also in England, where it was called 'hanging it out' and Scotland where it was called 'ca canae.' But Taylor denigrated systematic soldiering not simply because it affected output but because it reflected workers ability to uphold collective beliefs and values. 'The most serious of the delusions and fallacies under which workmen, and particularly those in many of the unions, are suffering is that it is for their interest to limit the amount of work which a man should do in a day', he wrote. In short, Taylor depreciated what Montgomery calls the 'mutualistic ethical code' that characterised workers control, because he believed that it promoted hostility to management. Likewise he opposed all traditional patterns of working-class interaction, notably shop committees, sympathetic strikes, boycotts,
pickets, mass rallies and attacks on strike-breakers.\textsuperscript{40} Such attitudes and activities led to trade unionism, which he thought had outlived its usefulness. Indeed, the unions’ formal support for collective output restriction provided him with grounds on which to censure them; in his view they stirred up class hatred and warfare.\textsuperscript{41}

Implicit in Taylor’s ideology was the view that traditional ways of doing things, as well as ways of thinking about the world, had to be discarded. Accordingly, the four principles of his system advocated that management should assume new duties by classifying and reducing the traditional, ‘rule-of-thumb’ knowledge, previously possessed entirely by craft workers; scientifically selecting workers; scientifically educating workers; and by promoting intimate friendly cooperation between the management and labour.\textsuperscript{42} These principles provided the plan for spreading Taylor’s philosophy. Through the implementation of scientific management methods, the first principle sought to directly alter the organisation of work processes. Time and motion studies enabled tasks to be broken-up, standardized into their elementary components and sequentially ordered by ‘experts’ who Taylor located in what he referred to as a planning department. The reconstituted information pertaining to task performance was then passed on to workers in the form of written instructions. To make sure that workers both understood and carried out their instructions Taylor proposed that managers should become ‘teachers’. He also argued that they should link the payment of additional wages to the exact performance of the written instructions and refuse to enter the workers’ pay on pay sheets until workers filled in details of their times and pay rates on the same card on which they were required to enter the other ‘desired information’.\textsuperscript{43} At the Bethlehem Steel Works, Taylor adopted Gantt’s bonus pay scheme which offered a daily bonus of 50 cents to every worker who accomplished the task as it was set out on a personalised instruction card.\textsuperscript{43}

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These methods provided the practical means for separating planning from execution and thus increasing management's technical control. As importantly, they enhanced its disciplinary power and capacity for surveillance. By advocating a formal system of information exchange based on written instructions, scientific management reconstituted individual workers as describable and analysable objects 'under the gaze of a permanent corpus of knowledge'. The planning department was equivalent to the panopticon in microcosm; its operation was intended 'to carry out experiments, to alter behaviour, to train or correct individuals' and to transform them from subjects 'in communication' into objects 'of information'.

As Taylor put it, under his system, workers could be cut 'loose from the mass' and induced 'to act individually'. Moreover, the 'scientific' rate-fixing made possible by time and motion studies was intended to enable the selection of those who were physically able and mentally suited to following their instructions. To formally ensure the recruitment of such 'first-rate' individuals Taylor proposed that selection be conducted scientifically. Traditional reliance on formal trade union or informal family and social networks, he argued, hindered efficiency. Because workers were unwilling to throw 'their friends or brothers' who worked with them out of jobs for which 'they were not suited', he suggested that management replace 'old fashioned hiring methods' with centralised selection procedures. These could also be used to eliminate those workers who were unable or unwilling to adapt to Taylor's new methods and philosophy. His pig-iron shovelling experiments, for example, also included 'thorough investigations' of workers' histories. They were designed to enable

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45 Consequently, he made no provision for collective bargaining stating: 'It is sufficient under scientific management for a single workman to step up and say, "I have been wronged" and he will have his wrong righted.' Taylor, ‘Shop Management....’, p.184. See also, p.57, p.69, p.186-191 and Taylor, ‘Taylor’s Testimony....’, pp.182-3, p.226, p.287.
the selection of those who possessed the character, habits, and ambition to become 'first-class' shovellers.  

Taylor presented his methods as 'scientific' partly because they relied on time and motion studies and partly because they were informed by experiments in personal attributes, or what Taylor called 'co-efficients,' conducted in the physiological departments of various universities. For example, following time and motion studies of the bicycle ball inspectors employed by the Symonds Rolling Machine Company, during the 1890s, Taylor and his assistants deemed that the efficient performance of inspecting tasks required a low personal coefficient. Those workers who were considered to be otherwise endowed were immediately 'layed off' so that the work previously undertaken by 120 women was henceforth performed by 35. Taylor concluded that the resulting increase in output was 'due, not only to the improvement in the work of each girl, owing to better methods, but to the weeding out of the lazy and unpromising candidates, and the substitution of more ambitious individuals.'

Two decades later in Australia Muscio found this case instructive; it outlined 'sophisticated' methods for deciding the fitness of workers for specific types of work. But Muscio was not the first Australian intellectual to embrace Taylor's ideas on selection. In dealing with the need to overcome the prevailing negativity towards scientific management, R.F. Irvine stressed in 1915: 'It is our plain duty to select the ablest men we can lay our hands on and put them in charge of the business side of military organisation.'

While Taylor's first two principles went some way toward altering traditional collective work practices, the final two were more directly oriented toward spreading his philosophy. Indeed, 'scientific education' was the means by which Taylor hoped

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49 Taylor, ibid., p.43, p.48; Taylor, ‘Taylor’s Testimony...’ p.77. In Australia, Muscio gave extensive coverage to these pig-iron experiments because he thought they adequately portrayed the new methods of work represented by scientific management. Muscio, op. cit., pp.168-174.

50 Those who were born with unusually quick powers of perception, accompanied by quick responsive action, were described as having a 'low personal coefficient,' while those with slow perception and slow action were said to have a 'high personal coefficient'.


52 Muscio, op. cit., pp.112-119, pp.221-222.

to ensure 'intimate friendly co-operation' between management and labour. Because craft skills were then learnt 'practically as they were in the Middle Ages,' not from books but 'by word of mouth', Taylor advocated supplementary training in scientific principles. Books, he argued, would help to eradicate 'rule-of-thumb' knowledge which he distinguished from that provided in schools and colleges.54

Considering these principles in conjunction with the philosophy and methods of scientific management highlights the inadequacy of the traditional 'technological explanation' popularised by Braverman. As Montgomery points out, it is inappropriate to view workers' ability to exercise control simply in terms of technical skill. Such skill was, he argues, 'embedded in a mutualistic ethical code, also acquired on the job, and together these attributes provided skilled workers' with the ability to exercise collective autonomy and resistance. In other words, according to Montgomery, late nineteenth and early twentieth century industrial workers not only exercised control over the labour process in a technical sense but also in social terms: through informal collective organisation at the local level older workers 'taught newcomers.... covert forms of collective resistance'; through the enactment and enforcement of union work rules links were forged between groups of workers in different locales; and when coupled with the sympathetic strike involving members of numerous different unions, 'important connections' were made 'across locales and industries'.55 Insofar as the technical features of scientific management provided the means for spreading its consensus ideology, they attacked all three levels on which workers exercised social control over each other and- their work.

Australian workers' ability to exercise such control particularly perturbed those middle class professionals who were engaged in the pursuit of national efficiency during World War One. Meredith Atkinson, an intellectual associated with the University of Sydney and the Workers Education Association (WEA), vehemently criticised workers for believing the 'pathetic and pernicious' fallacy that caused

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workers to restrict output. Like Taylor, he argued that if workers stopped 'going slow,' the goods produced would be cheapened, consumers would benefit and workers would be able 'to live on a higher plane.' Similarly, Irvine criticised the 'go easy' and 'make work' principles that operated among Australian workers. Such behaviour, he argued, was postponing 'indefinitely a more rational organisation of society.' More specifically, James Fraser disparaged the 'slowing down movement' in the NSW Railway and Tramway workshops. Workers were 'going through the motions but... producing nothing' because of a deliberate effort 'to prevent the output of work,' he claimed. In January 1917, Fraser told his Department's managers and foremen that this disease was spread by those who were 'saturated with poisonous ideas' and it resulted in industrial ferment 'where peace and contentment should reign.'

The desire to ensure acceptance of a consensus ideology provided the basis on which manufacturers and middle class professionals supported the NSW railways and tramways managers' representation of the card system. Manufacturers were, in fact, greatly distressed by the rapidity and extent to which workers throughout NSW conformed to working class norms by joining the General Strike. Moreover, the NSW Chamber of Manufactures' declaration that the card system was 'in general use among private firms' sustained the stance taken against railway and tramway workers by the Government and the Commissioners for Railways. It allowed manufacturers to portray the workers' opposition to the card system as a flimsy pretext for industrial action.

Government administrators, politicians and manufacturers were united in the denial that the Railways and Tramways Department was implementing a version of the Taylor's system. In the Senate debate on the Strike, Senator Pratten, a

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57 Irvine, op. cit., p.10.
58 Curlewis, op. cit., p.9.
60 Australian Manufacturers' Journal (AMJ) 1/9/1917, p.7, p.40; See also on the Taylor System, pp.36-38; 1/10/1917, p.29.
prominent member of the Chamber of Manufactures, reiterated the statements made by Fraser and the Acting Premier about the card system:

It may be that some honourable senators, in talking about the Taylor card system, do not realize all that it means. The Taylor system of industrial efficiency and economy... is really a system of motion study. The motions of workmen have been studied that they may be reduced to a minimum, so that with the same exertion the workmen may do a greater amount of work.\textsuperscript{61}

So too did George Beeby, the Minister for Labour and Industry, when he told the NSW Parliament that the card system was simply a method of better costing and a way of overcoming IWW ideas.\textsuperscript{62} And Muscio alleged in a number of press articles that a fundamental difference existed between the two systems.\textsuperscript{63}

In one of these articles, Muscio reproduced 'a typical "Taylor" instruction card' to show that it bore 'little resemblance to the one which has caused the present dispute.' 'In fairness to the Railway Commissioners,' he told his readers, 'and, indeed, to "Taylor" - the strike card should be disassociated from "Taylorism".'\textsuperscript{64} This representation ignored Taylor's own declaration that the form of the cards depended entirely on the nature of the instructions to be conveyed. In some cases, he wrote, the card 'should consist of a pencil memorandum on a small piece of paper... while in others it will be in the form of several pages of typewritten paper,'\textsuperscript{65} a point not lost on Walter Hislop, a long-standing employee of the NSW Randwick Tramway Workshops. As Hislop told the Curlewis Royal Commission: 'I claim, whether it is a sheet of paper, whether it is a piece of cardboard, or a slate on which the time is put down, it is just the same as a card system.'\textsuperscript{66}

\textsuperscript{61} AMJ 1/10/1917, p.38. Pratten was the Vice-President of the NSW Chamber of Manufactures between 1910 and 1913, President in 1914 and a member of its Council until 1919.

\textsuperscript{62} NSWPD Vol.67, pp.496-497; SMH 15/8/1917. Likewise, the Australasian Manufacturer (AM) supported the Card System on the grounds that it would help to eliminate shirking. AM 11/8/1917, p.9.

\textsuperscript{63} Muscio described scientific management as consisting of the systematisation and standardisation of every industrial process from buildings and machines to the movements of workers; 'the inducements offered to the operatives to accept innovations in the methods of work'; planning by experts; routing systems which involved the grouping of men and machinery; time and motion study to standardise the 'least wasteful movements'; and instruction cards to teach workers to adopt such movements and methods.

\textsuperscript{64} B. Muscio, 'The Taylor System: 1. General Features,' SMH 15/8/1917. Also see 17/8/1917.


\textsuperscript{66} Curlewis, op. cit., p.47.
Why did professionals and manufacturers proffer what I will demonstrate to have been a gross misrepresentation? In effect, the narrower 'technical' portrayal of the card system obscured the ideological struggle over the prevailing labour culture manifested by the General Strike. Because besides being a ritualised form, the Strike also involved a range of other working class traditions, such as mass picketing, processions, demonstrations and the intimidation of those who were unwilling to conform to working class cultural norms not only in the industrial centres of NSW but elsewhere in Australia.  

In denigrating the actions of railway workers and thus implicitly supporting the Department's management, Senator Pratten inadvertently exposed the strength of this collectivist culture in the railway workshops when he informed the Senate:

One man told me that he went to work in the railway workshops, and that after being there a week he was told to slow down, and that he was doing too much work... It is no wonder that the New South Wales Railways Commissioners wanted to tighten up the administration of the railways in that State.

Pratten's statement demonstrates that the pressure to conform to working class social norms presented a powerful counter-pole to those promoted by employers and managers.  

The full force of the Arbitration System was brought to bear against the operation of such collective norms. Those unions which had contravened Section 10 of the State's industrial legislation by 'instigating or aiding any other union or any of its members in a lock-out or a strike...' were deregistered. In justifying this action, Justice Heydon told the Industrial Court on 23 August, 1917: 'By acting together they aided each other, and by aiding each other they brought themselves under Section 10.' Heydon then legally supported his decision by adding: 'Their proper course was to come to the Court. If the card system comes within the jurisdiction of the Court, the

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67 Taksa, ‘Defence not Defiance...,’ generally.
68 *AMJ* 1/10/1917, p.39.
69 *SMH* 14/8/1917. The strength of such informal cultural norms was made evident when the Acting Premier called for the suppression of 'abusive terms' such as 'scab' and 'blackleg'. As he put it: the Strike Defence Committee could 'drag a new union into this fight... simply by threatening to call them "scabs" and "blacklegs" if they don't.'
Court could have considered it.' This, despite his own ruling that as 'a mere detail of workshop management' the system did not come within the Court's purview.\textsuperscript{70}

In fact, the controversy over these competing representations was eventually resolved in the workers' favour. In 1918, Justice Curlewis devoted an entire section in his Royal Commission Report into the Card System to a discussion of the conflicting definitions presented by the Chief Commissioner and the workers. He concluded that this innovation was 'an integral part' of what was 'coming to be known as a system of "Scientific Management"'.\textsuperscript{71} In order to understand the basis for this finding, the workplace restructuring undertaken by the NSW Railway and Tramways Department between 1914 and 1921 needs to be examined by reference to the philosophy, principles and methods of scientific management.

\textbf{II. THE NSW RAILWAYS AND TRAMWAYS - AN IDEAL LOCUS FOR THE DIFFUSION OF SCIENTIFIC MANAGEMENT}

The NSW Railways and Tramways Department provided an ideal locus for the diffusion of scientific management. Since Australia's satellite status made it reliant on foreign technology, this Department provided an important conduit for the transfer of innovations developed elsewhere in the world.\textsuperscript{72} The Department's activities were pivotal to other industrial enterprises, particularly those related to the manufacture of iron and steel. And its public stature demanded cost-efficient operations for political as much as economic reasons. Its scale of operations was, moreover, extremely large; by 1913 the Department had become Australia's largest employer.\textsuperscript{73}

Continuing expeditions to the USA by railway officers enabled the spread of American innovations in NSW. But the Department's adoption of new technologies was not simply a case of geographical relocation of technological hardware. In providing technical education for its workforce, it also operated as a centre 'for the

\textsuperscript{70} See, AMJ 1/11/1917, p.9 and extracts from Heydon's judgements in various union deregistration cases in Holme, \textit{op. cit.}, Appendices 68 and 91, p.100, pp.123-142; Childe, \textit{op. cit.}, p.157.

\textsuperscript{71} Curlewis, \textit{op. cit.}, p.x, p.28.

\textsuperscript{72} Its leading engineers participated in the International Railway Congress in Washington in 1905, where they also attended the American railway appliance exhibition and engaged in discussions with America's leading engineers. R & T Budget 7/10/1905, p.335; Proceedings of the International Railway Congress..., (1905) pp.22-33, Part XIII, pp.188-189.

diffusion of technical culture’. From 1891, when it established the Railway and Tramway Institute, the Department disseminated technical knowledge to employees and attempted to ensure compliance with management rules by linking training to job promotion. The following year, in an effort to further its educational aims the Institute launched the NSW Railway Budget as a journal for staff. Later renamed The NSW Railway Magazine, this organ continued to communicate management’s objectives until 1930. In the interim, during World War One, attention was increasingly given to the pursuit of industrial efficiency in general articles as well as in additional features such as a 'Literary Page' and later, a 'Women's Page' and a 'Children's Page.' The Institute exposed workers to the most modern training methods and provided management with an avenue for controlling workers' culture both at work and during their leisure-time. Its library and reading room, the provision of lectures and classes, the creation of country branches and the publication of reports, pamphlets and books sought to influence social attitudes as much as industrial ones and to influence behaviour both inside and outside of the workplace.

These educational arrangements, coupled with the economic, social and technological factors elaborated above, assisted in spreading knowledge about scientific management and in imposing pressure for its adoption, albeit in modified form.

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74 Two mechanical and two electrical engineers were sent to America in 1919 to investigate technical matters relating to electrical furnaces. Later, when steel cars became a feature of the American railroad rolling stock, the Commonwealth Railways' Chief Mechanical Engineer and a draughtsman with the NSW Railways were sent to the USA to report on railway workshops and munition factories. R & T Magazine 1/5/1919, p.184; 1/5/1920, pp.373-374; AM 25/1/1916, p.28; 25/7/1916, p.10; Daniel R. Headrick, The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940, Oxford University Press, New York, 1988, p.323.


III. WORKPLACE RESTRUCTURING AS A MEANS OF IMPLEMENTING CULTURAL CHANGE

The workforce of the NSW Railways and Tramways Department was divided by a bureaucratic structure, by the numerous trade unions represented in its workshops, and by geographical separation, unique rosters, long hours and the need to move around the State. Nevertheless, the Department provided a favorable climate for unionism. Many railway and tramway workers were unified by craft traditions and the permanent nature of the Department's work. For others, geographic and temporal isolation limited companionship to fellow employees. In hard times, such camaraderie contributed to the emergence of solidarity which sustained extensive industrial action, as was evident in the approximately twenty-one strikes which occurred in railway workshops between 1915 and 1917.78

In response to this collectivism and the enormous expansion in the railway labour force between 1897 and 1914, the Department adopted new strategies for labour control.79 Changes were made to appointment, promotion and dismissal procedures, the formal authority structure and the monitoring system as well as to the organisational division of labour. As a result the relationship of railway jobs to the wider labour market was also altered. In short, these strategies redesigned task performance, introduced new modes of control and reshaped the employment relationship; precisely the three levels on which Littler argues that managerial ideologies are institutionalised.80 To explain how this process related to scientific management, the rest of this discussion considers the Railway and Tramway Department's administrative innovations during the second decade of the twentieth century in terms of Taylor's philosophy, principles and methods.

Taylor's international notoriety was first sparked in 1900 at the Paris Exhibition when he and his associates displayed their discovery of high-speed steel which

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more than doubled the output possible in steel production. But because of the way Taylor enmeshed high-speed steel with his system of management, the latter rapidly obtained a global audience and a diverse following which extended to Australia.

Taylor repeatedly stressed that the implementation of his system of management had to be gradual so as to prevent opposition being mobilised. He recommended that administrative procedures and the layout of workshops had to first be changed so that control could be centralised and extended, particularly through the sub-division of the foreman's duties. 'Functional foremanship,' as Taylor called it, divided the supervision of work among numerous foremen who specialized in various functions. It thus increased the possibility of surveillance over individual workers because each worker could be dealt with directly by numerous managers instead of 'second hand through the old style gang boss as mouthpiece.'

To a certain extent the administration of the NSW railways and tramways was already centralised as a result of the bureaucratisation of its branch structure during the late nineteenth century. In 1914, however, this arrangement was extended when the Railway Commissioner decided that uniform practices were needed across the entire Department. Accordingly, in May of that year, a Staff Board was established which consolidated control over all railway management functions. Further changes were then gradually made which assisted in the implementation of scientific management methods. During the early years of the War, the Department adopted high-speed steel and hired additional people as sub-foremen, or what one Labor MP referred to as 'taskmasters,' to extend supervision over workshop labour.

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83 Functional foremanship fragmented the traditional foreman's job into eight parts as follows: 1. gang bosses 2. speed bosses 3. inspectors 4. repair bosses 5. order of work and route clerks 6. instruction card clerks 7. time and cost clerks 8. shop disciplinarian. Taylor, 'Shop Management...,' pp.100-106.
85 Patmore, 'A History of Industrial Relations...,' pp.245-246; Patmore, 'Arbitration and Bureaucracy...,' p.580.
86 As part of this process the locomotive workshops were extended and additional erecting shops, pattern shops and a large up-to-date foundry were constructed at Eveleigh. Patmore, 'Systematic Management...,' p.311;
Taylor's proposed 'important physical changes' to the layout of workshops included a planning department, a centrally-controlled tool room and a routing system. Together these innovations were designed to ensure sequential operations by identifying and designating tasks to be performed, formulating written instructions, organising machines and tools in distinctive groups and supplying specific materials for specific tasks. By these means, Taylor hoped to prevent the loss of time which occurred when workers moved around workshops.87

All of these changes were implemented to some degree in the Eveleigh railway and Randwick tramway workshops. Although no clear evidence exists that a planning department was formally established, the duties outlined by Taylor for the planning experts were adopted by the Department as these involved the constant provision of ongoing tasks and instruction cards. Mr. Shenstone, the Works Manager at the Randwick Tramway Workshops, told the Curlewis Royal Commission that the introduction of the card system was gradual. Initially he trained a special officer in the use of the cards whose duty it was to 'go to each sub-foreman and instruct each one separately how to work the cards' as follows:

the sub-foremen fill in the times, but they have "jobs ahead." As soon as a job is put in hand they lift the card out of the drawer and put it in the "jobs in hand" section; then, if a job is stuck up for any reason, they put the card into "delayed"; then when a job is in hand again after the delay, they put it back into "in hand," with the proper notes on it; when the job is finished they put it into "finished."88

Clearly the card system involved a conscious planning and sequential ordering of task performance that followed Taylor's proposed strategy. In a similar fashion, control was increased over the way that workers were supplied with tools and stores at the Eveleigh workshops. This change was particularly aimed at traditional work practices as Fraser demonstrated in his testimony to the Curlewis Royal Commission when he gave the following description of a man unscrewing a pipe:

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88 Curlewis, op. cit., p.57, p.65.
That particular wrench he put to one side and went across and brought another wrench and tried that one with the same result, and gradually he accumulated beside him six different wrenches.

As W.J. Knight told Curlewis, the subsequent reorganisation of the stores substantially affected long-standing work practices. For the past thirty years, he commented: 'I have always been in charge of a job; any material I wanted I obtained from the store myself; if I wanted turps I would obtain half a gallon; of course, I might not use it all at once, but still I would have it by me.' Under the new system, by contrast, he had to 'have an order from the sub-foreman' to obtain any materials.\textsuperscript{89}

Such planning and control over job performance by engineer/managers and sub-foremen, who were also responsible for grouping machinery according to the plans laid down, indicates that a rudimentary routing system was adopted at Eveleigh at this time. A few years later, the system was formalised. When it became necessary to extend operations beyond the Eveleigh site's capacity, the decision was taken to establish additional workshops at Chullora. The 'Principles of Shop Arrangement' adopted at this site, following 'a study... of many workshops... abroad', brought work 'to the men... rather than the reverse.' This new arrangement simplified supervision because it kept workers 'in definite locations.' Moreover, while some effort was made to introduce 'uniform' practices and standards at Eveleigh during the War, standardization certainly became a basic feature of the Chullora workshops.\textsuperscript{90}

The fear expressed by workers, during the General Strike, that they would be restricted to certain machines and benches where they would be provided with the means of communicating with the tool room were certainly borne out by these spacial alterations to railway workshops.\textsuperscript{91} Their freedom of movement was decreased and their capacity for interaction and communication was limited to those who supervised and disciplined them.

On the basis of such preliminary 'physical changes,' Taylor had proposed numerous methods for altering collective work practices which involved time study of individual workers to enable the production of extensive work records and the

\textsuperscript{89} Curlewis, \textit{ibid.}, p.9, p.27.
provision of personalised tasks, incentive payments, decreasing the size of gangs, 'scientific selection' and 'functional foremanship.' These methods were all evident in the administrative innovations associated with the card system's operation. Bonus payments were attached to a number of job classifications in the tramway workshops between 1907 and 1910. Then during 1914, at around the time the Department introduced high speed steel tools, a new time-keeping system was adopted in the armature shops and the electrical repair shops of the tramway workshops. Those affected began to complain that their work was being timed by foremen and that they were being subjected to a 'task system' which required them to individually produce a certain amount of work in a pre-estimated time for which some received a bonus payment.

In September 1918, as use of the card system was being extended, a new bonus payment scheme, known as the Halsey Plan, was introduced to the Eveleigh workshops. Certainly, this was not Taylor's most favoured one. But he supported its use during the adaption of his system to an American government enterprise; it was combined with task setting by time study as prescribed by his system at the Watertown Arsenal in 1910. The choice of this scheme in NSW is hardly surprising. It was popular in Britain because it based payment on past performances. And it suited the Department's award structure because it did not alter minimum rates and allocated bonuses to specifically selected jobs. As at the US Government's Watertown Arsenal, it involved the calculation of standard times by an assessing officer chosen by the manager.

The card system reduced workers to 'objects of information' because it allowed management to gauge precisely how much time was spent on every operation and to establish each individual's 'rate of output'. It also enabled the foremen to 'produce evidence to show a man was going slow by written record.' By 1919, the Railway and Tramway Magazine openly admitted that the system's

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93 These sorts of innovations were later extended to the pattern-making shops, oxy-welding shops and tinsmiths shops.  
adoption in other branches of the Department involved the recording of employees’
motions. In addition, the information recorded on the cards now included details
concerning each employee’s history, position, pay-rate, debits for offences
committed and credits for increased output; precisely those details Taylor had
specified for inclusion on his instruction cards.97

In operation, Taylor’s instruction cards were integrally tied to his new role for
foreman. In order to ensure that each individual worker would ‘be given his proper
implement and his proper instructions for doing each new job’ on the basis of
scientific investigation, he promoted closer contact between workers and their
supervisors. The latter became ‘teachers’ who were responsible for helping workers
perform their duties according to the details outlined on the cards.98 In itself, Taylor’s
functional foremanship highlights the cultural trajectory of scientific management. It
directly affected traditional modes of informal co-operative training among workers
because it enabled each worker to be dealt with directly by numerous foremen
whose duty it was to teach workers new habits and the best standard methods by
which to perform their work. As Taylor saw it, management would no longer stand
aside, as in the past, and throw on workers ‘the entire responsibility as to methods,
implements, speed, and harmonious co-operation (my emphasis).’99 This was clearly
a strategy to undermine the transmission of those values, norms and rituals which
challenged managerial authority.

The adoption of such a strategy by the Railways and Tramways Department
was evident in the restructuring of supervisory roles and employment of additional
foremen. According to W.T. Padgen, a machinist and President of the Amalgamated
Society of Engineers there was only one foreman in his workshop until 1914. But
immediately before the General Strike this number increased to three and after it to
13, the 10 additional staff being designated to a new job classification of ‘sub-
foreman’ which superseded that of the leading hand. When Padgen returned there in

96 Foucault, op. cit., p.200; R & T Budget 1/2/1917, p.182; Curlewis, op. cit., p.8, pp.11-13, p.17, p.62, p.77.
97 R & T Magazine 1/12/1919, p.58; Taylor, ‘Shop Management...,’ pp.115-6; Taylor, The Principles..., p.23,
Piece-Rate System...,’ p.857, p.862.
1918, on an errand, he 'saw more foremen than workmen. They seemed to be falling over one another.'

Under the previous system workers were allocated tasks every morning by leading hands. Later in the afternoon the time-keeper would walk through the works and ask each employee, 'Well, what have you been on to-day?' And each would divide up the total hours of the day and rely on his memory of the work performed during those hours. By contrast, after the card system was introduced, the sub-foremen could calculate the time taken 'instead of asking the men' because the cards included extensive details concerning the precise work performed, rates of pay, and job numbers. This change followed Taylor's suggestions for the use of instruction cards. In 1903 he had pointed out:

There is no question that all of this information can be given both better and cheaper by the workman direct than through the intermediary of a walking time keeper, providing the proper instruction and report system has been introduced in the works.

The new role given to the Department's sub-foreman also altered the way workers were supervised. In the tramway workshops, each sub-foreman now directly supervised a smaller number of workers directly. The new 'squad system,' involved 24 workers in some areas, while in others it approximated 40. The duties of the sub-foremen were also extended. They were required 'to detail the work for each man to perform, and to supervise that work, check it, and see that the employee conducts himself properly.' It was up to them, rather than the workers, to record the time taken by each individual in the performance of tasks. The employment of additional foremen for such ends formed one of the major points of contention in the parliamentary debate surrounding the General Strike. 'Who ever heard of foremen being told to stand over and watch good workmen in order to get good results from their labour?' asked the particularly strident opponent of this new recruitment policy,

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100 Curlewis, op. cit., p.41, p.47.
102 Curlewis, op. cit., p.10, pp.14-15, p.17, p.22. See also pp.43-45 for the way unionists described these changes and Interview with Leslie Best conducted by Lucy Taksa on behalf of the NSW Bicentennial Oral History Project, 8 December 1987 [Transcript held at the State Library of NSW] Transcript, p.13.
John Storey in the House. But despite such rhetoric on the part of Labor parliamentarians the Department continued to increase the number of foremen so that by 1918 railway workers were using the term 'over-supervision' in their objections to the card system's administration by the new sub-foremen. Padgen commented that 'nothing is more aggravating to a man than to have a very large number of officials continually hopping around him like flies around a honey-pot.'

Workers, in fact, related such increased supervision directly to scientific management. As the General Secretary of the Amalgamated Railway and Tramway Association, Claude Thompson, told Justice Curlewis, 'the function of a sub-foreman was equivalent to that of a speed boss'; that is, one of Taylor's eight functional foremen. And, in turn, Curlewis commented that 'Mr. Fraser's description of the functions of the foremen correspond with Mr. Thompson's ideas of the functions of a speed boss.' In fact, this correlation merely reflected the degree to which the unionised workforce distrusted those employees who became sub-foremen. According to Padgen, the sub-foremen were capable of including 'false particulars' on the cards which they filled in and locked in a box 'with Yale locks on the doors.' Curlewis asked: 'Did you say that the men were picked as sub-foremen who had no sympathy with working men, men who did not believe in a fair day's work, but in sweating men...?' To which Padgen replied emphatically: 'Yes, and I believe it too.'

The sub-foremen employed after the General Strike played precisely the role Taylor had ascribed for functional foremen. They perceived a mutuality of interests with the management. They willingly exercised a high degree of surveillance and discipline over their subordinates. And they avoided the traditional unions which reflected the collective culture of work that had previously been dominant in the Department's workshops.

Yet according to scientific management dogma, the increased contact between labour and management constituted only half of the change needed to effect a 'mental revolution' among workers. As Taylor put it:

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104 Curlewis, op. cit, p.47.
105 Curlewis, ibid, pp.36-37.
106 Curlewis, ibid, p.40.
Their real instruction, however, must come through a series of object lessons. They must be convinced that a great increase in speed is possible by seeing here and there a man among them increase his pace and double or treble his output.... It is only with these object lessons in plain sight that the new theories can be made to stick.

Indeed, Taylor added that 'in assisting to form public opinion in the shop,' such object lessons would help to achieve new attitudes.108

It was precisely to such object lessons that railway management attributed the success of the card system. Following its introduction, production increased by 40 percent even though the labour force was decreased by 10 percent. Mr. Shensone insisted that this was because those 'old employees' who regained employment with the Department after the Strike began working at a faster pace 'unconsciously.' They were, he said, 'drawn into the speed set up' and the vigilance incorporated into Eveleigh by the loyalist workers.' This process of change, he told Curlewis, was 'something like a man on a bicycle following a pacer.' In this case, he thought that the University graduates who had volunteered as strike-breakers had 'set a pace' that was 'to be envied.' It was this pace that had 'been followed as the other employees came back to work.109

These technical changes fulfilled the requirements of Taylor's first principle of scientific management: the reduction of traditional, 'rule-of-thumb' knowledge to 'true science.' However, the Railways and Tramways Department also sought to realise the other three principles of scientific management.110 The employment policy it adopted after the General Strike, like Taylor's 'scientific selection' gave management greater control over recruitment.

The terms of this dispute's settlement granted the Commissioner of Railways unconditional 'discretion to select whom he chooses to fill those posts' vacated by striking workers. Such discretion invariably gave preference to strike-breakers particularly as the Government and the Commissioners had vowed to 'stand by'

109 Curlewis, op. cit., p.59.
those 'who had come to the assistance of the country' during the industrial 'crisis'.

Additionally, Chief Commissioner Fraser told a meeting of Branch Heads in October 1917 that applications from those who had never before been employed in its workshops should be encouraged at the expense of those from strikers. This would enable them to obtain 'one or two first rate men into the service.' Like Taylor, Fraser had a fixation on this class of citizen.

By favouring those who had no knowledge of past practices, the Department directly attacked the mutualistic ethic that informed labour organisation in its workshops. Padgen informed the Curlewis Royal Commission that:

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\text{it is a most remarkable coincidence that all those men who have previously held good records... and the only thing against them was that they had taken an active interest in trades unionism or politics, were debarred re-admission into the service.}
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Indeed, virtually no union officials were re-employed after this Strike because the Department blacklisted those former employees who had participated in the Strike as well as those who were thought to be either sympathetic to the IWW or simply 'indifferent' workers. Its refusal to re-employ 2,000 strikers provides a startling example of 'scientific selection' in action.

The Department's recruitment policy explicitly challenged the solidarity borne from life-long employment and recruitment based on skill, kinship and labour movement networks that had existed in its workshops. As one Departmental manager pointed out, the greater output achieved by the 865 employed in 1918, as compared to that produced by the 1,134 employed prior to the General Strike, was

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111 Holme, op. cit., p.28.
113 Curlewis, op. cit., p.42; Edmunds, ibid., pp.xxv-xxviii.
114 Boys employed by the railways tended to follow in the footsteps of the male members of their families. Interview with Stan Jones conducted by Lucy Taksa, 8 September, 1983. John Shields shows that this form of family-initiated recruitment was widespread. Shields, op. cit., p.93.
115 Prior to the General Strike, Sydney Trades Hall had provided rooms specifically for the location of workers for Government jobs. During the Strike these were closed down when the Government no longer saw fit to employ union labour. AW 31/5/1917; Holme, op. cit., pp.37-38.
due to the combination of the card system and 'the getting rid of undesirable elements.'

These selection procedures were reinforced by the Department's efforts to provide 'scientific education', in tandem with the wider reforms made to the State's technical education by the NSW Director of Education, Peter Board and the Superintendent of Technical Education, James Nangle in 1914. In an effort to prevent 'overlapping' and 'wasted effort' and to ensure the conservation of public resources and uniform teaching practices throughout the State, these reforms established closer links between the Departments of Public Instruction and Railways and Tramways. The Railway and Tramway Institute ran Trade Courses in conjunction with those offered by the Department of Public Instruction's newly established Trade Schools. Hence, the Institute also adopted the School's new registration forms (effectively entrance tests) to select students on the basis of their literacy. Similarly, a formal compact was established between the Institute and the Sydney Technical College. Those of the Institute's Trade Course students who showed the capacity to become foremen and managers were allowed to sit for the College Diploma Course entrance exams. Such foremen would be among those that railway workers later equated with Taylor's 'functional foremen."

The alliance between these public educational bodies enabled the standardisation of courses, exercises, workshop practices and administrative procedures. The Institute adopted the industrial management methods which were a central feature of the Sydney Technical College's new approach to training. Included among these was a new record-keeping system based on the use of 'job-cards' which were filled in after every exercise was completed. They not only enabled marks to be allocated for accuracy and general knowledge but, perhaps more importantly, for the time taken by each, individual student to complete their own personal tasks. Marks were then recorded in a roll-book in which information from the

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116 DT 9/8/1917; Curlewis, op. cit., pp.15-17. Leslie Best, a shop boy involved in the production of spark arresters at the Eveleigh workshops acknowledged that the use of the card system enabled a job that had taken two days to be reduced to one day. Interview with Leslie Best..., Transcript, pp.12-13.

job-cards was also collated. Complementing the job and time cards that were being experimented with in the Department's workshops between 1915 and 1916, this new approach to marking effectively promoted new norms of conduct for the performance of tasks. Its underlying purpose was equivalent to that which underpinned the incentive payment schemes associated with scientific management; it rewarded those students who conformed to instructions.

In 1916, the Department began promoting new selection procedures through the Institute's training activities. First, Selection Committees were established for the Institute's trade class teachers. Next, its magazine began advertising specific criteria for selecting apprentices. Included were cleanliness, smartness, intelligence, and the capacity to prevent waste. A year later, such attention to recruitment resulted in more formalised efforts. Following the presentation of a paper on 'The Training and Selection of Youths for Apprenticeship' to the Institute's new Literary and Scientific Association, a special sub-committee was formed to investigate the problem. Three months later its findings were discussed by the Secretary to the Staff Board and Branch Heads, together with Peter Board and other Education Department and Technical College administrators. Subsequently, a formal Discussion was held to devise more systematic methods of selection. Criticising the way boys relied on family tradition to select their future trades, the participants in this forum praised the Education Department's decision to increase contact with parents so that some external control could be exercised over their offsprings' choice of

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119 Nangle, Report of the Superintendent of Technical Education For 1914..., pp.104-108; R & T Budget 1/3/1917, pp.211-212; 1/2/1917, p.193, p.195. The job cards included each student's name, roll-book number, the total hours of attendance per week, the number of the job exercise and the time allotted for completion. Spaces were also left on cards for students to enter dates and times when exercises were started and finished. In situations where cards were inappropriate, such as for lectures or practical work in laboratories, progress was measured by a time test or 'Quiz' which required students to answer questions in an allotted time.
120 From June 1915, railway unions began to resist the Railway Commissioners' efforts to introduce a card system of job-records. When a similar attempt was made a year later, unions successfully thwarted the initiative by lobbying the Minister for Railways through their Labor Party connections. Turner, op. cit., pp.142-143.
123 R & T Budget 1/12/1916, p.125.
vocation. A similar practice was advocated for the Railways Department's own Staff Board. 124

These public service administrators were particularly perturbed by apprenticeship regulations which prevented boys beginning with the Department until they turned 16, even though some of them left school at the age of 12 or 13. This situation, they thought, forced boys to waste time after leaving school, left them open to 'bad' social influences and so resulted in 'bad habits'. Accordingly, Railways and Tramways Department managers sought advice on how to obtain 'a better class of apprentice' from the self-avowed supporter of scientific management, J.J. King-Salter, the Commonwealth Naval Dockyard's manager. A conference of Railway and Education Department administrators, held during November 1917, further expedited the adoption of new selection procedures. 125

In December 1920, an article published in the Institute's magazine entitled, 'Education and Brotherhood' demonstrated the cultural implications of the Department's attempt to systematise selection. The issue of recruitment, argued the writer, was of immense significance for a Department which employed over 45,000 people. The Institute, he added, was an effective instrument for the creation of an 'entirely new comradeship of Labour and Capital' because of its attention to selection and 'moulding' of new recruits, as well as for advising them on 'openings and opportunities for promotion. 126 To the extent that it encouraged co-operation between workers and managers and acceptance of scientific management methods, the Institute provided a perfect channel for spreading Taylor's fourth principle: 'harmonious co-operation' between labour and management.

Through its training methods, literature and control over recreation, the Institute mobilised its forces against the 'go-slow' tendency among workers. 127 It opened its facilities to civilians in country towns and sold its magazine to the public.

126 R & T Magazine 1/12/1920, pp.725-6.
through the NSW Bookstall Company and rural booksellers. Every issue of the magazine, from 1916, advertised the sale of technical books by the Bookstall Company and by Dymocks. Included amongst these were ones written by F.W. Taylor. In this way the Department spread ideas about new tools and methods which saved time and labour. In 1917, when its staff of 98 teachers was engaged in training 3,000 students, the Institute began to produce and sell text books directly to its students as a way of replacing rule-of-thumb methods with scientific knowledge. Such texts were favoured because they made sure that 'the fast student may not be kept back to suit the slower one.'

These developments occurred at the very time when the Institute's relationship with the Sydney Technical College was being strengthened through the standardisation of Trade Classes. In 1917, the 300 Trade Class students at the Institute were receiving supplementary day-time instruction at the Sydney Technical College, a practice which was to continue and expand during the following years. The object lesson provided by Nangle's reforms had a marked impact on the Institute's own work-related training courses. In terms of content, classes were extended to include subjects such as 'station management' which involved lessons on the recording of orders and the allocation of duties. In administrative terms, too, the Institute standardised teaching by producing a syllabus for each course, together with a general rule-book to guide teachers. This introduced uniformity in teaching methods, standards and time to all students, even those who were transferred to the country or whose work duties required them to travel. In addition, the Institute prepared pocket-book 'catechisms' as a supplementary form of training. 'Scientific' knowledge would henceforth be transmitted through books in place of the old 'rule-of-

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128 R & T Budget 1/2/1917, p.191; 1/1/1918, p.118.
129 See for example, R & T Magazine 1/4/1919, p.iv; 1/10/1919, p.vi.
thumb' knowledge that had been 'handed down... by word of mouth' among workers. 

Between 1917 and 1918, the Institute's magazine was fully enmeshed in the campaign for national efficiency. Managers who spoke through its pages consistently pointed to the relationship between training and increased output, as well as the necessity to fit men for their duties. In 1919, the editorial article described the training of lower grade staff in the Institute's classes as 'a continuous selection' process which involved 'eliminating the unfit and selecting the fittest.'

By this time too, the Institute was being described as 'The New University' where people were 'improved by the application of scientific education.' Old methods of training which relied on 'the slavish imitation by the apprentice of the processes which he saw going on around him' were now redundant, declared its magazine in 1921. Instead modern machine shop conditions demanded that apprentices be given continual instruction in the 'actual conduct of the work' because the methods of handling work were no longer left to 'the general judgement of the workman'. In strict accordance with scientific management dogma, the magazine pointed out that such newer methods were now determined by the administration in the light of the costs involved. As one railway engine driver put it: 'in our branch there was no such thing as wasting time because you had that sheet and every minute you were paid for was accounted for on that sheet.' The Department's Irregularity Clerks would 'go through the drivers sheet' and send memorandums to workers to explain why they had 'lost three minutes somewhere' and if workers did not respond in writing they were not signed on for work.

In the face of passive and active resistance by workers the Department promoted Taylor's fourth principle of 'harmonious co-operation' to legitimate its new

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136 R & T Magazine 1/2/1921, p.50. John Mongan was very hostile to the Irregularity Clerk's demand for him to perform his work in a way that would save time. While 'that nincompoop' had never driven a locomotive, nevertheless, it was he and men like him that were 'rushing the likes of me that's doing the work.' Interview with John Mongan conducted by Lucy Taksa on behalf of the NSW Bicentennial Oral History Project, 19 March, 1987. [Transcript held by the State Library of NSW, p.21, pp.30-31.]
work methods. One avenue was provided by the Suggestions and Inventions Committee, established under the Institute's auspices in 1915 by Chief Commissioner Harper.\textsuperscript{137} This scheme fitted neatly with Taylor's ideological imperatives. In 1911 Taylor, in fact, advised managers to encourage workers suggestions and to evaluate them by scientific analysis:

And whenever the new method is found to be markedly superior to the old, it should be adopted as the standard for the whole establishment.

The workman should be given the full credit for the improvement, and should be paid a cash premium as a reward for his ingenuity.\textsuperscript{138}

As he told the US House of Representatives Inquiry in 1912, workers' suggestions were 'most welcome to the management' because they provided an important source of knowledge for 'improvements in methods and implements'. In short, they ensured continuous change and improvement, a point that was reiterated by railway administrators vis-a-vis their own scheme.\textsuperscript{139} In 1916, the Railways Suggestion Committee processed 711 suggestions of which 48 were found acceptable. Three years later 99 of the 685 suggestions received were adopted, the Department paying £2,171 in bonuses and £90 in patent fees.\textsuperscript{140} Such bonus payments for individuals fitted well with other bonus schemes then operating in the workshops.

The Literary and Scientific Association, launched by James Fraser under the Institute's auspices in January 1917, also helped to disseminate scientific management ideology to the Department's workforce. Both directly through papers presented before it and indirectly through their publication in the Railway and Tramway Magazine, this Association provided an arena for management to attack the mutualistic ethos underpinning traditional collective work practises and to promote a Taylorian 'mental revolution.' During the first Address to the Association, the Works Manager of the Eveleigh Workshops stressed that the practice of copying others had to be eradicated. If 'we are to be progressive', he continued, scientific

\textsuperscript{137} This argument questions the conclusion drawn by Patmore that Harper borrowed this scheme from the English Great Western Railway Company because he thought it would encourage an 'esprit-de-corps' among railway staff. Patmore, 'A History of Industrial Relations...,' p.313.

\textsuperscript{138} Taylor, The Principles..., p.128.

\textsuperscript{139} Taylor, 'Taylor's Testimony...,' p.196; Curlewis, \textit{op. cit.}, p.21, p.68.
methods, high standards and 'American methods in educating our young' had to be adopted. In a similar vein, the next Address, presented by James Fraser, described 'Slow Work' as a 'microbe' that was spread by 'misdirected effort,' idleness due to mistakes and careless operations. The third Address by a Signalling Branch clerk went one step further in censuring workers' output restriction. To increase production and ensure 'properly directed effort', J.S. Dowling advised railway administrators to 'study the number of motions necessary,' and eliminate unnecessary ones. It was a fallacy, he continued, to suppose that this would lead to unemployment; on the contrary, he stressed that it was simply required to cut costs.

In the discussion which followed, Fraser endorsed Dowling's view that motion study and technical education provided the best tools for cultivating new habits in the workplace. Indeed, he thought it easier to impart new practices to youth through education than to teach them to older workers. The Scientific and Literary Association was a useful vehicle for such education, argued the Eveleigh Machine Shop Assistant Foreman, S.J. Andrews, because papers such as Dowling's could be presented to apprentices to stop the 'pernicious influences in the homes of the boys of the workshops'. The influence of those 'who filled the minds of youths with bad ideas' could, he added, be defeated by bringing the boys together at the Institute and the Technical College; the very organisations which had incorporated scientific management into their training methods.

In 1920, these ideas culminated in the arrangement of classes on railway economics and scientific management under the auspices of a new Traffic Officers' Training School. In this context, a new generation of Traffic Inspectors and Station Managers were trained in the basics of scientific management practice, as these included knowledge of the 'part that rate-fixing plays in the scientific management of modern transport' and the classification of freight by arrangement of goods according to the Department's newly adopted rate-fixing system. Special attention was also

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142 R & T Budget 1/5/1917, pp.272-275.
143 Ibid., pp.276-280.
given 'to the economy of time, effort and material.'

A year later, students were also required to attend university-based courses which included leament systems and time studies. Knowledge of these ideas and practices was then ctures on job costing, timekeeping methods, job and time cards, bonus and other pspr ead further afield through the publication of such lectures.

As Gramsci pointed out, the state not only operated as an instrument of economic reorganisation, but also 'of rationalisation... and of Taylorisation.' As a hegemonic force, scientific management provided the consensual resource par excellence for a cultural battle to transform the popular mentality of Australian workers. The latter's claims during the General Strike were vindicated. The card system was the 'thin end of the wedge' for the spread of scientific management. As part of a wider restructuring of work practices and relations it certainly threatened trade union organisation by undermining workers' ability to form intimate work groups and hence to engage in militant collective action. In effect, the General Strike's terms of settlement succeeded in establishing what the Acting Premier referred to as the 'harmonious relationships which ought to exist between the State and its employees.'

Scientific management ideology was thus institutionalised in the organisational arrangements of one of the State's largest and economically significant Departments.

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144 As part of their study, students had to attend university classes two nights per week and Institute Classes two nights per week. The University courses offered specifically to these students included one on Railway Economics, convened by F.A. Bland, a prominent member of the WEA, one on Business Management by W.J. Clearly, the Assistant General Manager of Messrs. Tooths and Co., and one on Transport Economics by C.A. Hodgson, the Railways' Chief Traffic Manager. *R & T Magazine* 1/3/1920, p.268, p.283; 1/5/1920, p.433; 2/8/1920, p.525; 1/11/1920, p.674; 1/12/1920, pp.729-30; *Engineering Journal (E.J.)* November 1920, p.8. See also p.9, and Adam McCay, 'Student To-Day - Engineer To-Morrow,' *E.J.* December, 1919, p.59.


147 The informal shop-floor committees established by railway and tramway workers after their unions were deregistered ceased to operate after 1921. See Patmore's treatment of developments during the 1920s. Patmore, 'A History of Industrial Relations...,' pp.357-358, pp.439-446.

148 Holme, *op. cit.*, p.28.