

***Scientific Management at Work:
the Bedaux System, Management Consulting,
and Worker Efficiency in British Industry, 1914-48***

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Declaration of originality

This thesis is my own work. Where the work of others has been used, it has been appropriately referenced.

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Abstract

Building on scholarly research into the history of management, consultancies, the British state, trade unions, and industrial activism, this thesis uses a variety of private and public archives, printed materials, and private collections, to examine the inception, development, and large scale implementation of work measurement in Britain between 1914 and 1948. It explores work measurement's origins in the American scientific management movement, particularly F.W. Taylor's *unit-times*, and Charles E. Bedaux's development of Taylor's *unit-times* into a more effective work measurement unit: the Bedaux *B*. It elucidates on Bedaux's commercial career and his foundation of several successful industrial consultancies in the 1920s. It explores the activities of his consultancy in interwar Britain, including the installation of the *B* system at Imperial Chemical Industries (ICI) and the negotiations conducted in order to introduce the *B* system. It also explores Charles Bedaux's demonisation by the US and British media from 1937-44.

The thesis then provides case studies of the circle of managers based at the Rowntree Cocoa Works at York in the interwar period to demonstrate that, in contrast to existing historiographical claims, the Rowntree circle were important in developing, and using, additional work measurement units derived from the *B* such as the Rowntree *Mark*, the Mander *Work Unit*, and the Urwick Orr & Partners *Point*. It explores the large-scale expansion of work measurement during World War Two, particularly in the use of the *B*-derived ICI *Standard Minute* unit at the Ministry of Supply's National Filling Factories, and the endorsement of work measurement by the postwar Labour government in the form of the establishment of the British Institute of Management in 1948.

It examines how, when, and why the leadership of major trade union organisations, particularly the Transport and General Workers' Union and the Trades Union Congress, accommodated themselves to the Bedaux *B* and other work measurement systems in the early 1930s, as well as the more vociferous response to 'Bedaux and kindred systems' by the Communist Party of Great Britain and the Amalgamated Engineering Union. It concludes by examining the uneasy political consensus around the utility and practices of work measurement in postwar British industry, both public and private.

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List of abbreviations used in the text

AACP	Anglo-American Council on Productivity
AEU	Amalgamated Engineering Union
AFL	American Federation of Labor
AIC	Associated Industrial Consultants Ltd.
APOC/AIOC	Anglo-Persian Oil Company / Anglo-Iranian Oil Company
ASE	Amalgamated Society of Engineers
ASME	American Society of Mechanical Engineers
<i>B</i>	Bedaux Unit of Human Power/Energy Measurement
BFL	Baltimore Federation of Labor
BIM	British Institute of Management
BPC	British Productivity Council
BS	British Standard
BX	British Xylonite Ltd.
CIO	Congress of Industrial Organizations
CIOS	International Council of Scientific Organisation
CPGB/CP	Communist Party of Great Britain
CPSU	Communist Party of the Soviet Union
CPUSA	Communist Party of the United States of America
DSIR	Department of Scientific and Industrial Research
E&ATSSNC	Engineering and Allied Trades Shop Stewards' National Council
ECCI	Executive Committee of the Communist International
EEF	Engineering Employers' Federation
EKCo	E.K. Cole
EL	Economic League
ENIOS	Italian National Committee for Scientific Management
EWO	Essential Works Orders
EWS	Experienced Worker Speed
FBI	Federal Bureau of Intelligence
FBrl	Federation of British Industry
GM	General Motors Inc.
HMWC	Health of Munitions Workers' Committee
ICWA	Institute of Costing and Works Accountants
IIA	Institute of Industrial Administration
ILM	Institute of Labour Management
IMechE	Institute of Mechanical Engineers
IPE	Institution of Production Engineers
IPM	Institute of Personnel Management

JPC	Joint Production Committee
ICI	Imperial Chemicals Industries
ILO	International Labour Organization
IHRB	Industrial Health Research Board
IMI	International Management Institute
M-O	Mass Observation
MAP	Ministry of Aircraft Production
MCA	Management Consultants' Association
MI5	British Security Service
MOL	Ministry of Labour
MOM	Ministry of Munitions
MOP	Ministry of Production
MOS	Ministry of Supply
MRC	Medical Research Council
MRG	Management Research Groups
MSF	Morton Sundour Fabrics Ltd.
MV	Metropolitan-Vickers Ltd.
NCB	National Coal Board
NFF	National Filling Factories
NFRB	New Fabian Research Bureau
NICB	National Industrial Conference Board
NOB	Not on Bedaux/Not on Bonus
NKVD	People's Commissariat for Internal Affairs
NUCAW	National Union of Clerks and Administrative Workers
NUGMU	National Union of General and Municipal Workers
OSS	Office of Strategic Services
PA	Personnel Administration Ltd.
<i>PA</i>	Personal Allowance
PAMT	Personnel Administration Method of Training
P-E	Production-Engineering Ltd.
PCMC	Production Control Machines Corporation
PEB	Production Efficiency Board
PBS	Premium Bonus System
REFA	German Institute of Work and Time Study
RNPF	Royal Navy Propellant Factory
ROF	Royal Ordnance Factories
SBAC	Society of British Aircraft Constructors
<i>SM</i>	Standard Minute
TCB	Technical Costs Branch

TGWU	Transport and General Workers' Union
TUC	Trade Union Congress
UAWA	United Auto Workers of America
UOP	Urwick, Orr & Partners Ltd.

Archives consulted

BI	Borthwick Institute
BL	British Library
HALS	Hertfordshire Archives and Local Studies
HBS	Henley Business School
IBI	International Bedaux Institute
IET	Institution of Engineering and Technology
IISG	International Institute for Social History
ILO	International Labour Organisation
LAC	Library and Archives Canada
LHASC	Labour History Archive & Study Centre
LSE	London School of Economics
MRC	Modern Records Centre, Warwick University
NA	National Archives
NARA	National Archives and Records Administration
NAS	National Archives of Scotland
NYPL	New York Public Library
OHC	Oxfordshire History Centre
RGASPI	Russian State Archive of Socio-Political History
ROLLR	Record Office for Leicestershire, Leicester and Rutland
SI	Stevens Institute
SRO	Suffolk Record Office
OU	Open University
WALS	Wolverhampton Archives and Local Studies
WCML	Working Class Movement Library

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Chapter 1.

1.1. Introduction

This thesis examines the history of an important but largely unknown unit of work measurement: its creation, use, and significance, especially in Britain. This unit has had various names, and was, and remains, defined by a British Standard: BS 3138. It is a unit which has been used over the last century to measure the work of millions of Britons employed in manufacturing and some clerical work. If it features in historical literature, it is as the notorious Bedaux *B*, a seemingly dubious unit of measurement at the centre of the Bedaux system, a system which was widely used in interwar British industry. In this thesis I show that this unit - an abstract measure used to compare workers and different types of work - was in fact central to work measurement in twentieth century Britain and elsewhere, well beyond its association with Bedaux. It was created by Frederick Winslow Taylor, who remains famous in the present day, though this aspect of his career does not feature in historians' accounts, even though it was central to what historians have called Taylorism or scientific management, and also to a number of different methods of management control, labour costing, and payment-by-results systems. In fact, I show how Taylor's *unit-times*, outlined in his books *Shop Management* (1903) and *Concrete Costs* (1912), became not only the Bedaux *B*, but also other work measurement units including the Rowntree *Mark*, the UOP *Point*, the ICI *Standard Minute*, and many more.

Charles E. Bedaux, an infamous figure in the history of work, the history of the British royal family, and the history of industrial consultancy, was a key figure in bringing Taylor's *unit-times*, to Europe, especially Britain. In this thesis, I present the first reliable account of Bedaux's extraordinary life and work, outlining his influence and the spread of versions of his *B* through much of British manufacturing industry in the inter-war period, through his British consultancy, and via the 'Big Four' industrial consulting firms which were offshoots of Bedaux's British consultancy. I then examine how the use of these work measurement units expanded in Britain during World War Two, and became central to post-war attempts to increase British industrial productivity. I also demonstrate that work

measurement based on the *B* and similar units was a principal concern of the British Institute of Management; established by the British state in 1948. I show that the significance of work measurement and the units it relied upon was recognised by some: by the consultants who implemented it, certain important British firms, including ICI and Rowntree, and some political activists, particularly the Communist Party of Great Britain.

1.2. Literature review

Much historical research has been conducted on Britain's relative economic decline in the twentieth century.¹ A central feature of this discussion has been a set of claims about British management, which was often pictured as backward and resistant to modernisation. While this pessimistic picture was propagated by many historians, it was most notably described by Alfred Chandler in *Scale and Scope: The Dynamics of Industrial Capitalism* (1990), in which Chandler depicted Britain as lacking large firms, adequate commitment to research and development, and professionalised managerial structures. Chandler argued that, 'the general failure to develop organizational capabilities weakened British industry and with it the British economy'.² Chandler's standpoint was augmented by other American historians such as William Lazonick, who argued that the British manufacturing sector was too long reliant on the 'persistence of craft control' rather than on modern management methods and labour-saving devices.³ This vision of the twentieth century British factory floor, one in which management was unable or unwilling to control workers at the point of production, was also shared by some prominent British historians such as Eric Hobsbawm.⁴

Since the 1990s, there has been a transformation in debates related to British relative decline and what British historians have characterised as 'declinism'.⁵ As Barry

¹ For example, see Andrew Gamble, *Britain in Decline: Economic Policy, Political Strategy and the British State* (London: Macmillan, 1985), Corelli Barnett, *The Audit of War: the Illusion and Reality of Britain as a Great Nation* (London: Macmillan, 1986), Sydney Pollard, *Britain's Prime and Britain's Decline* (London: Edward Arnold, 1989), and Richard English and Michael Kenny, *Rethinking British Decline* (Basingstoke: Macmillan, 2000).

² Alfred Chandler, *Scale and Scope: The Dynamics of Industrial Capitalism* (Cambridge: Harvard University Press, 1990), p.391.

³ William Lazonick, *Competitive Advantage on the Shop Floor* (Cambridge, Mass: Harvard UP, 1990).

⁴ E.J. Hobsbawm, *Labouring Men: Studies in the History of Labour* (London: Weidenfeld and Nicolson, 1964).

⁵ For example, see David Edgerton, 'The Decline of Declinism', *The Business History Review*, Vol. 71, No. 2. (Summer, 1997), pp. 201-206, and Jim Tomlinson, *The Politics of Decline: Understanding Post-War Britain* (Harlow: Longman, 2001).

Supple has argued, the relevance of the Chandlerian US corporate model for Britain or Germany was questionable.⁶ David Edgerton and Sally Horrocks have shown that Chandler's assessment of Britain's allegedly-weak industrial research and development was mistaken.⁷ Perhaps most comprehensively, Leslie Hannah refuted the Chandlerian characterisation of formalised British management as less deep or dense than in the USA or Germany, arguing that there is 'no easy way of measuring the depth of management in order convincingly to establish the proposition that managerial hierarchies were unusually thin in Britain'.⁸ As Hannah observed, *Scale and Scope* notably did not examine the development of twentieth century factory floor methods of production or management in Britain and elsewhere.⁹

Chandler's claims reflected long-standing assumptions about poor work organisation, and ambivalent, even hostile, relations between management, trade unions and labour in nineteenth and twentieth century Britain. Indeed, some historians have made specific studies of these issues, and concluded that, either due to managerial indifference or worker resistance, a root cause of Britain's relative economic decline was a deficiency in Taylorism, or scientific management, in British manufacturing.¹⁰ There also is a long-standing claim, dating back to the 1960s, but recently re-iterated by authors such as Mauro Guillén, E.F.L. Brech, Andrew Thomson, and J.F. Wilson, that key interwar British business intellectuals, particularly Seebohm Rowntree, Lyndall Urwick, Oliver Sheldon and Clarence Northcott, all of whom were based at the Rowntree Cocoa Works at York,

⁶ Barry Supple, 'Scale and Scope: Alfred Chandler and the Dynamics of Industrial Capitalism', *The Economic History Review* Vol. 44, No. 3 (1991), pp.500-514.

⁷ David Edgerton and Sally Horrocks, 'British Industrial Research and Development before 1945', *Economic History Review*, Vol. 47 (1994), pp. 213-38.

⁸ Leslie Hannah, 'Scale and Scope: Towards a European Visible Hand?' *Business History* Vol. 33, No. 2, 297-309.

⁹ When Chandler's full list of publications are consulted, it seems Chandler had ruled out consideration of the factory floor after 1920 earlier in his career. See Alfred Chandler, *Strategy and Structure: Chapters in the History of the Industrial Enterprise* (Cambridge: MIT Press, 1962), p.24. In his book, Chandler cited Jenks, 'Early Phases of the Management Movement' *Administrative Science Quarterly* Vol. 5, No. 1 (1960), pp.421-447 as providing 'an excellent introduction to the beginnings of rational, carefully planned organization of work in factories and plants'. Jenks' focus was also on the 1890s. Eric Hobsbawm, *Industry and Empire: From 1750 to the Present Day* (Harmondsworth: Penguin, 1969), p.148 remarked that "Scientific management" became both a programme and a reality in the 1880s, chiefly under the impact of F.W. Taylor of the USA. By 1900 therefore, the foundation of modern, large-scale industry had been laid'.

¹⁰ For example, see Charles S. Maier's widely-cited 'Between Taylorism and Technocracy: European Ideologies and the Vision of Industrial Productivity in the 1920s', *Journal of Contemporary History* Vol. 5 (1970), pp.27-61. For a review of this literature, see Kevin Whitston, 'The Reception of Scientific Management by British Engineers, 1890-1914' *The Business History Review*, Vol. 71, No. 2. (1997), pp.207-9.

actively eschewed Taylorism in favour of more humanist management philosophies and looser, more cooperative managerial structures. They are seen as influential pioneers in this regard, with this approach and attitude reaching public and government acceptance in the postwar period.¹¹

More recent scholars have revealed a different picture of industrial management and work organisation in Britain in the first half of the twentieth century. A literature of particular importance to this topic is that of the 'labour process debate'.¹² Inspired by Braverman's *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*, the labour debate led to much discussion and research on F.W. Taylor, the organisation of work, and the recovery of classic texts from Karl Marx to Carter Goodrich.¹³

In the four decades since the publication of Braverman's book, historical studies of British industrial work organisation methods and related labour relations issues have emerged, the earliest being Littler's *The Development of the Labour Process in Capitalist Societies*. Littler shifted the debate from F.W. Taylor's *publications*, Braverman's body of source material (an issue further addressed in chapter 2), to the *practices* of the Bedaux consultancy and its Bedaux system, the latter of which he characterised as the 'Taylorism of the Great Depression'.¹⁴ In his examination of the Bedaux consultancy archives, the first, Littler discovered that the Bedaux system did not generally lead to deskilling as it was typically applied to jobs which were already semi-skilled or unskilled. He showed that resistance to the Bedaux system did not primarily come from factory workers but from middle managers and foremen who believed that their managerial prerogatives were under threat. Littler also discovered that the Bedaux system was based on a unit named the *B*,

¹¹ The most complete early exposition of this stance is John Child, *British Management Thought: A Critical Analysis* (London: George Allen and Unwin, 1969). See also Mauro F. Guillén, *Models of Management: Work, Authority, and Organization in a Comparative Perspective* (Chicago and London: University of Chicago Press, 1994), J.F. Wilson, and Andrew Thomson, *The Making of Modern Management: British Management in Historical Perspective* (Oxford: OUP, 2006), E.F.L. Brech, Andrew Thomson and John F. Wilson, *Lyndall Urwick, Management Pioneer: A Biography* (Oxford: Oxford University Press, 2010).

¹² A good summary collection is Stephen Wood (ed), *The Degradation of Work: Skill, Deskilling and the Labour Process* (London: Hutchinson & Co., 1982). One of the strongest works produced during this debate was Michael Burawoy, *The Politics of Production: Factory Regimes Under Capitalism and Socialism* (London: Verso, 1985). Craig R. Littler, 'The Labour Process Debate: A Theoretical Review, 1974-88' in David Knights and Hugh Willmott (eds.), *Labour Process Theory* (Basingstoke and London: Macmillan Press, 1990) noted that the majority of the labour process debate focused on Britain.

¹³ Braverman's book also gave rise to the reprint of Goodrich's 1920 book. See Carter Goodrich, *The Frontier of Control: A Study in British Workshop Politics* (London: Pluto, 1975).

¹⁴ This was a phrase also used by David Montgomery in *The Fall of the House of Labor: The Workplace, the State, and American Labor Activism, 1865-1925* (New York, CUP, 1987), p.440.

which, despite being 'pseudo-scientific', successfully included allowances for work and rest, and so acted as a 'universal measure for all work'. The *B*, Littler argued, was the Bedaux system's distinctive advancement beyond Taylor's 'arbitrary allowances' based on 'personal experience, assertion and cliché'.¹⁵ Additionally, Littler dismissed the bizarre life story of the *B*'s inventor, Charles E. Bedaux, which ended with his suicide as an alleged Nazi collaborator, as a 'side show'.¹⁶

Steve Kreis' doctoral research in the Bedaux consultancy archive produced detailed examinations of the Bedaux system in daily working life in the 1930s. Characterising the Bedaux system as 'more widely used in British industry than another other system of formal scientific management during the inter-war period', Kreis discovered that the Bedaux system did not involve the 'One Best Way' of Taylorism, was sometimes introduced at the same time as welfare packages, and noted that the Bedaux system was implemented in far more industrial plants than the original Taylor system had been.¹⁷ Focusing on the implementation of the Bedaux system at Imperial Chemical Industries (ICI), Kreis revealed that for the system to operate successfully, it necessitated close cooperation between 'work study, management and labor', that 'compared to most Bedaux applications, the introduction of the Bedaux system at ICI was successful, "intelligent" and complete', and that ICI was influential in the dissemination of the Bedaux system elsewhere in Britain.¹⁸ Like Littler, he downplayed Charles E. Bedaux personally, arguing that 'by 1930 at the very latest, Charles Eugene Bedaux and the Bedaux system were two

¹⁵ Craig Littler, *The Development of the Labour Process in Capitalist Societies: A Comparative Study of the Transformation of Work Organization in Britain, Japan, and the USA* (London: Heinemann, 1982), pp.105-9.

¹⁶ For analyses of the Bedaux system and gender, see Sylvia Walby, *Patriarchy at Work* (Oxford: Basil Blackwell, 1986) and Miriam Glucksmann, *Women Assemble: Women Workers and the New Industries in Inter-War Britain* (London: Routledge, 1990)

¹⁷ James Quigel, 'The Business of Selling Efficiency: Harrington Emerson and the Emerson Efficiency Engineers, 1900-1930' (PhD thesis, Pennsylvania State University, 1992) observed that Emerson's consultancy services were also used far more than Taylor's, Emerson and his consulting engineers eschewed the 'One Best Way' of Taylorism, and Emerson's 'firm also served as a bridge between scientific management and the rise of personnel administration'.

¹⁸ Steven Kreis, 'The Diffusion of an Idea: A History of Scientific Management in Britain, 1890-1945' (PhD thesis, University of Missouri-Columbia, 1990), pp.315, 369. See also Daniel Nelson (ed), *A Mental Revolution: Scientific Management since Taylor* (Columbus: Ohio State University Press, 1992) in which Nelson observes that the responses to Braverman had largely 'extrapolated from the *Principles* rather than from the experiences of the 181 plants or other historical data'. Kreis provided an expanded biographical section on Charles E. Bedaux, based on Janet Flanner's 1945 account in the *New Yorker*. This became the *American Dictionary of Biography* entry for Bedaux. Also in *Mental Revolution*, John Rumm revealed that the Bedaux system had been also been used extensively at DuPont's US plants in the 1930s, 40s and 50s.

decidedly different realities'.¹⁹

Also in the 1990s, Kevin Whitston used archival materials from several private companies, the UK National Archives, the Trades Union Congress (TUC), and Engineering Employers' Federation (EEF) to produce a doctoral thesis and a series of articles on what he described as 'Scientific Management Practice in Britain'. Whitston argued, in a fashion explicitly similar to Braverman, that 'Taylorism may be seen as a system of labour control, achieved through the use of time-and-motion studies' in which workers work every day to 'build for themselves more "modern", more "scientific", more dehumanized prisons of labor'.²⁰ However, in contrast to Littler and Kreis, Whitston dismissed the Bedaux system as 'one of history's most spectacular confidence tricks'. He argued that not only had Bedaux's salesmanship and company secrecy tricked contemporaries into believing the Bedaux system was unique, but Littler and Kreis had been similarly fooled. Whitston instead argued that the Bedaux *B* was 'no different' from 'every piecework system' which had 'a standard for a *normal* level of effort'.²¹ To Whitston, the Bedaux system was instead part of a broader pragmatic adoption of 'elements of Taylor's system, rather than the "system" itself, and in the development of production engineering which removed the planning and control of production from the shop floor to the office'. To support this claim, he singled out the interwar Rowntree Cocoa Works where, he argued, 'changes in management practices and procedures [related to Taylorism] were implemented' 'without the involvement of "efficiency engineers", or consultants of any kind', specifically Bedaux engineers.²² He argued that these practices and structures largely expanded in Britain after World War Two and peaked in the 1960s.²³ He also argued that with the expansion of 'Work Study' and Taylorism in Britain after World War Two, trade union bargaining apparatus also grew around these practices as they expanded in use.²⁴

Matthias Kipping has provided comprehensive accounts of the expansion of the

¹⁹ Kreis, *Diffusion of an Idea*, p.327

²⁰ Kevin Whitston, 'Scientific Management Practice in Britain, A History' (PhD thesis, Warwick University, 1995), p.25.

²¹ Kevin Whitston, 'Scientific Management Practice', p. 238.

²² Kevin Whitston, 'Scientific Management Practice Between the Wars' *Historical Studies in Industrial Relations* Vol. 1 (1996), pp.47-75.

²³ Kevin Whitston, 'Scientific Management Practice Between the Wars'.

²⁴ Kevin Whitston, 'Worker Resistance and Taylorism in Britain' *International Review of Social History* Vol. 42 (1997), pp.1-24.

Bedaux consultancies in Europe in the interwar period. Kipping's research revealed that Britain was the largest market for Bedaux's consultancy services and its offshoot 'Big Four' consultancies (Associated Industrial Consultants, Urwick, Orr & Partners, Production-Engineering and Personnel Administration) in the interwar and postwar periods. He argued that unlike in Germany and France, where Taylorism was successfully taught by large institutes, British Taylorism was disseminated by these consultancies and was smaller in scale than in other major European territories.²⁵

Michael Ferguson built on Kipping's research by using privately-produced publications to examine the careers of several British Bedaux consultants, particularly those who went on to found other 'Big Four' consultancies such as Norman Fleming, Maurice Lubbock, Robert Bryson, and John Orr. He noted that terms like 'efficiency engineer' and 'consulting engineer' were used until the late 1930s, after which the term 'management consultant' came into use.²⁶ Most importantly, and as examined in chapter 5, Ferguson was the first historian to examine the activities of the British industrial consultancy sector in World War Two.²⁷

Most recently, arguing that 'the European fascination with Taylorism took off [in the 1930s] just as the craze for scientific management began to die down in the United States', Christopher McKenna demonstrated that newer US management 'firms like McKinsey & Company largely replaced Taylorist consultancies [like Bedaux] in America during the 1930s, even though Taylorists [particularly the Bedauxist 'Big Four'] continued to dominate the market for organizational advice in Europe through the 1950s'. Using contemporary books, articles and archival materials, McKenna observed that, well into the 1960s, British industrial consultancies focused on solving problems of factory floor-organisation related to Taylorism rather than the higher value activities such as corporate strategy and company organisation on which American management consultancies focused.²⁸ McKenna also noted that after Bedaux's suicide in the USA while in custody on

²⁵ Matthias Kipping, 'Consultancies, Institutions and the Diffusion of Taylorism in Britain, Germany and France, 1920s to 1950s', *Business History*, Vol. 39, No. 4 (1997), pp.67-83 and Matthias Kipping, 'American Management Consulting Companies in Western Europe, 1920 to 1990: Products, Reputation, and Relationships', *Business History Review* Vol.73, No.2 (1999), pp.190-220.

²⁶ Michael Ferguson, *The Rise of Management Consulting in Britain* (Aldershot: Ashgate, 2002), chapter 1.

²⁷ Ferguson, *Rise of Management Consulting*, chapter 5.

²⁸ Christopher D. McKenna, *The World's Newest Profession: Management Consulting in the Twentieth Century* (Cambridge, Cambridge University Press, 2006), p.169

a charge of treason 'in 1945, in the newsreels and in the *New Yorker*, Bedaux served as an exemplar of all that was wrong with consultants'.²⁹

Another relevant literature is that of relations between the British state and industrial productivity, particularly during and after World War Two. Largely produced by Tomlinson and Tiratsoo using research in the UK National Archives, these studies challenged the arguments that 1940s and 1950s British governments failed to intervene to increase industrial productivity, or, as argued by Anthony Carew, that the Marshall Plan brought with it the wholesale implementation of Taylorism in Western Europe.³⁰ Instead, Tiratsoo and Tomlinson examined the wartime and postwar production drive, including the wartime Ministry of Aircraft Production (MAP), its Production Efficiency Service and Technical Costs Branch, the Anglo-American Productivity Council, the Human Factors Panel of the DSIR, and the foundation of the British Institute of Management in 1948.³¹

The final body of relevant literature is that of labour and trade union history, which, using archives, newspapers, biographies, memoirs and oral histories has recovered much about the landscape of twentieth century British unions' involvement in strikes, health and safety initiatives, job demarcations, and wage negotiations.³² Within this literature, some historians have observed that the TUC, TGWU, and the Leicester Hosiery Union were open to the Bedaux system in theory and accommodated themselves to it in practice at Lucas and Wolsey in the early 1930s.³³ A small number of accounts, usually memoirs or amateur histories written by former communists, suggests a different story related to the Communist Party (CP), the militant Amalgamated Engineering Union (AEU), and Bedaux.

²⁹ McKenna, *World's Newest Profession*, p.197

³⁰ Anthony Carew, *Labour Under the Marshall Plan: the Politics of Productivity and the Marketing of Management Science* (Manchester: Manchester University Press, 1987).

³¹ See H. Mercer, N. Rollings, and J.D Tomlinson (eds.), *Labour Governments and Private Industry: the Experience of 1945-51* (Edinburgh: Edinburgh University Press, 1992); Nick Tiratsoo and Jim Tomlinson, *Industrial Efficiency and State Intervention: Labour, 1939-51* (London: Routledge, 1993). On the BIM specifically, see E.F.L. Brech, *The Concept and Gestation of Britain's Central Management Institute, 1902-1976* (Bristol: Thoemmes Press, 2002).

³² Alastair J. Reid, *United We Stand: A History of Britain's Trade Unions* (London: Penguin, 2004) offers a comprehensive treatment of British trade unions. Vicky Long, *The Rise and Fall of the Healthy Factory: the Politics of Industrial Health in Britain, 1914-60* (Basingstoke: Palgrave Macmillan, 2011) examines debates by the TUC and industrial policymakers. J.B. Jeffreys, *The Story of the Engineers* (London: Lawrence and Wishart, 1946), does not examine work measurement though covers earlier developments such as the PBS. The Transport and General Workers' Union has most recently been covered by Andrew Murray, *The T&G Story: A History of the Transport and General Workers Union, 1922-2007* (London: Lawrence and Wishart, 2008), but it does not cover the TGWU's engagement with work measurement.

³³ Littler, *Development of the Labour Process*, chapter 9, Laura Lee Downs, 'Industrial Decline, Rationalization and Equal Pay: The Bedaux Strike at Rover Automobile Company' *Social History* Vol. 15, No. 1 (1990), pp.45-72, Selina Todd, *The People: The Rise and Fall of the Working Class* (London: John Murray, 2014), pp.101-5.

These authors suggest that the AEU and the CP responded to the Bedaux system, and the negotiation machinery which developed around them in the early 1930s, very differently to mainstream unions.³⁴ Moreover, Croucher's *Engineers at War* (1982), revealed the importance of the AEU and the CP in opposing production drives prior to summer 1941, and their subsequent support for higher industrial output after this date.³⁵

1.3. The thesis.

This thesis aims to add to this literature in five ways. The first, explored in chapter 2, is to observe that F.W. Taylor stressed that *unit-times* were the core focus of his practices of scientific management, but that his appeals to use *unit-times* in measuring work were largely ignored during his life (he died in 1915). The second aim, also presented in chapter 2, is to show that the Bedaux *B* had its origins in Taylor's *unit-times*. I agree with Littler, Kreis and Ferguson that the Bedaux system emerged from the US scientific management movement, and that the *B* was its distinguishing feature. However, I argue that the Bedaux *B* was not, as these authors have argued, simply a more flexible or universal form of Taylorism or, as Whitston has argued, a commercialised type of otherwise standard piecework norm. I instead argue that Charles E. Bedaux developed the *B* as an improvement upon Taylor's *unit-times*, and that Bedaux was unusual in doing so.

The third contribution I wish to make to this literature is a scholarly biographical account of Charles E. Bedaux's life which observes that Bedaux was one of a small number who took Taylor's *unit-times* seriously and used them to create a number of highly successful industrial consultancies, which implemented the *B* in hundreds of factories in North America and Europe. As examined in chapter 3, I argue that Bedaux and his consultancies were actually the principal vehicles which brought work measurement and the *B* to some countries in Europe, particularly Britain. However, in contrast to Kreis' claims about Bedaux's irrelevance to even his own company from 1930 onwards, and Whitston's argument about the charlatantry of the *B*, I demonstrate that both Bedaux and the *B* were taken seriously by senior British business figures well into the 1930s, and that both the

³⁴ See Mick Jenkins, 'Time and Motion Strike: Manchester 1934-7' *Our History* Vol. 60 (Autumn 1974) and Edmund Frow and Ruth Frow, *Engineering Struggles: Episodes in the Story of the Shop Stewards' Movement* (Manchester: Working Class Movement Library, 1982).

³⁵ Richard Croucher, *Engineers at War* (London: Merlin Press, 1982).

Bedaux system and the *B* (albeit under different names) became central to work measurement for many years. I also aim to move beyond the conspiracy theories related to Bedaux's life which have their roots in Janet Flanner's original 1945 *New Yorker* biography of Bedaux, which, based on his wartime links with the Nazis, unfairly demonised Bedaux's career, the Bedaux system and the *B*. In line with McKenna's observations about Bedaux's dreadful mid-1940s reputation, I also argue that the reputation damage which Bedaux's collaboration inflicted on contemporary consultants also damaged the posthumous reputation of Bedaux himself.

The next contribution relates to firms and consultants which the extant historiography, such as Whitston, claims did not implement the Bedaux system, instead introducing general elements of Taylorism, in the interwar period. As explored in chapter 4, Seebohm Rowntree, Lyndall Urwick and the Rowntree Cocoa Works at York are a key focus of this literature. As I aim to show in case studies of Rowntree's and Mander's, the Bedaux *B* could be, and was, copied, emulated, and used on many workers in these firms. I also show that at both Rowntree's and Mander's, their work measurement systems, based on the *Mark* and *Work Unit* respectively, were expanded from factory production work to repetitive office tasks. Moreover, to build on Kipping and Ferguson's general claim that the consultancy Urwick, Orr & Partners (UOP) implemented Taylorism in interwar clients' factories and offices, I reveal that UOP consultants actually implemented another derivative of the *B*, the *Point*, on a substantial scale. I then present the first case study of UOP's installation of the *Point* system at a client's plant.

Chapter 5 presents an argument which contrasts both Littler and Kreis' focus on Bedaux in 1930s Britain, and Carew and Whitston's focus on the spread of Taylorism in the 1950s and 1960s. Instead, I confirm the thrust of Tiratsoo and Tomlinson's study of World War Two and argue that work measurement actually expanded most rapidly in Britain during the war. I argue that work measurement, based principally on the ICI *Standard Minute* variant of the *B*, expanded radically during the war, particularly at the Ministry of Supply's (MOS) National Filling Factories (NFFs). I also argue that it was the wartime MAP experience of work measurement, both in terms of its employment of industrial

consultancies and its own expanded Technical Costs Branch (TCB), which convinced Sir Stafford Cripps, as postwar Chancellor of the Exchequer, to permanently institute work measurement in the foundation of the British Institute of Management (BIM) in 1948.

My fifth contribution to the field, explored in chapter 6, examines the ways in which unions and activists responded to work measurement. While general historiographical claims about cooperation between British trade unions and Taylorism exist, particularly Whitston's, I argue that mainstream trade unions accommodated themselves to work measurement, including the Bedaux system, believing that supervision by experienced trade unionists could ensure that measurement data and corresponding pay rates were fair. I show how British communists responded very differently to work measurement, particularly Bedaux. Although communists did not note that the Bedaux system and its *B* were derived from Taylor's *unit-times*, I observe that they argued that the Bedaux *B* and 'kindred systems' were indicative of a new phase of industrial capitalism in which work had been converted into abstract data (including the *B*), the definition and control of which had been extracted from workers by management. The CP also went to some lengths to highlight the fact that work measurement expanded considerably throughout the 1930s, particularly in aero-engineering during re-armament. Moreover, I aim to demonstrate that communists were unique among industrial activists in noting both that work measurement practices were transferred from factory floor production to repetitive office tasks, and also that work measurement consultants innovated in the mid-1930s with synthetic data whereby time studies at the point of production became less important in the practice of work measurement.

1.4 Methods

As Whitston has reported, the Bedaux company archives have become unavailable or lost since Littler and Kreis used them.³⁶ To compensate for this, I used many specialist books, magazines and journals to research the Bedaux system. American materials were obtained from the Rothermere American Institute at Oxford University, the Library of Congress in Washington D.C., and the New York Public Library. In addition to fresh

³⁶ Whitston, 'Scientific Management Practice in Britain', p.viii.

research in the UK, US, and Canadian national archives, research into Charles E.

Bedaux's life required extensive travel and the cooperation of private collectors such as the director of *The Champagne Safari*, George Ungar, resident in Toronto, Canada, and Jurrian te Gussinklo Ohmann of the International Bedaux Institute, based in the Netherlands.³⁷

In addition to well-known newspapers and magazines such as *The Manchester Guardian*, *The Times*, the *Washington Post*, the *New York Times*, *Fortune*, and *Time*, lesser-known British periodicals such as *British Management Review*, *Industry Illustrated*, *News Review*, *Shelf Appeal*, and various local newspapers and factory publications provided insight into areas which may have remained otherwise obscured. The collections of Bedaux newspaper clippings held in the TUC Library at London Metropolitan University saved me many hours of searching in the British Library. In addition, without the newspaper holdings of the People's History Museum, the Working Class Movement Library and the Marx Memorial Library, my study of the interwar CP would have been somewhat impoverished.

Given the absence of archives of any of the consultancies under examination, the archives of private individuals were invaluable, particularly those of Frederick W. Taylor, Lyndall F. Urwick, Edward F. L. Brech, and B. Seebom Rowntree. Several state archives were also visited: the UK National Archives, the National Archives of Scotland, the US National Archives and Records Administration (which holds the FBI archives), and Library and Archives Canada. University archive holdings, including those at Dundee, Glasgow, Henley Business School, the Modern Record Centre at Warwick, and York, were also helpful, and provided insights into various issues. Local archives at Hertfordshire, Leicestershire, Oxfordshire, and Wolverhampton provided some high quality, previously unused sources. The oral history collection on the Wolsey strike held in the Leicestershire Record Office offered poignant, human insights into events eight decades ago. The

³⁷ Most of the NARA was declassified in the 1980s. This material, which consists of several folders of correspondence and newspaper clippings, and hundreds of photographs, was moved from a private French collection to LAC in the 1990s, alongside the relocation of several hours of film footage from the 1934 Bedaux Sub-Arctic Expedition. As much as possible, the validity of these materials has been checked against other sources from the United States, Canada, the UK, the Netherlands, France, Germany, and Greece.

archives of private companies were useful too, in particular the Rowntree archive held at the Borthwick Institute at York, which was donated to the institute by Nestlé in the 1990s. Several websites were also helpful, including libertyellisfoundation.org for Bedaux's Ellis Island immigration records, and Fold3.com, which was crucial in my location of documents related to Bedaux's ill-fated Moscow trip in January 1936. A number of historians, including Michael Ferguson, Chris Nyland, Andrew Thorpe, and Chuck Wrege were kind enough to share original sources they had unearthed during their own research.

Chapter 2.

The origins and influence of Taylor's Unit-Times, 1895-1923

2.1. Introduction

Many studies have been conducted of the 'Father of Scientific Management' Frederick Winslow Taylor (1856-1915), his life, his circle, and aspects of his influence.¹ In this body of research, there is a consensus that, when it came to industrial practices, Taylor believed that the time study was the most important element of scientific management, and that Taylor himself emphasised the centrality of the time study in speeches and publications. Re-examining Taylor's *Shop Management* (1903) and *Concrete Costs* (1912), this chapter argues that these historians have overlooked the fact that Taylor himself stressed that the most important feature of his management system was not the time study but his *unit-times*, and that, despite his commanding professional and social standing, most of Taylor's contemporaries also missed Taylor's emphasis on this point.

Using a variety of extant historical studies, and fresh research using US and British government reports, contemporary management publications, and engineering materials, Taylor's lack of personal influence over contemporary work measurement during his lifetime is explored. It is demonstrated that few British managers, engineers or industrial activists understood Taylor's emphasis on *unit-times* either, let alone were able to develop any system based on Taylor's *unit-times* which could be used in industrial practice. A study of British debates and practices related to scientific management and Taylor prior to, and during, World War One is then presented. Taylor's personal opinions about British manufacturing and the efficiency of British workers are examined. Using sources such as Taylor's correspondence and publications, Harrington Emerson's publications, Charles E. Bedaux's *Bedaux Efficiency Course for Industrial Application* (1917), and the letters and

¹ Five full biographies of Taylor exist: Frank B. Copley, *Frederick W. Taylor: Father of Scientific Management* (2 vols., New York: Taylor Society, 1923); Sudhir Kakar, *Frederick Taylor: A Study in Personality and Innovation* (Cambridge: MIT Press, 1970); Daniel Nelson, *Frederick W. Taylor and the Rise of Scientific Management* (Madison: University of Wisconsin Press, 1980); Charles D. Wrege and Ronald G. Greenwood, *Frederick W. Taylor, the Father of Scientific Management: Myth & Reality* (Homewood: Business One Irwin, 1991); Robert Kanigel, *The One Best Way: Frederick Winslow Taylor and the Enigma of Efficiency* (London: Little, Brown, 1997).

diaries of B. Seebohm Rowntree, the chapter then goes on to examine how certain individuals, including Emerson, Bedaux, and Rowntree, did come to understand the purpose of Taylor's *unit-times* and innovated with ways in which to implement systems derived from Taylor's *unit-times* after Taylor's death in 1915. Bedaux's formulation of the *B* is a particular focus.

2.2. F.W. Taylor's impact on management thought *versus* practice

The historiography of early twentieth century management thought is dominated by examinations of Taylor. Indeed, Taylor's life and influence has received a very substantial amount of attention from historians, sociologists, management theorists, and business scholars.² However, although Taylor died in 1915, it was not until the mid-1940s and after, that he retrospectively became the simultaneous colossus, and demon, of twentieth-century management theory he remains today.³ Actually, claims about Taylor's importance increased from the 1940s onwards. In 1955, reflecting on Taylor's influence, the well-known management theorist Peter Drucker argued that Taylor's 'Scientific Management ... may well be the most powerful as well as the most lasting contribution America has made to Western thought since the Federalist papers.'⁴ At the same time in Britain, the management theorist and consultant Lyndall Urwick also increasingly emphasised Taylor's importance and influence.⁵

2 Much has been written on Taylor's influence on many countries. In addition to the material on Britain, examined in chapter 1, on the USA, see Milton Nadworny, *Scientific Management and the Unions: 1900-1932. A Historical Analysis* (Cambridge: Harvard University Press, 1955), Samuel Haber, *Efficiency and Uplift: Scientific Management in the Progressive Era, 1890-1920* (Chicago and London: University of Chicago Press, 1964), David Montgomery, *The Fall of the House of Labor: The Workplace, the State, and American Labor Activism, 1865-1925* (New York, CUP, 1987), and Bruce E. Kaufman, *Managing the Human Factor: The Early Years of Human Resource Management in American Industry* (Ithaca: Cornell University, 2008). On France, see Jackie Clarke, *France in the Age of Organization: Factory, Home and Nation from the 1920s to Vichy* (New York and Oxford: Berghahn Books, 2011) and Bernard Doray's classic *From Taylorism to Fordism: A Rational Madness* (London: Free Association Books, 1988). On the Soviet Union, see Mark R. Beissinger, *Scientific Management, Socialist Discipline and Soviet Power* (London: I.B. Tauris, 1988). On Italy, see Perry Willson, *The Clockwork Factory: Women and Work In Fascist Italy* (Oxford: Clarendon Press, 1993). For a more general survey of the US and continental Europe, from which Britain and the Bedaux story are conspicuously absent, see Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley and Los Angeles: University of California Press, 1992).

3 Lyndall Urwick, 'Peter F. Drucker: The Managers' Professor' in Tony H. Bonaparte and John E. Flaherty (eds.), *Peter Drucker: Contributions to Business Enterprise* (New York: New York University Press, 1970), p.72 noted that 'since the middle 1940s there has been growing chorus of academic disapproval of F.W. Taylor'.

4 Peter F. Drucker, *The Practice of Management* (London: Heinemann, 1955), p.274.

5 Michael Roper, 'Killing Off the Father: Social Science and the Memory of Frederick Taylor in Management Studies, 1950-75' *Contemporary British History* Vol. 13, No. 3 (1999), pp.39-58. A similar observation

Writing *Labor and Monopoly Capital* in 1974, the former metalworker and industrial activist Harry Braverman gave Taylor a particular prominence in his narrative about the degradation of work in the twentieth century, citing both Drucker and Urwick. *Labor and Monopoly Capital* sold in substantial numbers and was translated into many languages around the globe. In doing so, Braverman bolstered Taylor's reputation as *the* crucial historical figure in the development of twentieth century industrial capitalism.⁶ This emphasis on Taylor's centrality to twentieth century capitalism by both his enthusiastic supporters on the right and his opponents on the left guaranteed Taylor a central place in later histories.

The defining feature of the large literature on Taylor is that it usually considers Taylor's influence on management thought and publications.⁷ As examined below, this approach, which was also adopted by the majority of authors participating in the labour process debate in the 1970s and 1980s, hinders historians in their recovery of how the organisation of work was transformed in the twentieth century. Using recent work on the history of technology and industry by Edgerton and Scranton, this thesis therefore instead conducts an analysis of industrial methods which were actually used.⁸ In the Taylor case, this means shifting the focus of analysis from Taylor's most famous published works, particularly his *Principles of Scientific Management*, onto aspects of his career which were influential on industrial practices. However, there are further methodological and terminological issues related to Taylor, particularly the term *Taylorism*, and it is this issue to which this chapter turns next.

should be made for Urwick's co-writer, the management theorist and historian, E.F.L. Brech, who is also examined in chapter 5.

6 One online source indicates that by the time the volume had reached its 25th anniversary, it had sold 120,000 copies. http://www.marxists.org/history/etol/newspape/amersocialist/harry_braverman.htm; accessed 18 June 2014.

7 See Daniel A. Wren, *The History of Management Thought* (Hoboken: Wiley, 2005); Morgen Witzel, *A History of Management Thought* (London: Routledge, 2012); Arthur G. Bedeian (ed), *Evolution of Management Thought: Critical Perspectives on Business and Management* (Abingdon: Routledge, 2012); Morgen Witzel and Malcolm Warner, *The Oxford Handbook of Management Theorists* (Oxford: OUP, 2013).

8 Philip Scranton, *Endless Novelty: Specialty Production and American Industrialisation, 1865-1925* (Princeton: Princeton University Press, 1998); David Edgerton, *The Shock of the Old: Technology and Global History Since 1900* (London: Profile Books, 2006). Both authors argue that the greatest impact of particular machines or organisational techniques may not have been felt around the time of their inception. Indeed, both authors stress that they may have been used most in periods long after their initial creators had died, and in locations or professions unanticipated by their creators.

2.3. Problematising *Taylorism*

As Whitston has shown, *Taylorism* was indeed an actors' category during Taylor's life, usually as a general term of abuse, including in Britain.⁹ This is confirmed by Taylor's 1923 biographer, who noted that the term *Taylorism* was used sporadically, but that 'one finds "Taylorism," rather freely interpreted, brought up in connection with the efficiency shown at the American camp. Taylorism, indeed, has become more a French word than an American word'.¹⁰ However, it was not until Hugh Aitken deployed the term as a historical actors' category in his *Taylorism at the Watertown Arsenal* (1960) that it entered the vocabularies and methodologies of scholars, such as John Child's seminal 1969 study of British management thought.¹¹ The publication of Gramsci's *Prison Notebooks* in English in 1970 also influenced additional scholars to deploy the term *Taylorism* in a variety of ways. For example, Charles Maier's adoption of the term from the Italian version of Gramsci's *Prison Notebooks* in 1970 helped to expand the term as an analytical category for his influential examination of 'European ideologies and the vision of industrial productivity in the 1920s', although, following earlier claims about the lack of 'scientific management' in twentieth century Britain from Lyndall Urwick, Britain was downplayed in his analysis.¹²

Taylorism also entered Sudhir Kakar's 1970 biography of Taylor, via Aitken and contemporary statements made by the former French Prime Minister, Georges Clemenceau.¹³ Yet it was, argued here, Braverman's 1974 characterisation of *Taylorism*, informed by Kakar, which came to be most influential in Britain:

A comprehensive and detailed outline of the principles of Taylorism is essential to our narrative, not because of the things for which it is popularly known - stopwatch, speed-up, etc. - but because behind these commonplaces there lies a theory which is nothing less than the explicit verbalization of the capitalist mode of production ... It is impossible to overestimate the importance of the scientific management movement in the shaping of the modern corporation and indeed all institutions of capitalist society which carry on labor processes ... Taylorism dominates the world

9 Whitston, 'The Reception of Scientific Management by British Engineers'.

10 Copley, *Frederick W. Taylor*, Vol. 1, p.xxiii.

11 Child, *British Management Thought*; Aitken's book was renamed *Scientific Management in Action: Taylorism at the Watertown Arsenal* in 1985. Nelson, *Mental Revolution*, p.3 suggests that historians have been using the term *Taylorism* to avoid having to justify whether scientific management was truly scientific.

12 Maier, 'Between Taylorism and Technocracy'.

13 Kakar, *Frederick Taylor*, chapters 1 and 6.

of production.¹⁴

As in Braverman's work, *Taylorism* was also conflated with *scientific management* during the ensuing labour process debate, and in 1970s historical studies. For example, in 1977 David Noble joined Braverman in explicitly combining the two terms, and Geoff Brown dovetailed the Aitken, Gramsci and Braverman interpretations of *Taylorism* into one.¹⁵

Many subsequent well-known studies by academic historians have reinforced *Taylorism* as a term applicable to both Taylor's life and many locations in the period since.¹⁶ *Taylorism* has been also consistently applied to the Bedaux system, adhering to suggestions in the 1980s that Bedaux was the 'Taylorism of the Great Depression'.¹⁷ *Taylorism* has also been deployed by many non-academic historians, journalists, and other commentators.¹⁸

This terminological issue is important because historians have reported obstacles in recovering what specific management and work organisation methods were used in the past.¹⁹ As indicated by Braverman's remarks, the historical literature has never been clear about the relations between *Taylorism*, *scientific management*, the time study, and other practices. For example, Michael Rowlinson's historical research into the 'New Factory System' of *Taylorism* and *scientific management* at Cadbury's plant at Bournville in the

14 Braverman, *Labor and Monopoly Capital*, pp.86-87. Braverman's index reads: 'Taylorism, see Scientific Management'.

15 Geoff Brown, *Sabotage: A Study in Industrial Conflict* (Bristol: Spokesman Books, 1977), part three, 'Taylorism'. Like Braverman, David Noble, *America By Design: Science, Technology and the Rise of Corporate Capitalism* (Oxford: Oxford University Press, 1979)'s index reads: 'Taylorism, see Scientific Management'. See also Noble, David, *Forces of Production: A Social History of Automation* (New York, Oxford: Oxford University Press, 1986), pp.282, 310.

16 They have included David Hounshell, *From the American System to Mass Production, 1800-1932: the Development of Manufacturing Technology in the United States* (Baltimore: Johns Hopkins Press, 1984), Thomas P. Hughes, *American Genesis: a Century of Invention and Technological Enthusiasm, 1870-1970* (New York: Penguin, 1989), John Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), As noted by Charles Booth and Michael Rowlinson, 'Management and Organizational History: Prospects', *Management and Organizational History* Vol. 1, No. 1 (2006), pp.5-30 in order to refute the tyrannical version of Taylorism which Braverman had summoned, Chris Nyland has drawn attention to liberal practices such as the shortening of working hours and cooperation with labour unions by Taylor's allies and the Taylor Society which took place after Taylor's death in 1915. See Chris Nyland, Kyle Bruce and Prue Burns, 'Taylorism, the International Labour Organization, and the Genesis and Diffusion of Codetermination' *Organization Studies* (2014), pp.1-21. These issues in relation to Britain are also examined in chapters 3 and 4.

17 Montgomery *Fall of the House of Labor*, Littler, *Development of the Labour Process*, Whitston, 'Scientific Management Practice', Steven Kreis, 'Diffusion of an Idea'.

18 See Richard Edwards, *Contested Terrain: the Transformation of the Workplace in the Twentieth Century* (London: Heinemann, 1979), Howard Zinn, *A People's History of the United States* (London: Longman, 1980), Judith Merkle, *Management and Ideology: The Legacy of the International Scientific Management Movement* (Berkeley: University of California Press, 1980), Barry Pateman (ed), *Chomsky on Anarchism* (Edinburgh: AK Press 2005), and Matthew Stewart, *The Management Myth: Why the Experts Keep Getting it Wrong* (New York and London: W.W. Norton & Company, 2009). See also *The Century (Taylorism)*. American Broadcasting Company Evening News. Peter Jennings. 9 July 1999.

19 Nelson, *Mental Revolution*

early twentieth century revealed much about the new management structures, work incentives, and welfare programmes which were implemented at the plant in the early twentieth century. However, lacking the contemporary vocabulary to fully evaluate this activity, Rowlinson concluded that

It is hard to say whether Cadbury was applying scientific management at Bournville because it is hard to identify exactly what scientific management is. If time-study symbolised scientific management, then Cadbury was implementing it.²⁰

As argued throughout this thesis, the time study may have *symbolised* scientific management to workers and many subsequent commentators, but work measurement specialists knew that the time study was a means rather than an end. The necessity for the time study actually declined over time, and it is that issue to which we next turn.

2.4. Synthetic work measurement data and the time study

The *Taylorism* and *scientific management* issue is also significant as these terms have camouflaged what was really happening when *unit-time* work measurement systems like Taylor's were implemented. This said, some historiographical evidence suggests that specialists who had been intimately involved with work measurement practices believed that there was something distinctive about the abstract nature of the data which these systems created. Presumably based on his experience as an industrial worker, Braverman believed that practices related to Taylor and *Taylorism* gave rise to standard data systems whereby in factories

Since the accumulation of data does away with the need to time each operation, management is spared the friction that arises in such a procedure, and the worker is spared the knowledge that the motions, time, and labor cost for his or her job have been precalculated, with 'humane' allowances for rest, toilet, and coffee time, before anyone was hired and perhaps even before the building was erected.

Building on his later experience as the office manager of the *Monthly Review*, he argued that in addition to factories

Standard data have been collected specifically for office purposes, in the form of studies of particularly common office motions that are offered as interchangeable parts from which office managers may assemble their own complete operations.²¹

20 Michael Rowlinson, 'The Early Application of Scientific Management by Cadbury', *Business History* Vol. 30, No. 4 (1988), p.391.

21 Braverman, *Labor and Monopoly Capital*, p.320.

Moreover, he suggested that

In recent years, motion-time study or [Frank Gilbreth] therblig systems have had their logic and arithmetic assigned to computers, so that the time allowance for various job elements is worked out by the computer on the basis of standard data, perhaps supplemented by time study observations.²²

In terms of the dynamics of his arguments, Braverman was making several good points, but points which most subsequent historians and sociologists did not quite notice.

Moreover, it is argued in this chapter, Braverman was mistaken about Gilbreth's importance in the formulation of these standard data systems.²³

More recently, the former UOP work measurement consultant and management writer Edward Brech made similar points, but downplayed Taylor's central role and instead stressed the influence of Charles E. Bedaux in the origins of the synthetic data systems which developed as a consequence of work measurement practices from the mid-1930s onwards:

The determination or establishment of 'synthetic' time standards as operational norms for planning purposes and/or for personnel incentives was an alternative approach to individual job time-studies, although starting from the same foundation of systematic methods and motion specification

The concept of synthetic times arose quite early in the evolution of the operational study techniques: not with F.W. Taylor, because he worked to a principle of differential targets for selected operatives.

At a very early stage of his practice of time study Bedaux applied a systematic formula of 'rating' performance in respect of the operatives' speed and effort in work, so as to attain a 'levelling' factor for converting observed timings to standard 'allowed times' applicable to all operatives performing the same job.²⁴

In connecting these work measurement data to Taylor, both authors were addressing an important issue - that time studies became less necessary in work measurement practices over time - but neither Braverman nor Brech quite realised that the standard data under discussion were actually based on *unit-time* data developed by Taylor, and enhanced by Bedaux and others. Moreover, as examined in the next section of this chapter, by the time he presented his paper *Shop Management* to the ASME in 1903, Taylor was quite clear

²² Braverman, *Labor and Monopoly Capital*, p.178.

²³ As part of our interview in 2013, Ray Scott, who was a work measurement specialist at Joseph Lyons in the 1950s, remembered that while the *Therblig* classifications and symbols were taught in British technical classes, he did not recall them being used in industrial practice.

²⁴ E.F.L. Brech, *Productivity in Perspective, 1914-1974* (Bristol: Thoemmes Press, 2002), pp.602-3.

about this point.

2.5. Unit-times in *Shop Management* (1903) and *Concrete Costs* (1912)

Taylor's *Principles of Scientific Management* (1911) has been described 'as the most influential [organizational theory] book of the 20th century', and there is a consensus that it was his most important publication. It is much studied.²⁵ However in terms of practice, Taylor's *Shop Management* was actually the more influential publication, and set out several important features as to how scientific management developed into work measurement after Taylor's death.²⁶ For example, writing in 1924, Lillian Gilbreth stressed the importance of *Shop Management* compared to *Principles*:

It should be noted that Taylor's philosophy as described by him in *Shop Management* published in 1903, two years after retiring from business, presented his actual practice far better than did his *Principles of Scientific Management*.²⁷

Shop Management started life as a paper prepared for the 1903 meeting of ASME in Saratoga in California, intended as a follow-up to Taylor's 1895 ASME paper, 'A Piece Rate System'.²⁸ In his *Shop Management* speech, Taylor reminded his audience that the key feature of his system was not the time study, nor the differential piece rate, but *unit times*:

What the writer wishes particularly to emphasize is that this whole system rests upon an accurate and scientific study of unit times, which is by far the most important element in scientific management. With it, greater and more permanent results can be attained even under ordinary day work or piece work than can be reached under any of the more elaborate systems without it.

Taylor reminded the audience that he had said this before and very few of his peers had listened to him:

In 1895 the writer read a paper before The American Society of Mechanical Engineers entitled 'A Piece Rate System.' His chief object in writing it was to

²⁵ The opening remarks of the *Journal of Business and Management's* 100th anniversary edition of Taylor's *Principles of Scientific Management* simply state that 'The merits of Taylor's work can certainly be debated, but what cannot be argued is that Taylor changed the way people worked in the 20th century'. Cristina M. Giannantonio and Amy E. Hurley-Hanson, 'Frederick Winslow Taylor: Reflections on the Relevance of The Principles of Scientific Management 100 Years Later' *Journal of Business and Management* Vol. 17, No. 1 (2011), p.7.

²⁶ Individuals who joined the scientific management cause after reading *Shop Management* included Frank Gilbreth, Vladimir Lenin and Lyndall Urwick. For Gilbreth see Kakar, *Frederick Taylor*, p.178. For Lenin, see Merkle, *Management and Ideology*, p.179. For Urwick, see chapter 4 of this thesis.

²⁷ Lillian M. Gilbreth, 'Frederick W. Taylor' *Journal of Personnel Research* Vol. 3 (October 1924), pp.225-6. A.H. Church, *The Science and Practice of Management* (New York: Engineering Magazine, 1918), p.iv argued that *Shop Management* was the 'first and most forceful stirring' of 'a true science of management'.

²⁸ F.W. Taylor, 'A Piece-Rate System, Being A Step Toward Partial Solution of the Labor Problem' *Proceedings of ASME* Vol. 647 (1895), pp.856-903.

advocate the study of unit times as the foundation of good management. Unfortunately, he at the same time described the 'differential rate' system of piece work, which had been introduced by him in the Midvale Steel Works. Although he called attention to the fact that the latter was entirely of secondary importance, the differential rate was widely discussed in the journals of this country and abroad while practically nothing was said about the study of 'unit times.' Thirteen members of the Society discussed the piece rate system at length, and only two briefly referred to the study of the 'unit times.'

The writer most sincerely trusts that his leading object in writing this paper will not be overlooked, and that SCIENTIFIC TIME STUDY will receive the attention which it merits. Bearing in mind the Bethlehem yard labor as an illustration of the application of the study of unit times as the foundation of success in management, the following would seem to him a fair comparison of the older methods with the more modern plan.²⁹

How did the audience respond to Taylor's stress of the importance of *unit-times*? An examination of the ensuing debate reveals that only two of Taylor's peers, Harrington Emerson and John Balch Blood, discussed it, despite Taylor's emphasis.³⁰

By far the most developed exposition of Taylor's *unit-times* was in *Concrete Costs*, co-published by Taylor and Sanford Thompson. *Unit Times* frequently feature throughout the substantial volume as the best means to cost labour for any given piece of work. These labour costs could then be included in material costs to provide clients with as accurate estimates as possible. They defined the unit times thus:

'Unit Times' are the times required to perform the elementary or unit operations into which a piece of work may be divided. The purpose of unit times is to separate the elements that are alike in various pieces of work from the elements that vary or which occur a different number of times.³¹

Taylor and Thompson suggested that the manager should

First divide the work into small units, i.e., small elements or operations, then study and accurately determine the cost of each of these small units and finally recombine these unit costs to suit the work under consideration.³²

Dividing, studying and timing the work allowed the manager to compile a ready index of standard times for any particular work action. Moreover, the authors suggested, the

29 F.W. Taylor, 'Shop Management' *Transactions of ASME* Vol. 24 (1903), pp.1364-5.

30 Emerson stated that 'Mr Taylor's achievement is that he is the first one to use perfected scientific methods, one of them a microscopic study of Time Units to get at the elemental cost of all production'. Blood dismissively remarked that his factory already used 'what I call "work units", which units would present two factors - time and intensity, ability or skill'. F.W. Taylor, 'Shop Management' *Transactions of ASME* XXIV (1903), pp.1456-1480. The debate was not included in later reprints of *Shop Management*. Such an analysis of the response to Taylor's ASME presidential speech *On The Art Of Cutting Metals* at New York in December 1906, which featured many British commentators, remains to be conducted. Quigel, 'Business of Selling Efficiency', pp.104-5 did briefly examine the exchange, but focused on Emerson's subsequent expositions on his own theories.

31 Frederick W. Taylor and Sanford Thompson, *Concrete Costs* (New York: John Wiley & Sons, 1912), p.58.

32 Taylor and Thompson, *Concrete Costs*, p.55.

manager could then deploy the techniques of Frank Gilbreth to reduce the number of motions required to perform each piece of work.³³

The key individual who picked up on Taylor's claim about *unit-times* was Harrington Emerson. After hearing Taylor discuss the concept in 1903, Emerson absorbed it into his developing standard costing and efficiency system, which he discussed in detail in a series of articles in the British *Engineering Magazine* in 1908 and 1909. Like Taylor, Emerson believed that there were two ways to obtain standard costs: either by analysing extant working practices, or by ascertaining costs and potential sources of waste before work was undertaken. He advocated the latter, and, citing his recent experience of applying efficiency methods to the Santa Fe Railroad, Emerson stated that the job of the 'efficiency engineer' was to ascertain equivalency between financial cost and service provided.³⁴ While the operating cost of machines and maintenance could be calculated relatively easily,

The problem of standardizing direct pay roll is much more difficult, as it involves the determination of a standard time and cost for every task. For every work order issued to employees there is a determinable standard time. This time must be ascertained by the Taylor system of time studies.³⁵

The cost of each individual piece of work could then be compiled into job costs, and the work data could be used to conduct efficiency comparisons between different work groups and different locomotive plants. He summarised his fundamental elements of cost-accounting elsewhere as 'Standards, Efficiencies, Equivalents'.³⁶

A historical study of the Emerson system in practice indicates that Emerson's consultancy implemented his system in around two hundred US factories.³⁷ Moreover, Emerson spread the gospel of efficiency to a wider audience than Taylor's and his immediate circle did. Several of Emerson's protégés went on to be influential in their own

33 Taylor and Thompson, *Concrete Costs*, p.57.

34 Harrington Emerson, 'Efficiency as a Basis for Operation: VI. The Modern Theory of Cost Accounting' *The Engineering Magazine* (December, 1908), p.341.

35 Harrington Emerson, 'Efficiency as a Basis for Operation: V. The Realisation of Standards in Practice' *The Engineering Magazine* (November, 1908), pp.177-8. Emerson's theories were published as a book: Harrington Emerson, *The Twelve Principles of Efficiency* (New York: Engineering Magazine, 1912).

36 While the *unit-times* were absent from *Principles of Scientific Management*, the fact that the 'stop watch will be used to ascertain "unit times"' was noted at the congressional hearing into the Taylor system in 1911. Committee on Labor of the House of Representatives, *Investigation of Taylor System of Shop Management* (Washington, Government Printing Office, 1911), p.18.

37 See Quigel, 'The Business of Selling Efficiency'.

fields. Three of the most historically important have received less historiographical attention than they deserve. They are Charles E. Knoeppel, Earl K. Wennerlund, and Charles E. Bedaux.³⁸ Indeed, after Taylor's death in 1915 each would become more successful in implementing work measurement than Taylor had been.

2.6. The Taylor system in use, 1910-15

While Taylor's reputation may be considerable, when extant historical case studies of his industrial practices are aggregated, it is clear that Taylor's direct influence on industrial practices during his life was very small.³⁹ Despite Taylor's personal importance in Philadelphia, manufacturers in the city did not embrace scientific management in any substantive way.⁴⁰ Even the two model Philadelphia factories to which Taylor took visitors and potential clients, Tabor Manufacturing and Link-Belt, were actually artificial showcases and were not seriously using the Taylor system in their daily operations.⁴¹ Some of Taylor's attempts failed completely, and, in iconic cases associated with Taylor - Midvale Steel, Bethlehem Steel and the Watertown Arsenal - they were very significant failures indeed.⁴²

Taylor's influence could have been most felt in firms in which he was not personally involved. After all, Taylor was happy to leave the day-to-day operations to his followers and knew little of the details himself.⁴³ However, of the relatively few US organisations which adopted scientific management, most implemented it only half-heartedly: owners and managers were actually putting on a show of scientific management in order to gain access to Taylor's lucrative high-speed steel patents.⁴⁴ And this type of performance

38 For a brief biography of Knoeppel, see Lyndall Urwick, *The Golden Book of Management* (London: Newman Neame, 1956), pp.225-229. For Bedaux and Wennerlund, see chapter 3.

39 The most recent attempt to explain 'why scientific management was not as vital a force in practice as it was in theory' has shown that around eighty firms actually adopted the Taylor system, or a close variant such as that of Emerson, up to and including World War One. Richard K. Fleischman. 'Completing the triangle: Taylorism and the paradigms' *Accounting, Auditing & Accountability Journal* Vol. 13, No. 5 (2000), pp.597-623.

40 Andrew Dawson, *Lives of the Philadelphia Engineers* (Aldershot: Ashgate, 2004), chapter 9 posited this as an explanation for city's subsequent industrial decline. See also Scranton, *Endless Novelty*, pp.100-3 for additional comments on Taylor in Philadelphia.

41 Wrege and Greenwood, *Frederick W. Taylor*, part 4.

42 While Aitken subtitled his 1960 volume *Scientific Management in Action*, his analysis of Taylor's attempts to introduce the Taylor system at the Watertown Arsenal actually clearly demonstrated that Taylor failed to put his system into action. Wrege and Greenwood, *Frederick W. Taylor*, p.62 showed that the Taylor system was abandoned at Midvale by 1918 as it was too bureaucratic and complicated.

43 Horace Drury remarked in 1916 that 'Taylor himself had comparatively little experience with the introduction of his own system'. Cited in Wrege and Greenwood, *Frederick W. Taylor*, p.159.

44 For comments on manufacturers abandoning the Taylor system having gone through the charade of

became less relevant when the Taylor-White patents were invalidated by the Sheffield steel industry in 1909.⁴⁵

As explored earlier in this chapter, many commentators have argued that Taylor stated that the time study was the most important element of scientific management, and numerous histories of the topic prominently feature a stopwatch on their covers.⁴⁶ Notwithstanding the fact that this is not what Taylor stated, the stop watch did indeed become prevalent in twentieth-century manufacturing. This said, Taylor cannot be given credit for inventing the idea of using the stopwatch in the analysis of work processes.⁴⁷

It is also clear that very few industrialists or managers used Taylor's differential piece-rate, and it was quickly buried into lists of more mathematically sophisticated systems, many of which were rarely, or never, actually used either.⁴⁸ Related, Taylor's claim to have invented the Premium Bonus System, which was used extensively in British and American marine engineering and shipbuilding, found minimal traction with his peers, or indeed anyone else.⁴⁹ In fact, in one major case involving the US Navy shipyards, Taylor lost out to the Halsey PBS supplied by British armaments titan Vickers.⁵⁰

Taylor knew that his system was not in use in many establishments, and attempted

installing it to obtain Taylor-White steel, see Thomas J. Misa, *A Nation of Steel: The Making of Modern America, 1865-1925* (Baltimore: Johns Hopkins University Press, 1995), p.208. My thanks to Matt Hockenberry for pointing this study out to me.

45 Geoffrey Tweedale, *Sheffield Steel and America: A Century of Commercial and Technological Interdependence, 1830-1930* (Cambridge: Cambridge University Press, 1987), chapter 5.

46 For example, the cover of Aitken, *Scientific Management in Action* features a stopwatch very prominently. The documentary film *Stopwatch*, based on Kanigel's *The One Best Way* features a stopwatch as the main subject of the film.

47 For the origins of both time study and *Shop Management*, see Charles D. Wrege and Ronald G. Greenwood, 'Discovering Some of the Roots of Taylor's *Shop Management*: Taylor's Secret Six-Year Study of the Building Trades' *Proceedings of the Midwest Academy of Management* (1981), pp.417-28.

48 For the difficulties Taylor experienced in implementing his system of differential piece-rate, see Aitken, *Scientific Management in Action*, chapter 1. Kreis 'Diffusion of an idea', p.138 notes that the Taylor piece-rate was not used at the Renold works. M.L. Yates, *Wages of Labour Conditions in British Engineering* (London: Macdonald & Evans, 1937), pp.82-9 remarked that the following American systems were not in use in Britain in the interwar period: Emerson, Barth, Wennerlund, Bigelow, Knoeppel, Sherman, Baum, Diemer, and Ficker. Yates also remarked that 'The differential piece rate as used by F.W. Taylor in America in 1884 for repetitive work in machine shops has found no significant amount of support in the engineering factories' of Britain. The Bedaux system featured prominently in Yates' book.

49 Taylor was arguing with Frederick Halsey and Henry Towne in the debate after having presented his 'Shop Management' paper. See Taylor, 'Shop Management', p.1467.

50 For Taylor's lengthy engagement with the US Navy over this matter, see SI, F.W. Taylor papers, Box 115. The history of this encounter is yet to be written. See Committee of Naval Affairs, *Report of Civilian Expert Board on Industrial Management of United States Navy Yards* (Washington: Government Printing Office, 1912); Committee of Naval Affairs, *Report on the Vickers System of Industrial Management* (Washington: Government Printing Office, 1912); 'Vickers' System of Management' *American Machinist*, April 11, 1912, p.573 records that Vickers used the Halsey PBS. For a revisitation of the PBS at Vickers in the 1940s, see chapter 6.

to counter this with vague and unsubstantiated claims. For example, addressing the Dartmouth College scientific management conference in 1911, Taylor claimed that 50,000 men were working under scientific management, although he did not specify where.⁵¹ In the debate between Taylor and Edward Cadbury in 1914, Cadbury observed Taylor's claim that there were 200,000 American workmen working under scientific management, and responded that even if this figure was accurate, it was 'a very insignificant number when compared with the total workmen of the country'.⁵² Cadbury's critique was also important as he was, at the time, one of a small number of British manufacturers taking the US scientific management movement seriously.

2.7. F.W. Taylor, scientific management and British manufacturing

Revisionist historical studies of British industry in the 1910s have helped overcome the older notion that the Britain manufacturing sector was unusually weak in terms of interest in scientific management among engineers and managers.⁵³ For example, pre-war British engineers were in fact as interested in scientific management and Taylorism as those in other major industrial countries in Europe.⁵⁴ Additionally, while senior Cadbury figures may have publicly denounced elements of Taylor's work, this did not stop them implementing, via a consultancy, Suffern & Son, practices at their Bournville plant in the 1910s similar to those propounded by Taylor and his allies. This said, the Cadburys rejected elements of Taylor's system such as the differential bonus rate.⁵⁵ Concurrently, Charles Renold and several of his engineers personally studied Taylor's model system in operation at Tabor Manufacturing in Philadelphia, and, as a consequence, widely adopted time studies, job

⁵¹ *Addresses and Discussions at the Conference on Scientific Management held October 12-13-14 Nineteen Hundred and Eleven* (Hanover, NH: Amos Tuck School of Administration and Finance, 1912), p.29

⁵² E. Cadbury, 'Mr Cadbury's Reply' *Sociological Review* Vol. 7, No. 3 (1914), p.327-331.

⁵³ In assessing the relative influence of Taylor around the globe, Kanigel, *One Best Way*, p.494 placed Britain in joint seventh place, alongside the Netherlands. For a frequently-cited study of the history of scientific management in interwar Europe, in which Britain's importance is downplayed, see Charles S. Maier, 'Between Taylorism and Technocracy: European Ideologies and the Vision of Industrial Productivity in the 1920s', *Journal of Contemporary History* Vol. 5 (1970), pp.27-61. See also Guillén, *Models of Management*, pp.220-225, which explored the 'limited practical application of scientific management' in Britain during the interwar period.

⁵⁴ Whitston, 'Reception of Scientific Management'.

⁵⁵ Rowlinson, 'Early Application of Scientific Management'.

grading, and payment by results bonuses, at the firm's Salford plant.⁵⁶ Both Cadbury and Renold implemented welfare packages at the same time. However, both at Cadbury's and Renold's, consultants or managers either did not notice, or they repudiated, Taylor's emphasis on *unit-times*, instead implementing a simpler variant of the PBS.

In the years prior to World War One, British industrial efficiency, and national efficiency more generally, was a major issue which attracted much commentary in Britain and overseas.⁵⁷ Taylor was a known contributor to these debates. During his life, Taylor was actually a well-known proponent of the thesis that British workers delivered unusually low levels of output. Indeed, Britain was his principal comparison with the USA. To Taylor, low British worker efficiency was *the* fundamental problem facing British industry and British society more generally. Taylor lost few opportunities to repeat this argument, and recited many personal anecdotes to support his case. It was from extensive personal experience in industry, Taylor claimed, that he had concluded that British workers were unusually unproductive.

In August 1913, an article was published in *The Fortnightly Review* by the journalist J. Ellis Barker.⁵⁸ Barker charted the great levels of poverty in Britain, and connected it to low wages and low worker output, which he blamed on low levels of mechanisation in a large number of sectors. Responding to Barker's article by letter, Taylor agreed that low worker output was indeed a key cause of British poverty. But Taylor fundamentally disagreed with Barker's assertion that a lack of machines was the root cause:

I know of case after case in England where they use exactly the same machines as in this country [the USA], but at far less horsepower and at far less speed than they should be run, and in a manner to turn out nothing like half the work that is being turned out in this country; and this is due, not to the lack of proper machinery but to

56 Kreis, Steven, 'The Diffusion of an Idea', chapter 2. This should not be taken as a Taylor victory, however. Charles Renold, *Budgetary Control in the Organization of Hans Renold Ltd.* (Geneva: IMI, c.1929), p.1, remarked that by the late 1920s, the firm had dropped "Scientific Management" systems' 'of payment by result'.

57 For studies of the British national efficiency issue, and how it manifested itself in contemporary debate, see G. R. Searle, *The Quest for National Efficiency: a Study in British Politics and Political Thought, 1899-1914* (Oxford: Basil Blackwell, 1971), G.R. Searle, *A New England? Peace and War 1886-1918* (Oxford: OUP, 2005).

58 J. Ellis Barker, 'Great Britain's Poverty and Its Causes' *The Fortnightly Review* (August, 1913), pp.271-286. J. Ellis Barker (1870-1948) is now thought of as one of the principal proponents of British decline in the interwar period. See Ellwood, *Shock of America*, p.95. Barker was born a German, Julius Otto Elzbacher, and changed his name during World War One. After his career in journalism, in which he published many books, he switched to a career as a homeopathist, becoming editor of *The Homeopathic World*.

the almost inalterable determination of every workman in England to turn out as little work as possible each day, in return for the money which he receives. This with the English workman is almost a religion.⁵⁹

In his letters to Barker, Taylor used his experience of British workers to further support his case. As a young foreman in 1882, Taylor said, he had been forced by circumstance to employ a large group of skilled English steelworkers at Midvale Steel. Despite the fact that there were no trades unions in the US steel industry at the time, Taylor discovered 'it was absolutely impossible to persuade the English workmen that it was in their interest to turn out a proper day's work'.⁶⁰ Moreover, he believed that the British workers they were actually slowing the other workers down. After that experience, Taylor refused to employ any English workers at Midvale.

Nevertheless, one of Taylor's later employers had purchased a tyre rolling machine from Tangye Brothers in England, which came with English apparatus and crew. Much to Taylor's surprise, after three or four years of production, the machine was still only producing 15 tyres per day. Increasingly frustrated by this meagre output, Taylor fired the entire work group and employed an 'entirely new and green set of American workmen'. After three months, the American workers had exceeded the output of their English predecessors and after a few years, the machine was producing 150 tyres per day. From this experience, Taylor concluded that

The greatest obstacle which you have to overcome in England is not the unwillingness of the manufacturers to use modern machinery, but the unwillingness of your [British] workmen to properly use modern machinery, after it is installed.⁶¹

Moreover, Taylor used the British example as a dire warning against ignoring his advice:

years ago I arrived at the conclusion that under-production was the most serious problem which England had to face, and in my lectures in this country I have almost invariably spoken of this, pointing out the fact that the English people --- including their political leaders and the leaders of the trades unions --- were, as we put it, 'barking up the wrong tree' in their effort to ameliorate the condition of the working men ... The only hope lies in an increase in individual output throughout the country, and your statistics ought to be of immense help in convincing the English people of this fact.⁶²

59 F.W. Taylor to J. Ellis Barker, 26 November 1913, pp.1-2, SI, F.W. Taylor papers, Box 111, 'Scientific Management in England' folder.

60 F.W. Taylor to J. Ellis Barker, 26 November 1913, p.2, SI, F.W. Taylor papers, Box 111, 'Scientific Management in England' folder.

61 F.W. Taylor to J. Ellis Barker, 26 November 1913, p.4, SI, F.W. Taylor papers, Box 111, 'Scientific Management in England' folder.

62 F.W. Taylor to J. Ellis Barker, 26 November 1913, p.1, SI, F.W. Taylor papers, Box 111, 'Scientific

Did anyone in Britain listen to Taylor's arguments? Despite claims from historians to the contrary, British engineers listened to Taylor's arguments as much as engineers in other industrialised European countries.⁶³ If anything, they did so earlier than most other countries: an extensive set of experiments with Taylor's piece rate system had already been conducted at British Xylonite (BX) from 1894-6.⁶⁴

An extensive debate over Taylor's work took place at the Institution of Mechanical Engineers (IMechE) in London in 1912. G.C. Allingham of Tudor Accumulators, the brother of one of Renold's engineers delivered what was probably the first complete British exposition on the 'Taylor System' of 'Scientific Shop Management'.⁶⁵ The speech, which combined *Shop Management* and *Concrete Costs*, is significant as Allingham's exposition contained a detailed examination of Taylor's *unit-times*. Allingham explained that simply breaking down jobs into elements and timing them would not lead to any data which could be meaningfully compared:

A comparatively simple law can be arrived at governing the time required for each element; but each element is affected by different factors, so that if an attempt were made to study the job as a whole, the number of variables in the equation would be so enormous that it would be hopeless to attempt to solve it.

Allingham's method was to standardise each work element, attain standard times for each work element, and to assess measures of relative efficiency, which could then be multiplied by a fatigue allowance. The result was that 'we can calculate the time required for any job of this kind'. He went further: 'It is to be hoped that some day a handbook will be published giving tables of unit-times for all kinds of work'. In addition he advocated the creation of functional foremen and a planning office to plan and route the work. He also noted that the 'Taylor system' 'increases the number of "non-producers"' and that 'in many cases three times the number are required' but that 'this is compensated for over and over

Management in England' folder. Barker clearly believed this exchange with Taylor was significant, as he later cited his exchange with Taylor to support his claims as to why British industry was allegedly under-performing compared to all of its industrial competitors. See J. Ellis Barker, *America's Secret: The Causes of Her Economic Success* (London: John Murray, 1927), pp.154-6.

63 Whitston, 'Reception of Scientific Management'.

64 The full data from the experiments, which compared the 'Taylor piece-rate' with four other wage incentive systems, can be found at SRO, BX archive, HC410/F5/2.

65 See G.C. Allingham to F.W. Taylor, 21 September 1912, Box 111, 'Scientific Management in England' folder.

again by the enormous increase in the productivity of the men'. Allingham remarked that at least 50,000 workmen in the USA were already working under the Taylor system, their output had increased by three or fourfold, and that earnings per man had increased by 30 to 100 percent. He finished his speech by warning that 'The United States are rapidly adopting the Taylor system. If we are to compete with them, we *must have* the Taylor system'.⁶⁶ Many aspects of Taylor's system were examined in the ensuing debate at the IMechE, but Allingham's exposition of how to use Taylor's *unit-times* was not one of them.⁶⁷ Taylor died in March 1915, unaware that his *unit-times* were soon to be noticed by several people. It was to take war to force these issues to the fore in Britain.

2.8. Scientific management debate in Britain in the First World War

The First World War is significant to the history of scientific management, by name, in Britain as it is the period in which historians argue that its practice, however transient and superficial, peaked.⁶⁸ While the efficiency of British factory workers had been debated for a significant period of time, fears about the efficiency of Britain's workforce were thrust into the foreground, as did scientific management as a potential cure for this problem.⁶⁹ This took place within a much larger concern with national and racial efficiency which had been developing at the same time.

One of the main outcomes of the 'Shell Crisis' of 1915 was to amplify the notion that British industry, managers, or workers were unusually inefficient. Many solutions were posited over the coming months, and scientific management was much discussed in

⁶⁶ G.C. Allingham, 'Scientific Shop Management' *Journal and Record of Transactions of the Junior Institution of Engineers* (November 1912), pp.38-74.

⁶⁷ 'Discussion on Mr. Allingham's paper on the "Scientific Shop Management on the Taylor System"' *Journal and Record of Transactions of the Junior Institution of Engineers* (November 1912), pp.156-188.

⁶⁸ David W. Ellwood, *The Shock of America: Europe and the Challenge of the Century* (Oxford: Oxford University Press, 2012), p.97. Chris Wrigley, 'The Ministry of Munitions: an Innovative Department' in Kathleen Burk (ed), *War and the State: The Transformation of British Government, 1914-1919* (London: George Allen & Unwin, 1982), pp.50-1 specifically argued that the management policies of the Ministry of Munitions, established by David Lloyd George, 'smacked of tough efficient capitalism. It seems to have purveyed the scientific management of Taylor and his disciples'.

⁶⁹ The publication of See Herbert Gray and Samuel Turner, *Eclipse or Empire?* (London: Nisbet, 1916), a book which sold 80,000 copies in eight months, and which was distributed in the thousands around the Ministry of Munitions, claimed that British workers produced around one half to one third as much as their US equivalents, emphasised this further. For sales quantities, see Selina Gray, *Gray of Bradfield* (London: Oxford University Press, 1931), pp.108-9. H.G. Wells wrote that 'It is a book that has been enormously advertised; it has been almost impossible to escape its column-long advertisements; it is billed upon the hoardings, and it is on the whole a very able and right-spirited book'. See H.G. Wells, *War and the Future: Italy, France and Britain* (London: Cassell and Company, 1917), p.262.

Britain, both formally and informally. For example, the *Chicago Herald* editor James Keeley described how he 'met young engineers in Scotch shipyards who were filled to the teeth with the writings of Frederick Taylor and Harrington Emerson and all our other important American efficiency engineers'.⁷⁰

British intellectuals also closely engaged with this debate. Sidney Webb believed that scientific management was simply an extension of the PBS, which he had already endorsed.⁷¹ He remarked that

Of later years a new panacea has been boomed, especially in the United States, entitled 'Scientific Management'. So far the tremendous significance of 'scientific management' has not been fully recognised. Properly understood, it is the complement to the Industrial Revolution, which, by the more extensive use of machinery, etc., increased the efficiency of labour as an agent of production. The new revolution in industry has as yet merely begun, because employers, in spite of the motive of self-interest, are conservative; but it will receive an enormous impetus from the conditions arising out of the war.

Webb was right. His essay closed by stating verbatim the closing sentence of chapter one of Taylor's *Principles of Scientific Management*:

That these principles are certain to come into general use practically throughout the world, sooner or later, the writer is profoundly convinced, and the sooner they come, the better for all people.⁷²

Writing elsewhere, Webb stressed that many quarrels had resulted over piecework in Britain, and indeed 'it is very largely by its insistence on new kinds of piecework payment that the American campaign of "Scientific Management" .. arouses such bitter resentment'. He was largely dismissive of 'the bewildering variety of "reward" systems - such as those of Gantt and Emerson - in which, since the days of F.W. Taylor, the American "Efficiency Engineers" have delighted'. Webb claimed that these grievances could be rectified 'not only by an accurate equivalence of the basic "Standard Time" with the Standard Time Rate, but also by quite definite security for the future maintenance of the standard rate of remuneration for effort'.⁷³ He concluded that 'you must not dream of taking a single step in

⁷⁰ James Keeley, 'British Disclaim War Trade Plans' *New York Times*, 3 December 1916.

⁷¹ Jeffreys, *Story of the Engineers*, pp.154-5.

⁷² Sidney Webb and Arnold Freeman, *Great Britain After the War* (London: George Allen and Unwin, 1916). While the conversation between Webb and Renold has not survived, the following year Charles Renold sent Webb a detailed study of the work analysis, job grading, and payment-by-results methods at Hans Renold. See Renold to Webb, 8 February 1917, LSE, Passfield papers, XIV/5.

⁷³ Sidney Webb, *The Works Manager To-Day: An Address Prepared for a Series of Private Gatherings of Works Managers* (London: Longmans, Green & Co., 1917), pp.56-63. Webb also noted that some British systems had been developed along these lines, citing the Priestman system. No history of this system or

the direction of Scientific Management until it has been very elaborately explained to, and discussed by, not only the particular men with whom you are going to experiment, but also the by the whole workshop'.⁷⁴

In discussing the progress of scientific management in the war, G.D.H. Cole argued that the Taylor, Gantt and Emerson systems had all been widely discussed and experimented with in wartime Britain. However, he noted that the differential piece rate of Taylor, the 'founder of Scientific Management', was a system 'which claims pride of place both because of its historical priority and because it is perhaps the most iniquitous system existing'. He continued, noting that the sex of the worker was important too:

On the whole, however, British manufacturers have tended rather to take the Emerson efficiency task as a basis and to base upon it various modified efficiency systems which aim at securing similar results. The essence of the Emerson System is that the bonus paid for efficiency begins at a comparatively low point, and the stimulus is thus afforded to even the less efficient types of workers. This feature is reproduced in many of the British systems, especially in those which are designed for repetitive jobs, and above all in those which are designed for women.⁷⁵

Cole claimed that he, and many British workers, had three main objections to the Taylor, Gantt and Emerson, and related, time study and wage incentive systems. Firstly, the 'Scientific Management' propounded by these 'efficiency engineers' could not claim to be anything like science as it required much judgement, elasticity, and depended on unforeseen circumstances which would always come up. Secondly, he noted that despite the protestations of Taylor and others to the contrary, the wage calculations were too complicated for workers to establish how much they would be paid for what work. Thirdly, he attacked Taylor for his assertion that scientific management eliminated the need for unions and collective bargaining, instead arguing that as human judgement was always required in assessing the relative values of different kinds of work, so too unions would

its influence exists, but see Henry Atkinson, *A Rational Wages System* (London: G. Bell and Sons, 1917) and Priestman Brothers, *Payment By Results* (1918). Held at Glasgow University archives, Fullerton, Hodgart and Barclay archives, UGD120/7/4/33. Henry Atkinson, 'Scientific Management' *Engineering and Industrial Management* (13 January 1921), pp.35-8. Henry Atkinson, *Co-Operative Production: The Priestman-Atkinson System* (London: Ernest Benn, 1927). For a contemporary commentary on the Priestman system, see W.F. Watson, *Bedaux and Other Bonus Systems Explained* (London: privately published, 1932), pp.24-5.

74 Webb, *Works Manager*, p.137. One later source claimed that Webb's advice was 'much quoted'. See C.H. Northcott, 'Human Factor in Industry IV' (c.1921), p.14.

75 G.D.H. Cole, *The Payment of Wages: A Study in Payment By Results Under the Wage System* (London: Labour Research Department, 1918), p.62

always be required to check that these values were reasonable.⁷⁶

In addition to Seebohm Rowntree's engagement with the scientific management debate in 1916 while at the Ministry of Munitions, examined in chapter 4, the most authoritative examination of scientific management at this time was probably the Garton Foundation's *Memorandum on the Industrial Situation after the War* (1916). It noted that scientific management had become fashionable, but warned against using it:

No method of increasing output is more promising in theory than that known in America as 'Scientific Management'; but none is more open to abuse and frustration in practice. It is based on the conception of a works in which the whole routine, down to the last detail of every operation, is organised by the management, acting through a staff of efficiency experts. So far as concerns the 'routing' of work through the shops, no objection can arise. Confusion, over-lapping, delay and waste are avoided and the course of the work is made to run smoothly and rapidly. These are true functions of Management, and the more thoroughly they are performed the more efficient will be production and the less the strain on the workers.

With regard to the functions of Labour, the methods of Scientific Management are more open to question. The idea is to analyse and time the physical movements made in the performance of each operation on every job; to reduce each task to its simplest elements; to construct a routine from which every superfluous effort or movement is eliminated; and to train workmen to follow the prescribed schedule as a coach might train a boat's crew to use their oars. The reactions of environment and the limitations of fatigue are studied; no overstrain is allowed; rest periods are provided. An astonishing increase in output can be achieved along these lines; so that unprecedentedly high wages can be and are paid to those who will work under the system. Nevertheless, it is regarded with profound dislike and distrust by the general run of workers, and in a great many cases attempts to put it into practice have had to be abandoned.

The memorandum also reported that workers objected to the business keeping most of the efficiency increase, and having their work motions analysed, so the process needed to be negotiated using industrial relations.⁷⁷

Like the Garton Foundation, British manufacturers had positive and negative feelings about scientific management. Even those who had actively embraced and used elements of scientific management extensively before the war had similar concerns. Hans Renold was also unsure about scientific management, but believed that progress had been made. He noted in 1918 that 'How great or small the resistance of the English workman is today, against the Taylor System and scientific management of the shop, is very

⁷⁶ Cole, *Payment of Wages*, pp.64-8.

⁷⁷ Garton Foundation, *Memorandum on the Industrial Situation After the War* (London: Harrison & Sons, 1916), p.49.

difficult to say'. However,

I can affirm that during the last two or three years gigantic progress has been made in some English workshops. This could not have been made without adopting, more or less, scientific management, which is really COMMON SENSE management with an eye to quality, efficiency and economy.

Comparing the 'difficult' and 'self-help originality of the English character' with the 'scientific and logical' German, Renold concluded that if the war 'lasts another year or two' 'the greater will be our progress when the war is over'.⁷⁸ But how much did this debate manifest itself in industrial practice?

2.9. Scientific management practice in Britain in the First World War

Disseminating knowledge about scientific management and using it on the factory floor are not the same thing. Policymakers, managers, and workers certainly became far more aware of scientific management during the First World War, but there is minimal evidence that it was actually used, even in the Ministry of Munitions' huge national shell, projectile and fuse factories, which were newly built.⁷⁹ An examination of the Ministry's *Dilution of Labour Bulletin* and the *Ministry of Munitions Journal* reveals many discussions about boosting worker output, dilution of tasks, and the efficacy of bonus systems, but neither contain any suggestion of using scientific management, or the development of more sophisticated system such as work measurement, as had been developed in the USA by specialists like Emerson, Knoeppel and Bedaux.⁸⁰

The official history of the Ministry contained an assessment of what it believed

⁷⁸ Hans Renold to Frances Mitchell, 12 March 1918, SI, F.W. Taylor papers, Box 111, 'Scientific Management in Foreign Countries' folder. Even Charles Bedaux, almost completely unknown at this point, noted the new British enthusiasm for setting time standards: 'The labor of England today is demanding the establishment of [time] standards for all operations performed'. He also remarked that, 'When it is considered how backward England was in industrial management before the war, it is amazing to see British labor today demanding the setting of standards to be used as a basis of remuneration'. See Chas E. Bedaux, *Bedaux Efficiency Course for Industrial Application* (Cleveland: Bedaux Industrial Institute, 1917), pp.284, 424.

⁷⁹ Historians of accountancy have debated as to whether the creation of the Ministry brought with it a 'costing revolution'. For the older perspective, see Anne Loft, *Coming into the Light: A Study of the Development of a Professional Association for Cost Accountants in Britain in the Wake of the First World War* (London: Chartered Institute of Management Accountants, 1990), pp.11-24. For an alternative argument, see Trevor Boyns, 'Illuminating the darkness: the impact of the First World War on cost calculation practices in British firms' in J.G. Degos and S. Trébucq (eds.), *L'Entreprise, Le Chiffre et le Droit* (Bordeaux, Université de Bordeaux, 2005), pp.111-132.

⁸⁰ There is of course the possibility that some changes were hidden due to war secrecy, but, given the detailed equipment and organisational schematics depicted in these journals, it is unlikely that labour costing was a matter deserving particular secrecy.

scientific management to be. Its definition included both Taylor's *unit-times* and his differential bonus rate:

Under their [the advocates of scientific management] system the timing of jobs is done with great care, the process being divided into unit operations and a time fixed for each of these; by this method a standard time or output which should be attained without difficulty by the normal worker following instructions is established. On Mr. F.W. Taylor's system, when this output is reached the worker is paid at a higher piece-rate; on later systems, which a modified form of premium bonus instead of piece-rates, the bonus jumps to another level at this point.

The official account concluded that 'scientific management as a system has not been adopted widely in this country'.⁸¹ Instead of using any elements of the Taylor system, the MOM used time study and premium bonus systems, particularly the Rowan system, in a wide number of locations, on many kinds of work, and on both male and female workers.⁸²

Even the locomotive workshops of the British Expeditionary Force at St. Etienne Du Rouvray in northern France had heard of scientific management and Taylor. However, they appeared not to have noticed the time study element of Taylor's system let alone his *unit-times*, believing the important feature of the system to be 'the full system of routing and planning by schedule':

An effort was made to introduce scientific management on the Taylor system, an ambitious scheme in any locomotive shop, but it failed for the two following reasons:

1. Lack of trained personnel ... The numbers with clerical training or familiar with any works organisation were few.
2. The conditions, i.e., war service and the multiplicity of engine types. These made scheduled working impossible.

Having abandoned their experiments to introduce a full system of routing, 'a kind of local substitute was made up which worked quite well', a system based on estimated production times and work schedules.⁸³

Nor was Britain unique in its scant use of Taylor's system of scientific management

81 The official history noted that the Ministry consulted a 'delegate of the A.S.E. to a Manchester firm which had adopted the methods of scientific management' who said that workmen were not suspicious of scientific management when union representatives were included in rate setting experiments. Based on the analysis provided in Kreis, 'Diffusion of an Idea', chapter 2, this firm was probably Hans Renold, who did indeed include union representatives from the ASE when calculating work rates.

82 *History of the Ministry of Munitions*, Vol. 5, No. 1: 'The Control of Men's Wages' (1922), pp.153-166. Part 2 of Vol. 5, 'The Control of Women's Wages', described how women were largely paid on the same systems as men, particularly if the women were on 'men's work', though pp.140-3 concluded that even in this circumstance, women did not receive equal pay to men. Whitston, 'Scientific Management Practice', pp.106-111 noted that a sizeable number of manufacturers to adopt the Premium Bonus System and that this was principally related to the dilution of skilled labour with unskilled, conscript labour, particularly women.

83 C.H. Robinson, 'The Main Base Locomotive Workshops of the British Expeditionary Force, St. Etienne Du Rouvray', *Journal of the Institution of Locomotive Engineers* Vol. 13, No. 97 (1923), pp.117-8.

during World War One, in production, let alone in the field. Indeed, America was the exception, and even there it was confined to the private sector, despite the growth of some US manufacturing due to war. One 1917 US study estimated that there were 169 scientifically managed plants in the USA, but that this was very high compared to Britain (4), Canada (4), France (5), Japan (6), and Russia (9).⁸⁴

2.10. The 'Bedaux Principle of Human Power Measurement'

While Britain and the US were at war, a system explicitly based on Taylor's *unit-times* was being developed by a young engineer named Charles E. Bedaux (whose career is examined in chapter 3), who had not only noticed Taylor's point, but also that others had missed it. Bedaux's later second-in-command, Albert Ramond, recalled that Bedaux told him that 'the field was wide open, everybody talked about Frederick W. Taylor and scientific management' but that 'the few American engineers who were in the field went about it all wrong'.⁸⁵

Bedaux's first US industrial assignment took place in 1917 at the Imperial Furniture Company in Grand Rapids. The Grand Rapids furniture industry was particularly suitable for Bedaux's efforts as scientific management and bonus systems had failed to make an impact there. One proprietor had tried the Taylor system for two years but discovered that as individual job times were very short, the system cost more than it saved. 'Unless some "flat rate" method can be invented to apply to all varieties and styles of articles [of furniture] made, miscellaneous to a great extent, I don't believe it can be used to make a profit to anyone'.⁸⁶

⁸⁴ C.B. Thompson, *The Theory and Practice of Scientific Management* (Boston: Houghton Mifflin, 1917), p.39. According to Thompson's figures Germany, Spain, and Italy possessed no scientifically managed plants.

⁸⁵ Albert Ramond, *Memoirs* (privately printed, 1974), pp.160-1.

⁸⁶ Quoted in Scranton, *Endless Novelty*, p.175



Figure 2.1. Charles E. Bedaux poses for a self-taken promotional picture, c.1913-15. Image courtesy of the International Bedaux Institute.

Bedaux had created precisely such a method: the Bedaux system. Ramond recalled that 'it was in Grand Rapids that Bedaux "invented" the Bedaux System'. Ramond observed that Bedaux differentiated his system from Taylor's:

My recollection was that the Taylor 'System' was largely predicated on the establishment of time standards for various operations, and then tabulation and comparison with elapsed man-hours.

The basic idea [of the Bedaux system] was quite similar to Taylor's, but whereas Taylor used units of time, Bedaux used units of human energy. Bedaux' theory was that energy, i.e. manpower, was the important thing, not just time. One should use the energy available in human beings to best advantage.⁸⁷

In an interview, Imperial Furniture's owner, F. Stuart Foote, recalled that Bedaux 'who had installed plans in French and Belgian factories, asked for an opportunity to make a preliminary survey which he guaranteed would be worth \$10,000 to the company'. Foote remembered that Bedaux's system was based on a point rating system corresponding to each productive minute. In a nine-hour day, which, under Bedaux, consisted of 540

⁸⁷ Ramond, *Memoirs* (privately printed), pp.263-4. Richard Lewinsohn, 'Bedaux and His System' *Atlantica* (March, 1940), p.13 stated that the difference between the Taylor and Bedaux systems was that the former required 'revision of the entire method of management' whereas Bedaux 'finds such favor with employers, who consider it more economical in the long run and less interfering'.

minutes with a 40-minute allowance for interruptions, workers had to complete 500 points of work. Different jobs corresponded to Bedaux point ratings, and if workers achieved higher than their point requirement, they received a bonus. Bedaux received \$300 for the report, and the system was instituted.⁸⁸ At this point, Foote 'was able to make a contract with Mr. Bedaux not to do any work for other furniture factories in Grand Rapids'.⁸⁹

Foote later recalled that Bedaux then increased his fee to \$1,200, and promised that his system would save the company \$50,000 in its first year of operation. The new method was put into test operation in the finishing department, the 'least efficient of all phases of manufacture'. At first the workers objected but Bedaux, Foote and the parish priest convinced the workers to give the system a trial. The rubbing room, which consisted of Poles, Lithuanians and two Dutchmen was selected and the two Dutchmen put on a competing trial period. He remembered that the Dutchmen were informed of their progress each day and given separate bonus checks at the end of the week 'in a much larger amount than they deserved'. The second week's bonus payments were paid according to what the Dutchmen deserved under the new system. By the third week all the workers in the rubbing room wanted to be included on the system, and were duly enrolled into it. Workers were subsequently put in competition against one another, and in one instance, 'girls were pitted against men, and proved worthy opponents'.⁹⁰ Within two years Bedaux's scheme had paid off, and the firm saved more than Bedaux's predicted \$50,000. The Bedaux *point* system was then expanded to other Grand Rapids plants.⁹¹ Foote recalled that in these factories, like in his own, the *point* system was applied to certain departments and specific kinds of repetitive work.⁹²

Using his experience at Imperial Furniture, Bedaux described his experience and

88 Frank Edward Ransom, *The City Built on Wood: A History of the Furniture Industry in Grand Rapids, Michigan, 1850-1950* (Privately printed, 1955), p.69, interview with F. Stuart Foote, 20 August 1951.

89 'Charles Eugene Bedaux, Suspect. NARA, Military Intelligence Division, RG165-MID Correspondence (1917-41), 10505.

90 Ransom, *City Built on Wood*, p.69.

91 Other early clients included Grand Rapids Refrigerator, Grand Rapids Chair, Terrell, Clipper Belt Lacer, and American Board. They are listed in 'Charles Eugene Bedaux: Background and Personal History', NARA, RG65, Box 113, 100-49901, 1-100 (series 1). One article two decades later reported that the Bedaux system was still in use at Imperial Furniture. See 'What's Wrong with Bedaux?' *Liberty* 18 December 1937, p.45.

92 Ransom, *City Built on Wood*, p.69.

system in his *Bedaux Efficiency Course for Industrial Application*.⁹³ Privately printed in Cleveland, with editions published in 1917 and 1921, the Bedaux course was distributed to Bedaux Engineers.⁹⁴ Of the 'science of efficiency', Bedaux stated that 'efficiency does not necessarily mean large production. It measures production in relation to the reasonable maximum that can be expected of a man with the facilities at hand'. Citing Emerson as 'the master of the definition of the principles of efficiency', Bedaux recommended that all new clerks and foremen read 'Frederick Taylor for theory and Knoeppel for practical work'.⁹⁵

Bedaux argued that the analysis methods used in metalworking, particularly those presented by Charles E. Knoeppel's *Installing Efficiency Methods*, were not sophisticated enough to apply to other industries.⁹⁶ In contrast, Bedaux argued, his system of *work analysis* was. Using his experience from Imperial Furniture, Bedaux argued using the example of a railroad car wheel, that the work processes required in metal forging were relatively simple, requiring the engineer to pour the molten ore into a mould, and, once set, to finish the wheel on a lathe. In contrast, wood, which was by its nature irregular, required infinite combinations of hand motions such as ripping, cutting, grain alignment, glueing, assembly, dressing, and finishing. Also, Bedaux argued, the engineering industry typically produced large, expensive machines with only a few models per manufacturer. The woodworking industry, on the other hand, usually produced small, cheap items, which required many more work processes. A crane may consist of 1,000 components, but it would require only 20 assembly processes to construct the crane. Thus analysis of the assembly processes would be relatively easy. In contrast, Bedaux argued, a furniture factory employing 500 workers might make 700 designs, each of which contained 50 parts, and each of which required 20 work operations. This would require 175,000 operational analyses, with a further 11,900 for finishing, trimming and packing, leading to 186,000

93 The time sheet on Bedaux, *Efficiency Course*, p.272 notes Foote was the general manager of the works under discussion. Kreis, 'Diffusion of Scientific Management: The Bedaux Company in America and Britain, 1926-1945', in Nelson, *Mental Revolution*, p.172, n.21 lists the different titles this book was given in subsequent republications.

94 The pamphlet which accompanied the course made false claims about Bedaux's background and experience. He also attempted to sell the book as a self-taught course, although he appears to have had few customers. A rare receipt indicates that Bedaux billed one client in 1918 for 'Two Bedaux Efficiency Courses' at \$40 each. Bedaux Industrial Institute to Muskegon Boiler Works, 26 October 1918, IBI.

95 Bedaux, *Efficiency Course*, pp.10-11, 14.

96 As can be seen in Urwick, *Golden Book*, Knoeppel was a well known speaker and writer on factory efficiency before Bedaux became involved in the field.

operations in total.⁹⁷ Thus wood, and related products like stone, textiles, and garments, required a superior standard of work analysis which took this enormous number of variables into account.

Bedaux recommended standardising work practices and material flows and converting all the different kinds of work into units for easy and effective labour costing control.⁹⁸ Under the Bedaux system, *points* combined fixed tasks with a standard time taken to complete them. *Points* were then aggregated on a daily basis. Standard *point* values were multiplied by a coefficient for rest and delays (*r.d*). which took into account time lost due to fatigue and unavoidable delays. 'The actual time, plus the percentage for rest and delays, gives us the *standard*, which is expected of a normal operator under normal conditions'. It was the *point* and *r.d*, he argued, that made his system different from those of other 'efficiency experts'.⁹⁹ In addition, he argued that his method of 'graded remuneration' was superior to piecework incentive methods along the lines of 'Taylor's differential piece-work rates, Gantt's bonus plans, and Parker's differential bonus plan', each of which required highly standardised working practices. He argued that his system was also superior to profit sharing, which, he claimed, lowered the output of workers to the level of the worst worker.¹⁰⁰

As part of his work for the National War Labor Board, F.C. Hood of the Boston firm Hood Rubber investigated scientific management:

Many of the so-called efficiency experts, prominent at that time, were interviewed, and their methods investigated; but none of them seemed to have methods that would solve the Hood Rubber Company problems. During his service on the War Labor Board, Mr Hood had heard, indirectly, of the work that had been accomplished by the Charles E. Bedaux Company. Mr Bedaux was interviewed by the manager of the development department [of the Board], and his methods were studied carefully. It was discovered that the 'point system' (so-called by Mr Bedaux) more adequately compensated the worker, in proportion as he performed them, for his efforts, than any other system that had been investigated. At the same time the employer benefited through increased efficiency.¹⁰¹

The contact between Hood and Bedaux became important to ensuring Bedaux's the future

⁹⁷ Bedaux, *Efficiency Course*, pp.312-7.

⁹⁸ Bedaux, *Efficiency Course*, p.272.

⁹⁹ Bedaux, *Efficiency Course*, p.401.

¹⁰⁰ Bedaux, *Efficiency Course*, p.396.

¹⁰¹ Alfred A. Glidden, *A Brief History of the Hood Rubber Company, a Massachusetts Corporation* (privately printed, 1938), p.91. My thanks to Galina Shyndriayeva for locating this document.

of Bedaux's company, and his *B* unit more broadly.

2.11. The Chas. E Bedaux Company and the *B*

With his early assignments having been a success, and his reputation increasing, Bedaux formally founded the Chas. E. Bedaux Company in Cleveland around 1919. Early clients were White Sewing Machine Company and Davis Sewing Machine Company in Ohio, and General Motors (GM)'s recently-acquired Indiana subsidiary, Delco-Remy.¹⁰² Over the next two years Bedaux's company continued to grow, and costing \$7 per hour, per engineer, his consultancy's services were expensive. One Bedaux engineer recalled that it was precisely because Bedaux's services were so expensive that he convinced managers and company directors that his system must be very effective.¹⁰³

Bedaux used his family connections to recruit new employees. When he recruited the young French engineer Albert Ramond to his consultancy via his brother-in-law L.B. Duez in September 1919, Ramond was then trained how to use a stop watch to time workers. Ramond had done so before, but 'this, like everything Bedaux was different, a second, not a decimal watch, to facilitate understanding and confidence' of workers.¹⁰⁴ His recollections about the early Bedaux period reveal much about the vagaries and secrecy of the Bedaux system, even to those most intimately involved with its early development:

When I went with the Bedaux Company December 1, 1919, I was told very little specifically about the Bedaux system, at least very little that I understood. There was much talk about time studies, standards, measurement, productivity, but very little that was very different from what I had already heard and read, both in France and in the US. Bedaux emphasized that his measurement methods were altogether different from the usual time studies, but the only thing visible to me, and THAT was visible, was that Bedaux introduced factors proportional to the physical or mental strain involved, and also to the speed of motion in an effort to arrive at fairer standards, that is, standards that were more uniform in relation to the producer's capacity to produce. There would be more rest for hard work, and a more liberal allowance for fast work, the theory being that all producers could arrive at a similarly rated performance, if they applied themselves equally, irrespective of the kind of work, light or heavy, fast or slow.

¹⁰²Lytle, *Wage Incentive Methods*, p.224, n.1. C.E. Wilson, 'Group Bonus is Important Factor in Delco-Remy Production' *Automotive Industries* 10 December 1927, pp.870-1 noted that Delco-Remy had been using the 'Bedoe premium system' on the majority of its workers for eight years. C.E. 'Engine Charlie' Wilson became President of GM during World War Two and served as US Secretary of Defense under President Eisenhower from 1953-7.

¹⁰³Smyth, 'Bedaux - the Man and his Work', p.8.

¹⁰⁴Ramond, *Memoirs*, pp.160-1.

This demanded truly uniform standards, that is standards whose content would be an equal amount of productive energy, or as we said then, human power. So the whole thing was predicated on the ability of the Bedaux engineers to establish such standards correctly, and also to train other men to do the same. Every operation was so measured through a common unit, a common denominator 'the point'. This was a standard amount of human energy for one man per one minute. It is true that a careful analyst, using good judgement, could in time arrive at fairly consistent standards. Bedaux had defined some basic rules with some corollaries in his booklets, all supposedly insuring greater accuracy. Actually some of the rules and principles were found to be erroneous in time, and all or nearly all were forgotten by 1921. In 1919-20, our shortcomings were hidden behind a wall of mystery, but we did produce results, even with our imperfect rules and procedures. We devised and applied monetary incentives predicated on the Bedaux Measurement. Most people made more money, labor, foreman, and management, and that was the important thing.¹⁰⁵

Over the next four years, Bedaux and his new firm used a variety of names for his system, such as the *Point*, the *Bedaux-unit* and the *Bedaux Point System*.¹⁰⁶ It was used to attain better cost controls and administrative clarity over a variety of working practices. For example, this method allowed Bedaux to calculate the cost per *Point* of fan assembly work at Robbins and Myers, Springfield, OH from 1919-20.¹⁰⁷

Bedaux rebranded the *Point* as the *B* in March or April 1921, and coined the term *work measurement* around the same time.¹⁰⁸ The *Point* or *B* was a standardised measure of labour output with its distinctive feature being its simplicity compared to the complex multivariate calculations required when one extrapolated the Taylor *unit-times* method to the simultaneous study of different work processes. It was an equivalency unit of work measurement, free from monetary value, which its practitioners described as a 'universal measure of work', a 'yardstick' and a 'common denominator', akin to horsepower, or the British Thermal Unit.¹⁰⁹ If the system was working at the standardised rate, all workers working on the system would produce 60*Bs* per hour. Once working practices had been measured by Bedaux engineers, one could check how the output of workers compared to

¹⁰⁵Ramond, *Memoirs*, p.264.

¹⁰⁶Given the similarities in advertising language, it is possible that he developed his consultancy's brand out his former employer, Maximilian D. Berlitz, famous for his 'Berlitz method' of learning languages. While the connection between the Bedaux and Berlitz methods is speculative, one contemporary did make the connection between the Berlitz method and mathematical symbols. See Paul Dienes, 'On Symbols - Mostly Mathematical' *Modern Quarterly* Vol. 2, No. 2 (1939), p.166.

¹⁰⁷From Charles E. Bedaux, 'The Bedaux-Unit Principle of Industrial Measurement: Its Origins, Its Laws and Applications', *Journal of Applied Psychology* (1921).

¹⁰⁸In F.W. Sutton to Henry Ford, 25 March 1921, The Henry Ford archive, Acc 285 Box 1-22, the system was referred to as *The Bedaux Point System of Industrial Measurement*. Sutton's solicitation was unsuccessful, as was a later Bedaux overture in 1931

¹⁰⁹R.T. Mattinson, 'The Advantages to the Worker of the Application of a Common Denominator to all Plant Activities' *Welfare Work* (May, 1931), p.319. Mattinson was a Bedaux Field Engineer.

standard output by examining the output of *B*s for the period under analysis. If the firm so desired, labour was then costed by assessing the cost of 1000*B*s over periods of time. Measurement of the output of workers, groups and departments could thus be monitored by more senior management on a daily, weekly, or monthly basis, and management interventions could be made when necessary.¹¹⁰ The keeping of extensive output records also meant that individual worker, group and departmental performance could be tracked backwards and compared with similar data over long periods of time. The Bedaux argument was that these records could be used to check which employees were working on jobs to which they were unsuited, and so needed to be transferred to a different job in the firm. When it was well developed, the Bedaux system also focused on grading different kinds of work and linked them to different pay levels.¹¹¹ When asked about whether the increase in worker output offset the high volumes of paperwork and consultancy fees, clients were generally satisfied that it did.¹¹²

In creating the *B*, Bedaux claimed to have solved two problems which had thwarted others: firstly, the problem of how much rest time should be added to the amount of time allowed to perform a given piece of work. To address this issue, the Bedaux system contained a built-in Personal Allowance (*PA*), a percentage coefficient by which standard times were multiplied to take into account a variety of environmental and physical conditions.¹¹³ The *PA* ratio of work to rest was of necessity an arbitrary decision by the Bedaux engineer. In an ideal scenario, *PA* times would be reduced to zero as this would demonstrate that the system was measuring all work processes with one hundred percent accuracy.¹¹⁴ Alert workers quickly realised this ratio was arbitrary and some attempted to manipulate the system to their advantage.¹¹⁵

Bedaux's second claim was that his system had solved the problems inherent in

¹¹⁰Despite Bedaux's claim that the *B* could be used to compare the efficiencies of entire industrial sectors and even national economies, there is little evidence that the *B* was used for this purpose.

¹¹¹Kreis, 'Diffusion of an Idea', pp.308-312.

¹¹²Kreis, 'Diffusion of an Idea', p.316.

¹¹³As examined in chapters 3 and 6, the arbitrary nature of *PA* ratings led to disputes on the British factory floor.

¹¹⁴P.K. Standing 'The Bedaux System' *Industry Illustrated* (June, 1934), p.44. Standing was a Bedaux specialist at ICI.

¹¹⁵For a full examination of workers and Bedaux, see chapter 6.

both time work and piece work: hitherto there had been no way of checking under time work how much work it was reasonable to expect in a given period of time. Piece work, on the other hand, may boost worker output but when working conditions changed, pay adjustments became difficult, particularly when many piece prices had to be changed.

In addition to the *B*, Bedaux also implemented a regressive bonus system designed to incentivise workers to produce over the standard of 60*Bs*. The normal aim was to achieve 80*Bs*, and surviving evidence indicates that this higher, optimal amount was often attained, if not exceeded.¹¹⁶ The initial plan was to deliver 25% of workers' bonus to the foreman, leaving 75% for each worker, which Bedaux later recalled was 'a Socialistic idea of mine in the early days of the system'.¹¹⁷ In practice, it was often the first element of the Bedaux system to be removed when negotiating the system with workers or trade unions. The payment system was often linked to a minimum wage which could be decided upon by collective bargaining, management decision, or legal regulations. Moreover, as a labour costing system, the Bedaux system also measured working time in which work was not measured under the system, recorded as *NOB* or *Not On Bedaux*. *NOB* time took into account work processes which had not, or could not, be measured accurately enough to satisfy the engineer and, under some circumstances, workers or their representatives. Due to its unusual and unpredictable nature, overtime and maintenance were sometimes classed as *NOB*. Reducing *NOB* times was also an explicit goal of the system. Therefore, in an ideal world both *PA* and *NOB* would be zero, which in turn would reduce the number of calculations and paperwork required.¹¹⁸

Despite its growing client list, Bedaux's consultancy was still struggling and its founder worked hard to secure new clients. An important client was Hood Rubber, where 'from the very beginning, [in 1919] they [Bedaux engineers] obtained results pleasing to both the workers and the management'.¹¹⁹ The eight Bedaux engineers at Hood's worked for twelve to fourteen hours per day to make sure the system was a success. Ramond,

¹¹⁶See chapter 3 for additional discussion of this matter.

¹¹⁷See 'Duke to Inspect 15 U.S. Industries' *Baltimore Sun*, 4 November 1937.

¹¹⁸For a detailed explication of these issues, see P.K. Standing 'The Bedaux System' *Industry Illustrated* (May, 1934), pp.24-5, 38 and Standing 'The Bedaux System'.

¹¹⁹Materials held in *America, 1922-28*, BI, Rowntree archives, Box 11 remarked in 1926 that Hood's had been using the Bedaux system for seven years.

one of those engineers, later recalled that the assignment at 'Hood meant a great deal to Bedaux'. He believed that it was the first application of the Bedaux system proper and 'possibly saved the Bedaux Company'. Moreover, Hood acted as a springboard for the introduction of Bedaux to many other firms:

After the Hood Rubber Company had operated the system successfully, many of the other rubber manufacturing companies requested Mr Bedaux to apply the system to their plants. An arrangement was made whereby the Hood Rubber Company received a commission on the money paid to Mr Bedaux by the other companies, and a very substantial sum was thus collected by the Hood Rubber Company.¹²⁰

In 1921, Bedaux moved his main offices from Cleveland to Battery Park, New York.¹²¹ Also, recalled Ramond, 'Bedaux "sold" General Electric, I think late in 1921'.¹²² In 1922, *American Machinist* reported that his system had been successfully installed in 28 plants.¹²³ In addition to Hood and G.E., substantial early US clients included Kodak, Gillette, and Swift's.¹²⁴

2.12. Worker efficiency, wages and British manufacturers, 1918-21.

The war had strengthened and defined debates which been taking place in Britain before the war, and well-respected individuals such as Webb, Cole, and Renold believed that valuable lessons had been learned: shorter working hours could be beneficial to owners, managers and workers, plus payment-by-results could be highly effective, particularly on repetitive, simple tasks. The war also certainly increased the desire to develop superior

¹²⁰Ramond, *Memoirs*, p.170.

¹²¹'Charles Eugene Bedaux: Background and Personal History' NARA, RG65, Box 113, 100-49901, 1-100 (series 1). He also used his offices in Battery Park to establish the Washington-Lafayette Institution, designed to promote friendly relations between the USA and France. Almost nothing is known about the organisation. It published Washington Lafayette Institution, *Our Debt to France* (New York: Washington Lafayette Institution, 1926). It caused problems by adding people to its membership list who had not agreed to support its cause. See correspondence on this in the Swarthmore College, Frank Aydelotte archive, 100/1100.

¹²²Ramond, *Memoirs*, p.173. In addition, between April 1921 and April 1922 Bedaux also filed three more patent applications. No. 1,386,308, a safety fender for vehicle, was granted on 2 August 1921; Nos. 1,444,772 and 1,520,743 related to a mechanical game involving toy horses and jockeys, and were granted on 13 February 1923 and 30 December 1924 respectively.

¹²³L.C. Morrow, 'Application of Bedaux Management Methods in the Robbins & Myers Plants' *American Machinist* No. 57 (July-December, 1922), p.249. Ramond, *Memoirs*, p.266 recalled that 'most of the subsequent college references and guide books were taken from that article'.

¹²⁴Theodore V. Purcell, *The Worker Speaks His Mind on Company and Union* (Cambridge: Harvard University Press, 1953), pp.236-60 reported that the system was later renamed the *Swift Standards System*, which required workers to produce 60 *Work Units* per hour. For more on the Bedaux system in the meat-packing industry, see Alma Herbst, *The Negro in the Slaughtering and Meat-Packing Industry* (New York: Houghton Muffin Co., 1932).

costing controls over manufacturing processes. But it had also revealed that the American systems of Emerson and Gantt, as well as the older Taylor system, were complicated, tended to antagonise workers, and risked overly-individualising workers.¹²⁵

With the return to peace, British manufacturers such as Rowntree were presented with several serious problems. They still had, or at least believed they had, to solve the long-standing issue of low British worker efficiency. Indeed, in some sectors such as the cocoa industry, in which they faced revitalised international competition, also had to increase the efficiency of their businesses more generally. But they also had to cope with the increased bargaining power which the war had brought to British trade unions, and with learning valuable lessons from World War One, such as the positive effects that shorter working hours could have on production and workers' morale. Moreover, there was also a developing debate about the the important role that under-consumption might have in suppressing market demand.¹²⁶

Profit sharing and superior labour costing were much-discussed ways to achieve all these goals.¹²⁷ While it was during the Great War that key manufacturing figures studied scientific management for the first time, it was not until after the war that they had a chance to investigate it. However, the Taylor and scientific management names were likely to attract obstruction from workers and, given that Webb and Cole had spoken in favour of Taylor, also risked implying that British manufacturers were socialists.¹²⁸ Authors and manufacturers were therefore keen to stress that the new efficiency movement that the war had spawned possessed a particularly British character.¹²⁹ Alternative names for the

¹²⁵For example, see J.H.H. Boyd, 'Costing in Relation to Scientific Management' *The Accountant* (12 July 1919), pp.33-40. Boyd was Director of Costs and Efficiency Methods at the Central Stores Department of the Ministry of Munitions. See also H. Baker, 'The New Era of Scientific Management' *Engineering and Industrial Management* (24 November 1921), pp.604-5.

¹²⁶These points are examined in chapter 4.

¹²⁷For a full study of the importance of costing in generating useful data, see M. Webster Jenkinson, *The Workers' Interest in Costing* (London: Industrial Reconstruction Council, 1919).

¹²⁸Although it remains to be seen how well this was known at the time, Lenin's 1918 speech on Taylor was published in the *Bulletin of the Taylor Society* in 1919. Signalling the forthcoming relationship between the Taylor Society and its adherents in Britain, the Taylor Society also reprinted Webb and Freeman's remarks on scientific management as 'A Word from the Fabian Socialists' in the society's *Bulletin* of June 1919.

¹²⁹As Herbert Casson, a self-defined 'Efficiency Expert', founder of *The Efficiency Magazine*, and consultant to Cadbury, put it, in post-war Britain, 'there was an urgent need of developing a British type of Efficiency. I had learned by experience in over sixty businesses in Great Britain, that the methods of Taylor and Emerson did not altogether suit the mind and temperament of the British people. See Herbert Casson, *The Story of My Life* (London: Efficiency Magazine, 1932), pp.188-9.

successors to scientific management were suggested, such as Leverhulme's *Scientific Administration* or Rowntree's *Scientific or Efficient Management*.¹³⁰

As examined in chapter 4, by the early 1920s, Rowntree, Lever,¹³¹ the Cadburys,¹³² Urwick, and many other British manufacturers had visited the USA to investigate labour costing systems and had extensively innovated with their own factory work measurement and analysis in this way. For example, Rowntree was particularly impressed by the Bedaux system when he saw when he saw it in use at the Hood plant in October 1921:

This was extraordinary well-managed and we felt we had much to learn from their organisation. Here, as in all well-managed places in America, very careful time studies had been made and the standard amount of work which every man is expected to perform in a given time is always known.¹³³

The apparent alternative was the approach taken by Henry Ford and the Ford Motor Company, though very few interwar British commentators advocated managing British industry along Fordist lines.¹³⁴ As examined in chapter 4, British manufacturers such as Rowntree eschewed Ford's fixed 'five dollars a day' approach for three reasons. Firstly, they believed that fixed wages, high or low, would promote laziness, necessitate heavy-handed management, and the lack of empirical production data would prevent foremen and managers establishing which workers worked best. Secondly, labour costing data would enable industrial managers and planners to coordinate wages with other factories and sectors. This coordination was used to ensure a fair wage for workers, and also to

¹³⁰Lord Leverhulme, *The Six-Hour Day & Other Industrial Questions* (New York: Henry Holt & Company, 1919), p.252 remarked that instead of 'Scientific Management', which suggests only increasing profits for management, 'Scientific Administration' 'would be welcomed as merely the science of production' which would 'secure the greatest prosperity for employers and employees'. The Rowntree quote can be found in Seeböhm Rowntree, *The Human Factor in Business* (London: Longmans Green & Co., 1921), p.100.

¹³¹As examined in chapter 6, Lever unsuccessfully attempted to introduce the Taylor system in 1913. Jeremy David Rowan, 'Industrial Paternalism of William Hesketh Lever at Port Sunlight, 1888-1925' (Louisiana State University PhD thesis, 2003), pp.91-2, made a comparison between Taylor and Lever but went no further. Research has revealed that by 1930, Port Sunlight operated a system of 'Standard Units' and 'Datum Units' based on time study and bonus systems to increase the efficiency of its workers and to facilitate efficiency comparisons between departments. See *Port Sunlight: Collective Bonus Scheme*, 22 January 1930, LSE, MRG/8/5.

¹³²E. Prosser, *Piece-Rate, Premium and Bonus* (London: Williams & Norgate, 1919), chapters 7-8 indicates that Cadbury had moved on from 'the late Dr. Taylor (the founder of scientific management)' to 'the efficiency bonus [which] comes to us from America, and the honour of its successful introduction there is popularly attributed to Mr. Harrington Emerson'.

¹³³Rowntree 1921 America Tour Journal, 2 October 1921 entry, p.7. BI, Rowntree archive, box 11. As Briggs, *Social Thought and Social Action* noted, as part of this trip, Rowntree examined and rejected both the Ford and Taylor systems as being too inhumane.

¹³⁴For a recent examination of the fear of Fordism in interwar Britain, see Ellwood, *Shock of America*, pp.90-6. Huw Beynon, *Working for Ford* (London: Allen Lane, 1973) remains a classic on the Ford company's operations in Britain. For an collection of analyses of issues surrounding Ford in various European countries, including Britain, see Steven Tolliday and Jonathan Zeitlin (eds.), *The Automobile Industry and its Workers: Between Fordism and Flexibility* (Cambridge: Polity, 1986).

and sectors. This coordination was used to ensure a fair wage for workers, and also to enable superior budgetary analysis and control over the factory floor. Thirdly, once methods of incentive payments, particularly piecework and PBS had been enhanced, workers could be physically and statistically pooled into work groups with collective bonuses to imprint upon them a spirit of teamwork and corporate loyalty.

Following an examination of F.W. Taylor's publications, the term *Taylorism*, and a study of Taylor's published works, this chapter has examined F.W. Taylor's engagement with British debates over British worker efficiency. It has shown how Taylor argued that the time study was not the most important element of scientific management; his *unit-times* were. It then explored the British engineering and manufacturer engagement with Taylor, scientific management, and Taylor's *unit-times*.

It has examined firms which engaged with the scientific management project in the 1910s, specifically Cadbury, Renold and the Ministry of Munitions. It has noted that very few individuals or firms picked up on Taylor's *unit-times*, although a small number of people, particularly Emerson and Bedaux did. It then examined the roots of the Bedaux *B* in Taylor's *unit-times*. It has studied Bedaux's formulation of the Bedaux *B*, the *B*'s deployment in American manufacturing, and the foundation and expansion of Bedaux's consultancy. However, Bedaux's background and career remain mysterious. The next chapter therefore examines Charles E. Bedaux, the expansion and success of his consultancies in the interwar period, particularly in Britain, and Bedaux's demonisation as an industrial despot and Nazi collaborator between 1937 and 1945.

Chapter 3.

Charles E. Bedaux and the Bedaux system, 1886-1945

3.1. Introduction

Until 1937, Charles E. Bedaux (1886-1944) was not personally well known, although his 'Bedaux Principle of Human Power Measurement', and others like it, were experienced daily by millions of factory workers around the world. For fifteen years the Bedaux system had caused industrial disputes, work stoppages and strikes in North America and Europe, some of which had made headline news. Bedaux had also battled the national governments in Italy and Germany to prevent his system being suppressed. He failed both times.

What changed in 1937? On 3 June that year, Bedaux hosted the wedding of the recently-abdicated Edward VIII, and Wallis Simpson, at his French château. This drew the attention of the world's press to Bedaux and his life trajectory changed fundamentally. Following the couple's honeymoon, Bedaux accompanied the couple on a tour of Nazi Germany, where, much to the embarrassment of the British monarchy, still felt today, they met senior Nazis including Adolf Hitler. Bedaux's attempt to take the couple on a tour of the USA in November attracted enormous hostility towards him in the press. His association with fascism was further reinforced by his suicide in 1944 while awaiting charge for collaborating with the German and Vichy regimes during World War Two.

For this reason, Charles E. Bedaux features more prominently in historical studies of the royal couple than in any other historical literature. For example, the official biography of King Edward VIII described how

Bedaux had made his fortune and won the hatred of organized labour by inventing the time-and-motion study and showing big business around the world how to apply it. [He was also] anxious to establish closer links with the leadership in [Nazi] Germany and was looked at askance by the intelligence services of France and Britain.¹

¹ Philip Ziegler, *King Edward VIII: The Official Biography* (London: Collins, 1990), p.362. For the most recent example of this characterisation, see Anne Sebba, *That Woman: The Life of Wallis Simpson, Duchess of Windsor* (London: Weidenfeld & Nicolson, 2011). Bedaux also features in this sense in the Duchess of Windsor's memoir *The Heart Has Its Reasons: The Memoirs of the Duchess of Windsor*

As explored in this chapter, this demonised version of Bedaux's life overstates unpopularity of the Bedaux system and those like it. It also much exaggerates the conceptual links which contemporaries formed between the Bedaux system and fascism, particularly Nazism, before 1937.²

In contrast to the unhelpful conspiracy theories surrounding Charles E. Bedaux's life and death, historians have revealed much about the operations of the Bedaux system and its diffusion and use throughout Britain, the USA, and elsewhere. Littler's study of the Bedaux system argued that it was a flexibilised form of Taylorism, that 'history of "scientific management" in Britain in the inter-war period is largely the history of Bedaux' and that the *B* provided 'pseudo-scientific' 'universal measure for all work'.³ Also using the Bedaux archives, Kreis revealed a great deal about the Bedaux system's operations on a daily basis such its extensive use at ICI, the importance of healthy collective negotiation procedures relating to the system, the system's utility for departmental efficiency comparisons, and its lack of a 'One Best Way' which he argued that true Taylorism possessed.

More recently, Kipping explored the operations of the Bedaux consultancy's 'Big Four' offshoots in Britain: AIC, P-E, UOP and PA, and argued that consultancies were the principal route by which Taylorism diffused in Britain. Moreover, he examined the operations of consultancies across Europe and revealed that Britain, and to a lesser extent France, were Bedaux's principal markets in the 1930s. Most recently, McKenna has noted that Bedaux was indicative of a larger dynamic: European consultancies, particularly Bedaux and its offshoots, stayed focused on factory floor efficiency issues related to

(London: Michael Joseph, 1956), chapters 27-9. The literature on the Duke also implicitly assumes that the Duke had no prior knowledge of, or interest in, work measurement. This is untrue. As Prince of Wales, he was president of the Sixth International Congress of Scientific Management in London in 1935 and made a key speech there. In addition, he had visited the Rowntree Cocoa Works in May 1923 and Frank Gilbreth's laboratory at some point before Gilbreth died in June 1924. For the former, see BI, ARCH 721. For the latter, see Purdue University, Gilbreth papers, Box 127 where the Prince can be seen in the Gilbreth laboratory alongside Frank Gilbreth.

2 Littler, *Development of the Labour Process*, chapter 9, is entitled 'Case Studies in Control and Resistance'; Kreis, 'Diffusion of an Idea', pp.332, 351, argues that 'The Trades Union Congress and General Federation of Trade Unions issued independent reports on Bedaux and resolved that their members fight the system to a standstill'. As examined in chapter 6, not even the CP connected the Bedaux system to fascism in their 'class against class' period.

3 Littler, *Development of the Labour Process*, pp.108-9

Taylorism rather than focusing on higher-value strategy and restructuring activities like US consultancies. And to build on this literature, chapter 2 has explored the origins of the Bedaux *B* in Taylor's *unit-times*, the foundation of Bedaux's early consultancies, his engagements with initial clients, and the early reception of the Bedaux system (albeit under a different name) by some key British business intellectuals like Seeböhm Rowntree, examined in chapter 4.

However, despite historical examinations of the Bedaux system and Bedaux consultancies, Charles E. Bedaux himself remains something of a mystery. While journalists have addressed elements of Bedaux's career for many years, painting a picture of a sinister Nazi spy hated by workers worldwide, scholars have been ambivalent about addressing Bedaux's life. Those that do have been unsure as to what he should be given credit for. Littler claimed that

Bedaux's biography is a side-show, but it has one important effect: it served to link Taylorism and 'scientific management' to fascism. As a result, the work-study profession has sought to avoid any overt connection to Bedaux in the post-war period.⁴

In contrast, Kreis suggested that examining Bedaux himself was a distraction to historians, arguing that 'by 1930 at the very latest, Charles Eugene Bedaux and the Bedaux system were two decidedly different realities'.⁵ He added that

'Bedauxism' appeared under the clever guise of management consultancy and that few individuals, if any, would have ever referred to the Bedaux system of scientific management. This may explain why Lyndall Urwick and his young research associate Edward Brech gave no mention to Bedaux's name or work when they wrote *The Making of Scientific Management* in the early 1940s.⁶

More recently, McKenna has made a contrasting point, noting that after Bedaux's suicide in the USA while in custody on a charge of treason 'in 1945, in the newsreels and in the *New Yorker*, Bedaux served as an exemplar of all that was wrong with consultants'.⁷

This chapter argues something different. It argues that Bedaux's biography was not

⁴ Littler, *Development of the Labour Process*, pp.106-7.

⁵ Kreis, 'Diffusion of an Idea', p.327.

⁶ Kreis, 'Diffusion of an Idea', pp.292-3. For a different interpretation as to how Urwick and Brech dealt with Bedaux in their book, see chapter 7.

⁷ McKenna, *World's Newest Profession*, p.197.

a side-show. As examined in chapter 2, Bedaux was unusual in noting Taylor's focus on *unit-times* and, unlike Taylor and most of his circle, managed to transform Taylor's *unit-times* into practices which clients were willing to pay handsomely for. As Littler, Kreis and McKenna have observed, in different ways, Bedaux's career was also important in shaping discourse around work measurement and consultancies both during his and after his life. Moreover, moments in Bedaux's career, particularly his public brushes with fascist Italy in 1935 and the Third Reich in 1937, and his suicide in 1944 may have even strengthened the memory of F.W. Taylor himself. Using archives held by the FBI, the ILO, the IISG, the *New Yorker*, and a number of memoirs written by former Bedaux engineers, particularly that of Bedaux's right hand man in the 1920s and 1930s, Albert Ramond, this chapter examines his career from Bedaux's outset.

3.2. Bedaux's early life

The son of a Paris-based railway engineer, Bedaux attended J.B. Say College in Paris. Primary sources, even those written by Bedaux himself, are unclear as to whether he graduated from the college as an engineer.⁸ Described by one later colleague as 'physically an unattractive person, short of stature and with an exceptionally large head', Bedaux left France for the USA aged 20.⁹ One later FBI source recalled that Bedaux had told him that he 'was the black sheep of the family and that his father had run him out of Paris because of his use of narcotics and intoxicants'.¹⁰ When Bedaux arrived on the *Statendam* at Ellis Island on 13 February 1906, Bedaux stated his profession as 'publicity agent', though for the rest of his life he would claim that he was an industrial engineer.¹¹ He

8 Bedaux, *Bedaux Efficiency Course*, p.2 mentions 'Upon leaving school, a civil engineer,' whereas 'What's Wrong with Bedaux' *Liberty*, 18 December 1937, p.44 remarks that 'Charles was the only member of the family who did not do well at school. Roistering, life-loving, adventurous, he cut most of his classes in favor of Paris taverns'.

9 The description is from W.A. Smyth 'Bedaux - the Man and his Work' *Work Study* (October, 1966), p.8. As he noted in his article, Smyth had spent a week with Mr and Mrs Bedaux in Baghdad in 1938.

10 'Charles Eugene Bedaux: Background and Personal History' NARA, RG65, Box 113, 100-49901, 1-100 (series 1).

11 See his entry at <http://www.ellisland.org>; accessed 11 June 2014. Given that Bedaux would later claim that he had arrived in the USA with a single dollar in his pocket, it is worth noting that Ellis Island officials recorded he had more than \$50 in his possession. Albert Ramond, *Memoirs* (privately printed, 1974), p.263 recalled of 1906 that "Systems" were coming into their own when Bedaux came to the US in 1906 ... Frederick Taylor had come out with his *Scientific Management* a few years before. His *On The Art*

lived with relatives in New York from February to October 1906, then in Philadelphia from October to December. From December 1906, Bedaux worked at Mallinckrodt Chemical Works in St. Louis, Missouri, where he became an assistant auditor. Bedaux later claimed in an interview that

While I was in St. Louis I made a study in my spare time of the function of power plants. I soon found that engineers had assigned units of measurement to power of all sorts - fuel, water, electrical. Why, I wondered, couldn't a wholly scientific and mathematical measurement of man power be ascertained?¹²

Bedaux married and had one son, Charles Emile Bedaux, born in 1909. In December 1911, Bedaux senior returned to see his family in France. He returned to the USA in May 1912, later remembering this date as it was 'just a week (sic) after the TITANIC went down'.¹³

It is not clear what Bedaux did for the following eighteen months in the USA, but in autumn 1913 he returned to France with the French efficiency consultant A.M. Morinni who had visited the USA to investigate scientific management. Morinni took with him three Emerson engineers and Bedaux as a translator.¹⁴ Bedaux usually claimed that between then and mid-1914, while working for Morinni, he conducted factory surveys in fourteen different countries.¹⁵

After working for Morinni, Bedaux served as a private, then a corporal, in the French Foreign Legion from 24 August 1914 to 26 December 1914.¹⁶ Although Bedaux later claimed that he was invalided out of the legion due to a combat injury, he had, in fact received compulsory retirement for contracting bacillary hemoptysis.¹⁷

of Cutting Metals had brought him in the limelight, but it was his dissertation on better operating management and especially waste, waste of time, of labor, of materials etc. that had made Taylor "The Father of Scientific Management".¹

¹² 'What's Wrong with Bedaux?', *Liberty*, p.45.

¹³ 'Record of Hearing before a Board of Special Inquiry: Charles Eugene Bedaux', 23-29 December 1943, p.22, NARA, RG65, Box 114, 100-499091, 281-306 (series 4).

¹⁴ Charles W. Lytle, *Wage Incentive Methods: Their Selection, Installation and Operation* (New York: Ronald Press, 1942), p.224, n.1. Lytle lists the Emerson engineers as George Viel, J.S. Hecox and A.R. Decker.

¹⁵ It is telling to note that Morinni named his consultants *Engineers*, like Bedaux later would. See 'Preliminary Report. Austin Automobile Co. (1914) Ltd.', p.3, 1 June 1914, British Motor Industry Heritage Centre, Austin Motors, 80/84/31/76-AUS/31. In questioning by the FBI in 1943 he made the more modest claim of having conducted industrial work in France and Belgium in this period.

¹⁶ Dates confirmed by Colonel R.H. Van Deman of the Military Intelligence Branch to A. Bruce Bielaski, Department of Justice, 26 February 1918, NARA, RG65- MID correspondence (1917-41), 10505, 27.

¹⁷ Major Grimprel to Colonel R.H. van Deeman, 19 February 1918, NARA, RG65- MID correspondence (1917-41), 10505, 27.



Figure 3.1. Charles E. Bedaux in uniform in France, 1914.
Image courtesy of the International Bedaux Institute.

Bedaux returned to the USA and travelled to Grand Rapids, Michigan. The FBI later believed that he had travelled via New York but one contemporary newspaper claimed he did so via Petrograd, Siberia and Vancouver.¹⁸ What is known for certain is that he lodged patents for telephone recording devices in September and November 1916, and demonstrated one such device at a party he held for local businessmen.¹⁹ At this time, noting Bedaux's employment as an industrial advisor to factories and foreign nationality, the US war intelligence services suspected him of industrial espionage on behalf of Germany. This accusation was later shown to be based on lies by his father-in-law.²⁰ He was, however, engaged in deceptive activity. While in Grand Rapids in 1917, 'Lieutenant

¹⁸ John T. Bissell to General Strong, 8 January 1943, NARA, RG65, 100-49901, 1-100 (series 1). In contrast, see 'Blanche Allen Bedaux Seeks Wounded Husband' *Muskegon Chronicle*, 30 January 1917.

¹⁹ For the party, see 'Memorandum for Mr. Ladd', NARA, RG65, 100-49901, 1-100 (series 1). The patent applications (Nos. 1,259,591 and 1,291,731) were granted on 19 March 1918 and 21 January 1919 respectively.

²⁰ See 'Charles Eugene Bedaux: Background and Personal History' NARA, RG65, Box 113, 100-49901, 1-100 (series 1).

Bedaux', an 'engineer', applied for a major's commission in the US Army, basing his application on his 'actual experience of trench warfare'. To the dismay of local reporters, his application was turned down due to his lack of US citizenship.²¹ That year, Bedaux divorced his first wife, and married Fern Lombard, a Daughter of the American Revolution and practising Christian Scientist.²² Bedaux was naturalised as an American citizen on 18 September 1917.²³ As examined in chapter 2, it was from 1917 onwards that Bedaux developed Taylor's *unit-times* into the *Point*, then the *B*, and started winning large contracts for his system such as at Hood's, Kodak and G.E.

3.3. The Bedaux companies

In addition to his move from Cleveland to New York in 1921, Bedaux opened new consultancies, with him as the chairman of each. In April 1925 he opened north American subsidiaries in New York, with Douglas S. Keogh as President and Treasurer, and Illinois, with Albert Ramond as President and Treasurer.²⁴ This was followed by a company in the Pacific states, with Chas. W. English as President. In 1926, Bedaux established his first overseas company: a permanent Bedaux consultancy in Britain, of which he was Chairman and Sir Francis Rose Price was Director.²⁵ In 1928, the Charles E. Bedaux Company was renamed International Bedaux Company, Inc, which acted as a coordinating company between the Bedaux companies. Bedaux was Chairman of the Board, Royal B. Mudge its President and Treasurer, Frank R. Mead its Vice President and European Manager, and George Link, Jr its General Council, Vice-President and Secretary.²⁶

That year Bedaux established three more foreign Bedaux companies.²⁷ The first,

21 'Veteran of War Already but Commission to Fight Under U.S. Flag Denied' *Muskegon Chronicle*, 3 July 1917.

22 For information on the circumstances of the wedding, see 'Punctured Tire - Lo! Society Girl is Wed', *Grand Rapids Herald*, 3 July 1917. Around the same time Bedaux's friend L.B. Duez married Fern's elder sister Eve Hanley. Eve had a daughter, Betty, from a previous marriage. An interview with Betty Hanley about the Bedauxs' personal lives can be seen in *The Champagne Safari*.

23 Copy of *Certification of Naturalization*, held in NARA, RG65, Box 113, 100-49901, 1-100 (series 1).

24 *Personnel of the Chas. E. Bedaux Company* (c.1929) informs that an abortive Boston office closed in 1924.

25 A 1923 Kodak application had been cut short when the visiting Bedaux engineer, Emile Paissic, died. See *Personnel of the Chas. E. Bedaux Company* (c.1929), p.12 and Ramond, *Memoirs*.

26 International Bedaux Company, *Personnel of the Chas. E. Bedaux Company* (c.1929), p.3.

27 See Kipping, 'Consultancies, Institutions and the Diffusion of Taylorism'.

Società Italiana Bedaux, was chaired by Giovanni Agnelli of FIAT.²⁸ The second, Deutsche Bedaux-Gesellschaft, was chaired by the Willy Tischbein, also President of Continental Gutta Percha, the largest rubber company in Germany.²⁹ The third, Société Bedaux Suisse, was chaired by Bedaux's brother Daniel.³⁰ These were augmented in 1929 with Société Française Bedaux, of which Charles E. Bedaux was chairman.³¹ Finally, Australian Bedaux was created in 1929 by a license to US firm Looney and Anderson.³² The following tables indicate the level of staffing of each company that year, and how many clients each had:

Table 3.1. Numbers of Bedaux Engineers employed by each Bedaux company, c.1929

Company	Number of Bedaux engineers
Bedaux New York	31
Bedaux Illinois	25
Bedaux Pacific States	10
Chas. E. Bedaux Ltd. (Britain)	19
Società Italiana Bedaux	19
Deutsche Bedaux-Gesellschaft	16
Société Française Bedaux	2
Australian Bedaux Company	0 (new company)

Source: International Bedaux Company, *Personnel of the Chas. E. Bedaux Company* (c.1929)

28 International Bedaux, *Bedaux Measures Labor* (1928), p.21. Agnelli's biographer, Valerio Castronovo, *Giovanni Agnelli: La Fiat dal 1899 al 1945* (Torino: Einaudi, 1977), does not note this. For a study of how Bedaux operated at FIAT, see Stefano Musso, 'Production Methods and Industrial Relations at Fiat (1930-90)' in Haruhito Shiomi and Kazuo Wada (eds.), *Fordism Transformed: The Development of Production Methods in the Automobile Industry* (Oxford: Oxford University Press, 1995).

29 Ramond, *Memoirs*, p.191-2 recalled that the 'German business never grew like the British or French. For one thing the Germans thought they knew as much, or more than the Americans; for another, Hitler's national socialism was not favourable'.

30 Other than this, nothing is known about Daniel Bedaux.

31 The history of Société Française Bedaux has not yet been written, though traces of it exist. For example, see G. Matheron, 'Note sur l'Application du Système "Bedaux" dans les Travaux du fond de la Compagnie des Mines de Roche-a-Molière et Firminy' presented at the Sixth International Congress on Scientific Management, London, 15-20 July 1935. Matheron remarked that the system had been in use in the firm's mines for two years.

32 International Bedaux Company, *Personnel of the Chas. E. Bedaux Company* (c.1929), pp.10-11.

Table 3.2. Number of Bedaux clients in each territory, 1929

Territory	Number of Bedaux clients
USA	111
Italy	11
Britain	6
Germany	2
Canada	1
Czechoslovakia	1

Source: Chas. W. English client list, 1929. Held at IBI.

Bedaux established International Bedaux's headquarters on the 63rd floor of the recently-opened, and extremely prestigious, Chrysler Building.³³ His client lists had certainly grown substantially in number, to 132 clients worldwide, and his system, and the *B* specifically, was seriously discussed in technical journals and magazines.³⁴

33 International Bedaux Company, *Personnel of the Chas. E. Bedaux Company* (c.1929), p.4 lists International Bedaux as being located at 17 Battery Place, NY.

34 For example, see Charles Bedaux, 'The Bedaux System in Rubber Factories' *The India Rubber World*, 1 August 1926, 257-8; Virgil M. Palmer, 'Whatever the Job, We Pay for Accomplishment' *Factory*, July 1927, pp.46-8, 138-42; W.R. Hodgson, 'An Outline of the Bedaux Point System' *Cost and Management* Vol. 3, No. 11 (1928), pp.16-35; F.R. Baker, W.J. Burney, R.C. Grimm, E.J. Hanley, E.P. Learned, D.E. LeFlavour, F.W. Miller, P.W. Parsons, and W.D. Sleeper, 'The Point Plan for Industrial Control', *Harvard Business Review*, Vol. 6, No. 2 (1928), pp.219-230.

By 1932, the Bedaux client list and engineers employed had considerably expanded:

Table 3.3. Number of Bedaux companies, employees, and plants using Bedaux, 1918-31

Year	Number of Bedaux companies	Number of engineers employed	Plants Using Bedaux	Plants Under Application	Total Plants
1918	1	2	1	2	3
1924	2	19	70	15	85
1926	4	41	110	35	145
1928	7	94	161	72	233
1929	7	114	278	68	346
1930	9	176	399	81	480
1931	10	205	509	123	632

Source: *Bedaux Measures Labor* (1932)

However, despite the company's early American successes, Albert Ramond recalled that 'our US businesses suffered during the depression years, but the foreign companies and the company as a whole grew and prospered'.³⁵ In some cases, it did indeed: by 1932, Bedaux's company roster had been augmented by A.B. Nordisk Bedaux and Bedaux & Co. N.V.³⁶ Also by 1932, the International Bedaux Company of New York had joined the International Management Institute (IMI) in Geneva.³⁷

This is not to say that the Bedaux companies were without problems. Throughout the 1920s there had been US labour disputes over Bedaux. An early example was at William Rodgers in Niagara Falls, New York, in 1922, where the 'Bee [sic] system' had led to laying off sixty men. This led to a stoppage and dispute over layoffs which the

³⁵ Ramond, *Memoirs*, p.212.

³⁶ *Bedaux Measures Labor* (1932), p.21. Bedaux Suisse appears to have closed by this point.

³⁷ Frank Mead, Managing Director of Chas. E Bedaux Ltd. to International Management Institute, 12 March 1932, ILO, N400/0/4/1/25. For more on the IMI, see chapter 4.

management won.³⁸ Moreover, in depression-era France and Britain, the Bedaux system prompted a series of large and well-publicised strikes.³⁹

There were also negative developments in Germany. In 1933, the Nazi regime declared that patriotic German businessmen should have no need of a 'foreign product' like Bedaux.⁴⁰ This led to Deutsche Bedaux-Gesellschaft being unable to 'increase, or even maintain, its volume of business [in Germany] for a few years'.⁴¹ A similar process happened in Italy, where the unpopularity of the Bedaux system risked compromising Mussolini's promotion of Taylor and scientific management under the aegis of ENIOS from 1926 onwards.⁴² Surviving evidence suggests that the Italian regime either suppressed or nationalised the Bedaux system in early 1935.⁴³

Bedaux also faced increasing competition from other consultancies, particularly in Europe. Wallace Clark, another American industrial consultant, had set up offices in Paris, and had, at the very least, overhauled a Polish rolling stock company and consulted at Kodak France.⁴⁴ Moreover, Clark's services were being seriously considered by influential British manufacturers such as Rowntree's of York.⁴⁵ Also, with the founding of Urwick Orr & Partners (UOP) and Production-Engineering (P-E) in Britain in 1934, competition had

38 Details of the dispute can be found in Winterthur Library, Jewell Potter notebooks, Col. 110, 91x35.

39 For an examination of those strikes, see chapter 6.

40 See Anonymous, *Das Bedaux-System* (Berlin: Arbeitswissenschaftliches Institut der DAF, c.1937).

Christy's biography of Bedaux states that Bedaux's German company was seized completely. Given the other evidence deployed in this thesis, such as Ramond's *Memoirs*, this does not seem quite accurate.

41 Margaret Brownlow, *A History of Inbucon* (undated) p.45.

42 For comments on Mussolini's speech at the 1927 CIOS conference in Rome, see Erik Bloemen, 'The Movement for Scientific Management in Europe Between the Wars' in J-C Spender and Hugo Kline (eds.), *Scientific Management: Frederick Winslow Taylor's Gift To The World?* (New Jersey: Rutgers University Press, 1996), pp.116-117.

43 For material on ENIOS in 1932, see ILO archives, N400/1000/6/1. On the 1935 dispute at FIAT, see 'Application of the Bedaux System in the F.I.A.T. works, Italy. Collective labour dispute settled by the Collège Corporatif sur les Conciliations, Rome'. ILO archives, N400/0/4/2/34. For another account of the Bedaux system being disrupted in Italy in March 1935, see Maria Stella Rollandi, 'Il sistema Bedaux nelle miniere sarde della "Pertusola" (1927-1935)' *Studi Storici*, No. 26, Vol. 1, (1985), pp. 69-106. For a positive and detailed comparison of the Bedaux system with those of Taylor and many others, written by by Pertusola's General Inspector, see Paul Audibert, *General Considerations Upon the Rational Organization of Labour in Mines* (privately printed, c.1933). It is possible that this negative publicity was a cause of the renaming of the Taylor Society as the Society for the Advancement of Management in 1936.

44 For Clark's efforts in Warsaw, see IMI, *The Installation of Scientific Management in the Railway Car Plant of Messrs. Lilpop, Rau & Lowenstein, Warsaw, Poland* (Geneva: IMI, 1933). For more on Clark, see Kipping, 'American Management Consulting Companies in Western Europe', p.199.

45 During the depression, Rowntree considered 'calling in the services of an efficiency engineer of the type of Wallace Clark'. See Rowntree & Company organisation committee minutes, 6 October 1930. R/B3/4, BI. This is more significant than it may at first seem; as noted in chapter 5, Rowntree usually eschewed consultants of all kinds.

emerged in one of Bedaux's most successful markets, in the latter case in the expanding aeronautics industry.⁴⁶

Facing increasing competition in Europe and with some markets now closed to him, Bedaux looked further afield. That year Bedaux sent British Bedaux engineers to clients in India and South Africa.⁴⁷ He also jointly launched with Kodak, the 'Kodascope', a specialist camera and analysis system designed to measure work processes without the need for stopwatch time studies.⁴⁸ The product line necessitated forming a new company, Production Control Machines Corporation (PCMC), based in the Bedaux offices in the Chrysler Building.⁴⁹ This new product gained Bedaux additional publicity.⁵⁰

46 To distinguish their services from the Bedaux company, UOP offered a 'British Service for British Business' who claimed to consult with unions during their industrial assignments. See UOP, *Profit on Principle* (1934).

47 For a brief examination of the South African experience of Bedaux, which rightly observes the importance of race, see Jon Lewis, *Industrialisation and Trade Union Organisation in South Africa, 1924-55: the Rise and Fall of the South African Trades and Labour Council* (Cambridge: Cambridge University Press, 1984), pp.113-4. For brief accounts of the Bedaux system in use in interwar India, see Rajnarayan Chandavarkar, 'Workers' Resistance and the Rationalization of Work in Bombay Between the Wars' in Douglas E. Haynes and Gyan Prakash (eds), *Contesting Power: Resistance and Everyday Social Relations in India* (Berkeley and Los Angeles, University of California Press, 1992) and Anthony Cox, *Empire, Industry and Class: The Imperial Nexus of Jute, 1840-1940* (London: Routledge, 2013).

48 The patent application (No. 2017,142) had been filed on 10 May 1933.

49 There is little evidence that the company did any business. See untitled, c.1943 list of Bedaux companies, NARA, RG65, Box 113, 105-188 (series 2), where it is noted that PCMC 'has been operating at a loss for the last three years, being kept solvent by funds given to it by the International Bedaux Company, Inc'. 'Background and Personal History' NARA, RG65, Box 113, 100-49901, 1-100 (series 1) also notes that Bedaux was, at some point, Secretary and Treasurer of the 500 Fort Washington Avenue Corporation, although I was unable to discover anything about this company.

50 'New Type of Camera Analyzes Work' *New York Times*, 21 September 1934, p.25; 'Motion Movies', *Business Week* Vol. 29 (1934), pp.8-9; 'Movies Analyze Industrial Operations', *The Scientific American* Vol. 151 (1934), p.310.

By 1937, Bedaux's companies had acquired much business in many countries, and his consultancies in the capitalist democracies had fared the best:

Table 3.4. Numbers of Bedaux clients in all territories, 1937

Total	1,126
USA	500
Britain	225
France	144
Italy	49
Holland	39
Germany	25
Canada	25
Belgium	22
Australia	17
Finland	11
Czechoslovakia	11
Others	58

Source: Philippe Laloux, *Le Système Bedaux: de Calcul des Salaires* (Paris: Hommes et Techniques, 1950), p.11

Much of Bedaux's business had been built on his superb salesmanship and networking abilities. It is therefore appropriate to examine how Bedaux's personal and public life strongly influenced his companies' stance toward him.

3.4. Charles E. Bedaux, 1925-36

At the time of his establishment of his new US companies in 1925, Bedaux had begun to move in higher social circles. Using his recently-acquired wealth, Bedaux acquired much property, later estimating that at one time he had properties in twenty-four American states.⁵¹ In 1927, Bedaux bought and renovated the Château de Candé, a Renaissance

⁵¹ In 'Record of Hearing before a Board of Special Inquiry: Charles Eugene Bedaux', 23-29 December 1943, 23-29 December 1943, p. 2, NARA, RG65, Box 114, 100-499091, 281-306 (series 4), p.29, Bedaux claimed that in 1925 he bought a New York apartment at 1120 Fifth Avenue. He also claimed to have rented Ricehope ranch at Midway, South Carolina in 1933.

castle in the Loire Valley which he used as his social and business base from then on.⁵²

Figure 3.2. Château de Candé



Source: author's photograph, May 2013

From November 1929 to May 1930 Bedaux and a group of big game hunters motored across the Sahara from Mombasa to Casablanca, a trip which earned Bedaux his first feature in the *New York Times*.⁵³ Throughout the early 1930s, Bedaux became a well-known socialite, womaniser, big game hunter, and adventurer. With his businesses expanding, he also became extremely rich. Ramond recalled that

As a US citizen residing in a foreign country, Bedaux managed to pay very little

⁵² In 1928 Bedaux installed a customised Skinner pipe organ at Candé. For its specifications, see <http://aeolianskinner.organsociety.org/Specs/Op00718.html>; accessed 11 June 2013. By 1934 Skinner Organ Co. was a Bedaux client. See *Representative List of Clients*, p.6.

⁵³ 'Back After Driving Cars Across Africa' *New York Times*, 20 May 1930.

taxes anywhere. Link (the company's lawyer) said that he probably was one of the US citizens with the highest net income in those years.⁵⁴

Bedaux later claimed to have rented apartments at the Plaza and Ritz in New York and Claridge's in London.⁵⁵ He also bought land in British Columbia and commissioned a ranch, named the Empire Ranch.⁵⁶ Bedaux joined the Cloud Club, the Union Club, and the Ardsley Country Club.⁵⁷ Accompanied by his wife, explorers, hunters, aspiring actors, central European aristocrats, and servants, Bedaux travelled across Africa, Canada, India, Europe and the South Seas. Particularly notable was his failed attempt to cross the Rockies of British Columbia in 1934.⁵⁸ Sponsored by André Citroën and launched by Bedaux at a press conference at the Cloud Club, the failure of the Bedaux expedition led to its overshadowing by Citroën's successful trips across Africa and China.⁵⁹

54 Ramond, *Memoirs*, p.212. 'Memorandum for Mr. Ladd', p.4, NARA, RG65, Box 113, 100-49901, 1-100 (series 1), states that Bedaux's income was as follows: 1930 (\$36,000 salary as chairman of International Bedaux Company, \$8,250 in dividends and \$74,250 in dividends to Mrs Bedaux), 1931 (\$36,000 salary, \$35,000 dividends, and \$70,000 to his wife), 1932 (\$10,000 salary, \$1,780 dividends, and \$16,000 to his wife), 1933 (\$6,000 salary, and no income for his wife), 1934 (\$30,000 salary), 1935 (\$1,312 salary from PCMC). By this point, Bedaux was being pursued for back taxes. The *New York Times* of 5 October 1933 recorded that in 1933 Bedaux petitioned Board of Tax appeals to overturn a demand for \$48,976.69 in income tax for 1929, claiming that Internal Revenue had failed to deduct 'from taxable income the loss of \$357,769 on the sale of the Château de Candé in France, which was purchased for \$606,506'. See 'Ask Federal Tax Cut on Chateau Sale Loss', *New York Times*, 5 October 1933.

55 'Record of Hearing before a Board of Special Inquiry: Charles Eugene Bedaux', 23-29 December 1943, p. 28, NARA, FBI case files, RG65, Box 114, 100-499091, 281-306 (series 4).

56 Jay Sherwood (ed.) and Bob White, *Bannock and Beans: A Cowboy's Account of the Bedaux Expedition* (Victoria: Royal BC Museum, 2010), pp.133-9.

57 'Background and Personal History' NARA, RG65, Box 113, 100-49901, 1-100 (series 1).

58 For a sense of the publicity surrounding the trip, see 'Sub-Arctic Trip Planned' *New York Times*, 19 March 1934, 'Tractor Explorers Off' *New York Times*, 26 May 1934, and 'Bedaux Expedition to Give Up Tractors' *New York Times*, 19 August 1934. The best account of the trip is *The Champagne Safari* [Film] Directed by George Ungar. Canada: Field Seven Films and National Film Board of Canada; 1995. See also Pierre Barton, *My Country: The Remarkable Past* (Toronto: McClelland and Stewart, 1976), chapter 13. The most recent account, which used new primary source material, is White and Sherwood, *Bannock and Beans*.

59 The other two trips sponsored by Citroën were *La Croisière Noire* (1924-5) and *La Croisière Jaune* (1931-2), which travelled across Africa and China respectively. Unlike the Bedaux expedition, these films were produced and released. The film reels of Bedaux's expedition, held at LAC, are still labelled *La Croisière Blanche* ('The White Cruise'). Perhaps related, Bedaux also lodged a patent application in 1933 for a kind of automobile hatch which could be converted between a step and a air-tight door. The patent application (No. 2,001,863) was lodged on 27 April 1933 and granted on 21 May 1935.



Figure 3.3. Charles E. Bedaux, c.1934.
Image courtesy of the International Bedaux Institute.

Bedaux had a tendency to intervene personally, and publicly, in issues which his directors were far more wary about. Due to the ongoing complaints about the Bedaux system in Italy during the depression, but Mussolini's public favour of Taylor and statements about how patriotic Italian workers should be interested in work efficiency, the Italian regime and the fascist workers' syndicate either banned or suppressed the Bedaux system, in name at least.⁶⁰ Bedaux was upset by these developments, and responded in a newspaper article that

The Bedaux System, which is being applied at present in industries and commerce of twenty-three nations, is not a wage system. It is a system of control of human physical activity, based on a unit of measurement, which, if rightly applied, must give exact practical results ... In Italy, by official decision of February 22nd, 1935, this control system by means of the unit of measurement has been adopted at the request of the labor unions.

He suggested that as Italy was 'enjoying the strongest and most compact unity under a

⁶⁰ For the full speech, and much other material about the controversy over Bedaux in Italy, see the file contained in ILO archives, N400/0/4/1/34.

single great Chief' it could rise 'spontaneously, by a unified national movement, from thirty-five to seventy-five hour units'. This was compared to the forty hour units achieved by the US private enterprise system, which lacked state direction: 'We [Americans] should require two centuries what the [US] Government could do in two years'. He concluded that he was aware that he was advising against his own counsel, but in the face of the 'truly magnificent achievement of Fascist Italy personal interests take second place'.⁶¹

Despite the growth of his companies and their client lists - he claimed 850 client firms in 22 countries by this point - obtaining and satisfying the Bedaux system's biggest clients still relied on Bedaux's personal efforts.⁶² Having personally instituted the Bedaux system at the massive APOC plant at Abadan, Bedaux travelled through Tibet to Bombay from June to August 1935.⁶³ Interviewed by the *Times of India*, Bedaux, 'one of the world's leading industrial engineers', declared that his system could be used to tap the vast quantities of labour potential in the country's population.⁶⁴ Bedaux then visited Moscow in January 1936 under Intourist to

Acquaint the Soviet government with the details of his method of measuring human performance in industrial processes and to visit Soviet industries in order to acquaint himself with the extent to which scientific methods were being applied in the present campaign for increased labor productivity.

Following an interview with the chief of the foreign division of the Commissariat for Heavy Industry, Bedaux was informed that

the Soviet Union was not only not interested in his method, but that it felt that he might find it advisable to leave the country at once ... during his stay he [Bedaux] has not been allowed to see even those industrial enterprises which tourists are usually permitted to visit.⁶⁵

The Secretary of State in Washington was informed that Bedaux

Expects publicly to announce following his departure that the Soviet Union was unwilling to permit him to visit plants because it did not desire an expert to see the

61 Charles E. Bedaux 'The Bedaux System' *Corriere della Sera*, 8 June 1935.

62 Numbers quoted in 'Charles E. Bedaux's address to the Personnel Research Federation', 25 January 1935. Held at NYPL.

63 For more on Bedaux and APOC, see Matthias Kipping, 'Consultancy and Conflicts: Bedaux at Lukens Steel and the Anglo-Iranian Oil Company' *Entreprises et Histoire* Vol. 25 (2000), pp.9-25.

64 'How The Bedaux System Works: Inventor Interviewed' *The Times of India*, 17 August 1935.

65 'Charles Eugene Bedaux: Background and Personal History' NARA, RG65, Box 113, 100-49901, 1-100 (series 1).

shortcomings of labor organization and the faults of the Stakhanov.⁶⁶

Bedaux then travelled to Berlin to attempt to court the regime for new business, again unsuccessfully.⁶⁷ Even so, Bedaux's overtures to the German regime had started to embarrass his British directors.⁶⁸ Moreover, the Bedaux system's American roots and confusing *B* units had long laid it open to accusations of 'jargon' and 'Yankee salesmanship'.⁶⁹ Not only that; it had made Bedaux a figure of fun: Chaplin's *Modern Times* (1936) featured a 'Billowes feeding machine', designed by a crackpot inventor to cut out the need for meal breaks by automatically feeding workers on the production line.⁷⁰ In an attempt to rectify these issues, the Chas. E. Bedaux company of Britain was renamed British Bedaux Ltd. in 1936 and went public with a capital of £300,000 and 1,200,000 5s shares.⁷¹ 'Many of the new shareholders were directors of client companies and people on the Company's own staff'.⁷² The next section examines how Bedaux Britain developed, and its range of operations in 1920s and 1930s Britain.

3.5. British Bedaux Ltd.

Bedaux was one of, if not the first, work measurement consultancy to offer such a service in Britain.⁷³ Colwell Carney, one of the first American Bedaux consultants to work in Britain, remarked that in the 1920s it was extremely unusual for a British business to open its

66 Henderson to Secretary of State, 16 January 1936. Available at <http://www.fold3.com/image/38299462>; accessed 11 June 2014

67 George Stauss, *Some Memories in Three Parts* (privately printed, 1998), p.25 recalled meeting Mr and Mrs Bedaux at a dinner party in Berlin in late January 1936.

68 Brownlow, *History of Inbucon*, p.45.

69 One APOC General Manager reported that 'One of the most notable effects of discussions with Mr Bedaux is that, on reading again the Reports, phrases which one had been apt to set down at first as 'jargon' or as smacking of Yankee salesmanship acquired real meaning. The terminology is a weakness in the Reports which may have made people suspect Bedaux of wrapping up in unnecessary complications what are really quite simple conceptions. The fault is superficial and in my opinion unintentional.' See 'Bedaux System' MRC, BP Archive, ARC53897.

70 Guillén, *Models of Management*, p.57, n.57. Charles Chaplin, *My Autobiography* (London: The Bodley Head, 1964), pp.226, 415 claimed that he had the idea of the feeding machine in 1916, having heard about the 'factory-belt system' in Detroit.

71 'Bedaux System' *News Review*, 11 November 1937, pp.11-12.

72 Brownlow, *History of Inbucon*, p.45.

73 As Michael Rowlinson, 'Cadbury's New Factory System: 1879-1919' (PhD thesis, Aston University, 1987) and Vaughn White, 'A Historical Study of the Role of Cost Accounting on Performance in the UK Confectionery Market: The Experience of Cadbury and Rowntree 1919-38' (PhD thesis, York University, 2014) have noted, Cadbury employed two consultants in the 1910s: Suffern & Son and Herbert Casson. It is not clear, however, whether either consultancy instituted a *unit-times* based system of work measurement at Bournville.

doors to consultants. Moreover, unlike in the USA and continental Europe, there were no other consultancies in meaningful operation:

Competition between consulting firms in the United Kingdom at this time was virtually unknown. There was some work being done by the National Institute of Industrial Psychology. On the Continent Wallace Clark operated a few assignments and had one part time in England. Otherwise the area was entirely open.⁷⁴

Sir Francis Rose Price was the firm's chairman.⁷⁵ The board consisted of Bedaux, Rose Price, plus Keogh, Mead and Mudge of International Bedaux. The remaining two positions on the board were filled by the Earl of Verulam and Frederick Plutte, both of Enfield Cable Works.⁷⁶ They hired their first British Bedaux engineer, Norman Fleming, on 1 February 1927.⁷⁷

Verulam offers insights into what a self-defined modernist British industrialist believed the Bedaux system could do.⁷⁸ An old-money aristocrat with an electrical engineering degree, Verulam had first heard of Bedaux while visiting the Continental Gutta Percha rubber factory in Hannover. Here, a Bedaux Engineer informed him that his Bedaux comparison of German and American workers demonstrated that German workers turned out one third of the work of their American counterparts, and correspondingly received one third of the pay. Verulam stated in August 1927 that

I have been lately studying the Bedeau (I am not quite certain how the name is spelt) System, which is an American system, which aims at effecting the three desired objects of, increasing workmen's pay, increasing the profits of the Company for which they work, and reducing the costs of manufacture.

I am informed that whilst in England no bricklayer trades unionist is allowed to lay more than 470 bricks a day, or something like that, in America a man cannot get into the bricklayers' trades union unless he can show that he can lay 1600 bricks a day.

⁷⁴ Brownlow, *History of Inbucon*, pp.9-10.

⁷⁵ Kipping, 'American Management Consulting Companies', p.200.

⁷⁶ International Bedaux Company, *Personnel of the Chas. E. Bedaux Company* (c.1929), p.32. Verulam was so impressed with Bedaux's operation at Enfield Cables that he replaced Sir Francis Rose as the non-executive board member in 1932.

⁷⁷ Kipping, 'American Management Consulting Companies', p.200. Kipping records that, following termination, Bedaux engineers were forbidden from using the Bedaux name or methods, and seeking employment with any of Bedaux's clients for two years.

⁷⁸ Son of the MP for St. Alban's, also James Walter Grimston, the Third of Earl Verulam (1880-1949) attended Eton, then Oxford. He subsequently attended UCL, where he graduated with a BSc in Electrical Engineering in 1905. He returned to British Thomson-Houston (BTH) in Rugby and was employed as 'Mr James Grimston' to gain experience in various factory jobs. He founded Enfield Cables in 1913, became Director of BTH, and was on the board of Imperial Airways. Both his son, John Grimston, and his nephew, Robert V. Grimston, were Conservative MPs, the former for Westbury from 1931-64, and the latter for St. Albans from 1943-5 and 1950-9.

The Bedeau System sets out to measure the human effort in each operation and to convert the workman to the view that until he is producing so many Bedeau units of effort he is not worth full pay. The Bedeau System is already established in Germany in a few works. Preliminary studies have been made in several other European countries. The result has been that the following generalised figures of output have been found to be of universal application:

- ✧ In factories where all work is paid by time work only, the average output per man is found to be in the neighbourhood of 35 Bedeau units.
- ✧ Where piece work only or both systems are in force the output is found to be in the neighbourhood of 50 Bedeau units.

The Bedeau organisation claim that, wherever they have established their system, they have raised the output to 80 Bedeau units per man.⁷⁹

Verulam was clearly impressed. By November 1927 the Bedaux Engineers had entered the Enfield works and soon five hundred Enfield workers were working under Bedaux.⁸⁰

Electrical engineering was only one sector in which the Bedaux system was applied in Britain. The following table shows the sectors in which the Bedaux system was introduced by the Bedaux consultancy:

⁷⁹ Verulam to G.H. Osborne, 8 August 1927, HALS, DE/V F1445.

⁸⁰ Littler, 'Bureaucratization of the Shop-Floor', volume 2. I was unable to locate Enfield Cable's archives, so could not examine whether Bedaux's deployment at Enfield was distinctive in any way.

Table 3.5. Sectors of firms employing the Bedaux consultancy

Trade group	Number of firms using the Bedaux consultancy (1926-1939)
Food, Drink and Tobacco	22
Chemical and Allied Trades	26
Coal and Petroleum	3
Metal Manufacture	18
Mechanical Engineering	10
Electrical Engineering	9
Motor Vehicle Components	8
Textiles	36
Services/Distribution	11
Other	35
Total	178

These figures are consultations conducted strictly by British Bedaux/AIC, and do not represent all British firms using work measurement methods.

Source: Kreis, 'Diffusion of an Idea', p.344.

Table 3.6. Size of firms employing the Bedaux consultancy

Number of employees	1926-39 (number)	1926-39 (percentage)
0-100	5	4.3
100-250	19	15.8
250-500	37	30.8
500-750	21	17.5
750-1,000	9	7.5
1,000-2,000	16	13.3
2,000-5,000	6	5.0
Over 5,000	7	5.8
Total	120	100

These figures are consultations conducted strictly by British Bedaux/AIC, and do not represent all British firms using work measurement methods.

Source: Kreis, 'Diffusion of an Idea', p.339.

As in other countries, and with other methods of work measurement, positive relations with trade unions were extremely beneficial to the smooth introduction of the Bedaux system. Some firms, such as ICI, embarked upon extensive union consultation and research before implementing Bedaux.⁸¹ As with C.H. Northcott at Rowntree's, examined in chapter 4, the presence of a dedicated personnel or labour manager, in ICI's case Richard Lloyd-Roberts, was usually helpful in introducing work measurement systems like Bedaux as they were able to act as brokers between unions and management.⁸² At ICI in 1931-2 this

⁸¹ The Bedaux story is absent from the company's official history, *ICI: A History*. For accounts of the extensive use of the Bedaux system at ICI, see Joseph Faraday, *The Story of Work Study in Imperial Chemical Industries* (privately printed, 1961). Kreis, 'Diffusion of an Idea', p.369 states that by the 1930s, there were Bedaux engineers at 20 ICI factories, which were part of 5 ICI Divisions (Metals, Limes, Synthetics and Fertilizers, Nobel and Alkali). Bedaux was installed at DuPont at the same time. See John C. Rumm, 'Scientific Management and Industrial Engineering at Du Pont' in Nelson (ed), *Mental Revolution*.

⁸² Lloyd Roberts was appointed Chief Labour Officer of ICI in 1927. He had previously been a civil servant in the Post Office and Labour Exchanges, and was appointed Brunner, Mond's Chief Labour Officer in

meant negotiating the installation of the Bedaux system with contemporaneously well-known figures such as Harry McGowan and Lloyd-Roberts of ICI and Ernest Bevin of the TGWU.⁸³

As the Bedaux company and its methods consolidated throughout the 1930s, so did formal recruitment and training programmes. Perhaps with the exception of Charles E. Bedaux, the majority of early Bedaux consultants were university-educated male engineers.⁸⁴ In a careers advertisement in 1936, the Bedaux company stressed that it wished to recruit engineers, ideally university graduates, but 'no application is considered for a moment if the engineer has not had adequate works experience'.⁸⁵ This changed over time, and as the 1930s wore on, the Bedaux and similar systems was run by technicians and costing clerks with technical school training.⁸⁶ Some companies and unions developed their own in-house literature and pamphlets on the Bedaux system, and distributed them to their workforces.⁸⁷

3.6. The Bedaux system on the British factory floor

Bedaux developed a whole lexicon around his system and company, as did other firms instituting work measurement systems based on the *B*, examined in chapter 4. Even so, the *B* was the best known work measurement unit in Britain. His early 1930s advertising material, Bedaux described his principle thus:

The Bedaux principle of human power measurement is that all human effort is measurable in terms of a common unit made up of effort and relaxation in proportions governed by laws controlling strain ... The Bedaux Unit, or *B*, is a fraction of a minute of work plus a fraction of a minute of rest, always aggregating

1916. W.J. Reader, *Imperial Chemicals Industries: A History* (London, New York and Toronto: Oxford University Press, 1975), p.60.

83 For these negotiations, and the individuals involved in them, see Glasgow University archives, Lord Weir papers, DC96/10/4a. For the factory floor interpretation of Bedaux at ICI, see chapter 6.

84 For some of the backgrounds of Bedaux engineers, see Ferguson, *Rise of Management Consulting in Britain*, chapters 3 and 4. Brownlow, *History of Inbucon*, p.39 recorded that 'The most notable Bedaux pioneers were civil engineers, but mechanical, electrical and mining engineers were successful too'.

85 'Careers in Industrial Management. What are Bedaux Engineers?' *The Journal of Careers* (July-August, 1936), pp.417-20.

86 Hardwick, *Time Study in Treason*, pp.102-3 claimed that the replacement of university graduates with technical staff between 1928 and 1939, and thus the alleged lowering of the mathematical ability applied to the system, was responsible for many of Britain's industrial disputes in the 1970s.

87 For example, see Hayes Cocoa, *The Bedaux Method*, 16 October 1931, NA, LAB 11/1611.

unity, but varying in proportions according to the strain.⁸⁸

The Bedaux firm's distinctive logo, depicting an egg timer stamped with the Bedaux *B* was printed onto Bedaux stationery materials, which were distributed to clients for daily use.⁸⁹ Supposedly he even 'advertised his firm in neon lights'.⁹⁰ As a consequence, workers and managers sometimes found the *B* too jargonistic and attempted to neutralise it by changing its terminology.⁹¹ This renaming process did not always work immediately. At ICI's Dyestuffs works at Blackley, management were determined to indicate that they were using something different from Bedaux even though this was precisely what they were doing. Therefore, it

should not be regarded as a 'Bedaux' application, and so there was no formal approach to the craft unions because of their known prejudice to anything concerned with that particular system. To avoid the use of 'B's and 'B-hours', the individual performances of applied operators were expressed as:

$$\frac{\text{Allowed Minutes} \times 100}{\text{Actual Time (minutes)}} = \% \text{ efficiency}$$

and each one percent efficiency above 100 gave the bonus percentage. Notwithstanding the intentions of management, the hourly paid workers persisted in referring to the scheme as 'Bedaux'. This was perhaps not altogether surprising since the Bedaux engineer was well known from his two years association with the process work application; and for everything he published in connection with the engineering scheme, bulletins of values, etc. he continued to use the customary Bedaux Company stationery.⁹²

One of the more sophisticated changes to the Bedaux system at this time was to ensure that time studies and other visible Bedaux activity on the factory floor were kept to a minimum. One way to achieve this was to make sure that the majority of the labour efficiency and costing calculations were done mentally, or in an office removed from the factory floor. This was certainly possible. Addressing senior APOC figures in June 1935, Charles E. Bedaux claimed to be able to calculate the cost in *Bs* of construction jobs just by examining the architect's plans. The APOC managers who listened to Bedaux's speech

88 *Bedaux Measures Labor*, 1928 and 1932 editions.

89 Faraday, *Story of Work Study*, p.16.

90 Tisdall, *Agents of Change*, p.8.

91 As noted above, this happened in the USA and Italy too. It also happened in Czechoslovakia, where, by 1935, the Bedaux system was renamed the *Mzdovy* [payroll] *System*. See 'Bedaux System/Mzdovy System', ILO archives, N400/0/4/1.

92 Faraday, *Story of Work Study*, pp.15-16

were impressed and saw no reason why Bedaux's claim should not be true.⁹³

Chapter 2 has noted the kinds of synthetic work measurement data with which Bedaux innovated throughout the 1930s. One method used in Britain to make the system less intrusive to the workforce and cheaper to run, was to use synthetic times whereby a sample of work was examined, and standard times and *B* values calculated from the data. These general claims are indeed supported by contemporary evidence. One contemporary Bedaux source reported that synthetic times allowed for more sophisticated analyses than time study alone:

First of all we started with Time Study. The process was to take a number of studies and, after averaging them, a factor for rest was added and so a work value was established. As time progressed the engineer began to realise that there were other ways to save time and in consequence the semi-synthetic set-up was born. Later, the need arose for still greater progress and the fully synthetic set-ups were developed and values could be computed without the taking of further studies of the operation.⁹⁴

B values could be interpolated from related types of work. As a 'Bedaux expert' put it:

For example, in polishing the tops of tables, where the firm may make 100 different sizes, it is not necessary to study each and every size. We study a small, a medium and a large, and plot the results in curve form. If the curve shows that the law for this operation is a fixed time for walking to the job and getting your tools and materials plus so much per square foot, then you can evidently draw up a unit value sheet for tables of all sizes, with a certainty that they are accurate. So that the length of time we have to worry say one person with time study is often very short, and we endeavour to make it as little disagreeable as possible.⁹⁵

One employee at Hoffman's recalled that synthetic times could be beneficial or detrimental to trust in the Bedaux system, depending on who thought the amounts were fair:

These times have the advantage of consistency and consistent standard times give a work force confidence in the integrity of the management and the credibility of the system. Yet it was the synthetic standards that raised doubt and suspicion in the minds of the operators. In the thirties there was not the same degree of discussion and participation between management and workers that was common to post-war industrial relations. Bedaux engineers did not explain to the operators time study processes nor did they reveal to them the routines for calculating standard times from synthetic data. Therefore, while the operator could accept the results from the time study observers with their stopwatches and study boards, they were extremely sceptical about the masses of standard production times that were calculated from synthetic data and flowed from the office. The belief that was generally held was of

⁹³ 'Bedaux System' MRC, BP Archive, ARC53897.

⁹⁴ AIC, *Material Control Reference Book* (London: AIC, 1947), p.63.

⁹⁵ Debate on mechanisation and rationalisation which took place at the New Fabian Research Bureau (NFRB), 9-10 May 1936. LSE, Fabian Society archives, Fabian Society/J/15/8. For more on the history of synthetic times, see Brech, *Productivity in Perspective*, Appendix II.

a huge graph from which the Bedaux engineers could read all standard production times.⁹⁶

Events were soon to occur that ensured that the Bedaux name would be actively, and permanently, removed from his companies and his system.

Contemporary reports suggest that the Bedaux system worked, at least according to its own parameters of success; insofar as it was used to increase operator efficiency, boost operator earnings, and reduce working hours.⁹⁷ The following table contains the data from one 1938 survey, which reported very favourable results of the use of the Bedaux system in British manufacturing:

⁹⁶ Hardwick, *Time Study in Treason*, p.106 recorded that when the Bedaux system was in operation at Hoffman's, it required between fifteen and twenty time study men, and two young female graduates as calculators.

⁹⁷ For the elaborate bureaucracy involved in maintaining the Bedaux system, see Kreis, 'Diffusion of an Idea', pp.316-7.

Table 3.7. The positive effects of the Bedaux system in 15 factories

Firm type	Number of employees	Reduction in labour cost (%)	Increase in operator productivity (%)	Increase in operator earnings (%)
Dairy company: bottle discs, couplets etc	150	24.5	33	12.5
Chocolate, confectionary and tea	3,000	17	57	24
Patent food and condensed milk warehouse	120	32	90	20
Fruit preserving	600	40	100	15
Cocoa and chocolate	1,050	21.9	49	16
Biscuits (1)	230	20-48.5	53-120	21.33
Biscuits (2)	3,000	21.6	64	12.5-30
Chocolate and confectionary	2,100	31.5	52.7	7
Confectionary	476	15.5	48	25
Cardboard boxes (1)	130	25.7	49.1	12
Cardboard boxes (2)	208	22	60	30
Mail order house and office	200	36	71	9.5
Packing cases and packets	60	35	185	20
Preserved foods	1,000	20	78	18
Plywood barrels, tinfoil, collapsible tubes	1,100	26.4	77.5	14.6

Source: 'Bedaux', *Shelf Appeal* (April, 1938), pp.2-8.

These increases in operator productivity were in line with other contemporary installations of the Bedaux system in Britain for which thorough records have survived.⁹⁸ Evidence suggests that only a few applications of the Bedaux system were successfully rejected by

⁹⁸ Dundee University, Don Bros., MS 100/1/12/4, from 1933-8 workers on Bedaux achieved, on average, an output of between 80 and 100 Bs. At BX in 1936, workers were achieving between 70 and 80Bs. See BX SRO, BX archives, HC410/F4/1. Kreis, 'Diffusion of an Idea', pp.377-8 notes the Bedaux system in use at Azo Shed No.2, ICI Dyestuffs Group, increased worker productivity by 120%, earnings by 28%, and reduced labour costs by more than 40%, leading to ICI saving £1,600 per year. Richard Coopey, Sean O'Connell, and Dilwyn Porter, *Mail Order Retailing in Britain: A Business and Social History* (Oxford: Oxford University Press, 2005), pp.153 notes that the introduction of the Bedaux system at Empire Stores reduced working hours, increased worker pay, and reduced operating costs.

the workforce altogether.⁹⁹ The ways in which workers and trade unions interacted with the Bedaux system are examined in chapter 6. The next section examines why the Bedaux name became particularly controversial in 1937.

3.7. Bedaux and the Duke of Windsor controversy

Much of Bedaux's time in 1937 was taken up with the wedding of the former King Edward VIII and associated tours.¹⁰⁰ Bedaux's claim that he hosted the wedding because, as he put it 'I love Romance', should certainly not be taken at face value. Bedaux's condition for hosting the wedding was that it should be advertised as taking place at his château

For I am a hard-working business man and in these critical times, if the erroneous thought were to penetrate the public that we rented Candé for the purpose intended, it would be sure to have a disastrous effect on my business career.¹⁰¹

Ramond, Bedaux's second-in-command in New York, recalled that Bedaux, presently residing in a hired chalet at Berchtesgaden, did not host the couple out of the goodness of his heart.¹⁰² When Ramond arrived at Berchtesgaden and asked Bedaux why he was so interested in helping the couple, Bedaux 'told of his plans for getting to the very top socially, via the Duke and Duchess. He said he would make so much more money, too'. Bedaux continued: 'Mr Ramond, money is the only thing that really matters to me. With money I can have everything, women and everything'.¹⁰³

Simpson arrived at Candé on 9 March, guarded by police and under close scrutiny from the press.¹⁰⁴ Carefully monitored by the highest level of the British Foreign Office, the

⁹⁹ For the strike over Bedaux at Rover in Coventry, see Laura Lee Downs, 'Industrial Decline, Rationalization and Equal Pay: The Bedaux Strike at Rover Automobile Company' *Social History* Vol. 15, No. 1 (1990), pp.45-72. For the generally successful blocking of the Bedaux system at Morton Sundour Fabrics in early 1932, see chapter 4.

¹⁰⁰ Bedaux appointed Ramond President of the International Bedaux Company on 8 February 1937. The contract is contained in his memoir, pp.216-7.

¹⁰¹ Quoted in Ziegler, *King Edward VIII*, p.363. On p.387 Ziegler somewhat overstates the level of business which Bedaux had in Germany. For these claims, Ziegler cites the Royal Archives, which are not open to the public. I contacted the Royal Archivist in March 2014 to request access but received a response on 27 March 2014 reporting that 'while we do have some relevant material, it all dates from 1937 onwards, and, regrettably, this means that we cannot give you access to it, as our rules preclude those working towards any academic qualification consulting any material later than 1935'.

¹⁰² That Bedaux rented a villa at Berchtesgaden is confirmed by his testimony In 'Record of Hearing before a Board of Special Inquiry: Charles Eugene Bedaux', 23-29 December 1943, p, 39, NARA, FBI case files, RG65, Box 114, 100-499091, 281-306 (series 4).

¹⁰³ Ramond, *Memoirs*, p.218.

¹⁰⁴ 'Wallis' Party at Chateau Near Tours' *Baltimore Sun*, 10 March 1937. For a discussion of the castle and its decor, see 'Château De Candé' *Life*, 12 April 1937.

Duke arrived in early May.¹⁰⁵ The *Baltimore Sun* reported that the Bedauxs had travelled from Berchtesgaden, where 'Chancellor Adolf Hitler, of Germany, has his summer home', to be there.¹⁰⁶ The wedding took place on 3 June, with medieval decorations and flowers throughout the castle designed to be reminiscent of a romantic medieval past. When the celebrity photographer Cecil Beaton arrived, 'swarms of journalists and their vans and motorcycles waited outside the gates.' Upon arrival, Beaton was unimpressed by the decor, such as the 'bogus Renaissance carving' used as an altar, and the fact that 'nowhere in the chateau was there a crucifix' to place upon it.¹⁰⁷ As a wedding gift, Bedaux presented the couple with an abstract wooden statuette, *Der Kuss* ('The Kiss'), which had been made by the German sculptor Annie Hoefken-Hempel at a cost of 10,000 francs.¹⁰⁸ The event captured the imagination of the world's press and was headline news in many newspapers and newsreels.¹⁰⁹

Bedaux then arranged their honeymoon at Borsodivanka Castle in Hungary, which was 'guarded by a strong squad of police' although Bedaux had to order the ejection of one reporter who had crept in and was spotted by the Duke.¹¹⁰ The medieval theme of the wedding continued, with servants in coloured livery and local peasants encouraged by marching drummers and town criers to 'wear their most picturesque costumes and keep their farmyards clean' during the couple's visit. For the official photographers, Bedaux and the Duke wore Tyrolean peasant costumes which 'loyal Hungarians were none too pleased' about.¹¹¹ There were even rumours that Bedaux had equipped the castle with gold

¹⁰⁵Ziegler, *King Edward VIII*, pp.362-363 remarked that King George VI 'thought that a castle in Touraine sounded a far more suitable place for his brother's marriage than a villa near Cannes'.

¹⁰⁶'Duke's Friends Fly to Tours From London' *Baltimore Sun*, 10 May 1937.

¹⁰⁷Cecil Beaton, *The Wandering Years. Diaries: 1922-1939* (London: Weidenfeld and Nicolson, 1961), pp.304-313.

¹⁰⁸'Royal Family' *News Review*, 3 June 1937. Bedaux also commissioned the sculptor, who specialised in sculptures of the Nazi elite, to make busts of himself and his wife. At the time of writing, busts of Bedaux can be found at the IBI and the Château De Candé.

¹⁰⁹Even so, Charles Bedaux, Fern Bedaux, Candé and the wedding of Edward and Wallis do not feature in the Duke's memoirs. These memoirs, published as Duke of Windsor, *A King's Story: The Memoirs of the Duke of Windsor* (New York: G.P. Putnam's Sons, 1951) cover the period from Edward's birth on 23 June 1894 to 2 December 1936. For a list of the prestigious attendees at the wedding, see 'The Duke of Windsor: names of the wedding guests' *The Times*, 27 May 1937.

¹¹⁰'Royal Family' *News Review*, 16 September 1937. The British Foreign Office claimed that the trip lasted from 8-14 September. Letter from Sir G. Knox to Sir R. Vansittart, Foreign Office, 30 August 1937. FO 954/33A.

¹¹¹'Royal Family' *News Review*, 16 September 1937; 'Windsors Visit Hungary' *New York Times*, 9 September 1937.

pipes, but this was an exaggeration: 'only the plumbing in the master suite was gold, and not solid gold, at that, but only gold-plated'.¹¹² One Bedaux engineer, George Stauss, who at that time was installing the Bedaux system at a Hungarian steel mill recalled that 'There were some unkind observations about the Bedaux extravagance in the local papers', although noted that Bedaux, like him, had to spend this money as it was illegal to export the Hungarian *pengő*s earned by his Hungarian company.¹¹³ During the trip, Bedaux visited the US Legation in Budapest to begin arrangements for the couple's later trip to the USA.¹¹⁴

Bedaux then took the couple on a trip around Nazi Germany, which was completely paid for by Dr Robert Ley's *Arbeitsfront*. The trip involved visiting German factories and a meeting with Hitler for tea at Berchtesgaden. After leaving, 'the Duke sent Herr Hitler a telegram expressing his thanks for all the attention and hospitality shown him, and received a cordial reply'.¹¹⁵ Like the wedding and honeymoon, the visit to the Reich, and Bedaux's involvement in it, was scrutinised by the British Foreign Office and the world's press.¹¹⁶ Foreign Office officials were disappointed that the Duke 'saw very little of the real leaders and spent but a short time with the Fuhrer' and believed 'that the Duke could hardly have chosen a more unsuitable man' than Bedaux to supervise the trip.¹¹⁷ Officials were also dismayed that the US press had

 painted in vivid colours the trivialities in the life of a married couple which had stirred the enjoyers of the vulgar, [and] had now decided that HRH had entered the arena of politics and that they would now develop that aspect.¹¹⁸

Bedaux's planning for the trip to the USA was equally meticulous. Having returned to Paris, he approached senior US political figures to get the Duke's visit treated as a royal visit, to arrange a meeting between the Duke and President Roosevelt, and to encourage the

¹¹²See Harold Goldstein, 'Nailing the Bedaux Plot' in his undated *Memoirs of a Madman*. Available at <http://jondreyer.org/hal/bedaux.html>; accessed 15 June 2014. Goldstein had interviewed one of Bedaux's secretaries.

¹¹³Stauss, *Some Memories*, p.51.

¹¹⁴Victor Mallet to Sir R. Vansittart, 14 September 1937, NA, FO 954/33A/47.

¹¹⁵*Memorandum* (undated), p.3. NA, FO 954/33A/118.

¹¹⁶'Royal Family', *News Review*, 28 October 1937. For the Duke's itinerary in Germany, see *Memorandum*, FO 954/33A/118.

¹¹⁷For the former quote, see undated note, NA, FO 954/33A/131. For the latter quote, see Ronald Lindsay to Sir A Hardinge, 7 November 1937, NA, FO 954/33A/143.

¹¹⁸George Ogilvie Forbes to Secretary of State, 17 October 1937, NA FO 954/33A/94

American Federation of Labor (AFL) to extend a formal invitation to the Duke. He failed on all counts.¹¹⁹ Scheduled to last from 11 November to 17 December, Bedaux had instructed his senior US staff to include visits to such prominent Bedaux clients as Eastman Kodak, General Electric, DuPont, Thomaston Mills, Goodrich, and Swift.¹²⁰ Bedaux's purpose was to use the Duke's fame, and the Duke's well-known interest in the plight of the working man, to achieve the lofty goal of 'World Peace through Labour reconciliation'.¹²¹ Bedaux hired the advertising firm Arthur Kudner Inc. to issue stories about himself and the Duke in the press before his arrival.¹²² One such story in the *New York Times* described Bedaux as a 'Debonair Social Leader' who 'still dons overalls when on the job'.¹²³

In terms of these goals, the trip could not have gone any worse. Bedaux arrived just after the bitter and highly publicised sit-down strike at GM, where a principal Congress of Industrial Organizations (CIO) and United Auto Workers of America (UAWA) grievance had been the use of the 'speed up' and piecework to increase worker output.¹²⁴ In addition, senior British government and royal figures believed that any attempt to make the Duke look like a champion of the common man would make his graceless younger brother, George VI, look bad. Albert Ramond believed that

The British government asked the American government to do something to nip the whole thing in the bud. Mrs Perkins, then Secretary of Labor, was consulted. It was decided to stop Windsor as champion of the common man by picturing Bedaux as the enemy of labor. Mrs Perkins was on friendly terms with the big shots in organized labor. The word was passed around. The Big Labor men responded and asked the press to tell their (newly discovered) negative feelings about Bedaux, and stress their inability to cooperate with anyone sponsored by Bedaux.¹²⁵

119George Ogilvie Forbes to Secretary of State, 17 October 1937, NA FO 954/33A/94

120Charles Bedaux to Sir Robert Lindsey, 24 October 1937. FO 954/33A. See also Ramond, *Memoirs*, pp.219-220. For the AFL's pronouncements against Bedaux at B.F. Goodrich, see 'Bedaux System' *Report of the Proceedings of the 53rd Annual Convention of the American Federation of Labor* (1933), p.159.

121Unknown to Secretary of State, 17 October 1937, NA, FO 954/33A.

122'Mrs Bedaux In Duchess' Party for U.S. Visit', *Daily Express*, 19 October 1937.

123'Duke's Guide Here had Vivid Rise; Industrialist Began as Laborer' *New York Times*, 24 October 1937.

124Anonymous, 'Inside Facts on the General Motors Strike' *Personnel Journal*, March 1937. For more information on the strike and its relation to the efficiency system in use at GM, see Sidney Fine, *Sit-Down: The General Motors Strike of 1936-7* (Ann Arbor: University of Michigan Press, 1969), p.62. William F. Muhs, 'The Emerson Engineers: A Look at One of the First Management Consulting Firms in the U.S' *Academy of Management Proceedings* Vol. 1986, No. 1 (1986), pp.123-7 notes that Earl K. Wennerlund was a former Emerson consultant and that Wennerlund was by the late 1930s Vice-President of Production at GM. The Wennerlund system differed from the Bedaux system only in details. See Lytle, *Wage Incentive Methods*, p.274.

125Ramond, *Memoirs*, p.221. Ramond's memoirs must of course be considered critically, but they at least suggest that American workers were not as hostile to the Bedaux system as accounts have suggested.

Whether this was precisely what happened is not clear. But when he arrived in the USA ahead of the Duke, Bedaux found himself blocked at every turn. He travelled to Washington DC where he attempted, again unsuccessfully, to convince the State Department to treat the Duke's visit as a state visit. The *Baltimore Sun* reported that at the press conference Bedaux arranged, Bedaux looked 'fagged' and 'showing increasing fatigue'. He also attracted unwelcome questions such as 'Do you approve of Fascism?', 'What do you think of the New Deal?' and 'Who is paying their [the couple's] expenses?'. 'Slumped down in a chair', Bedaux responded that 'I am a consulting engineer. I have no views. I have no business having views on political philosophies'. Asked to explain his system, and did so 'with relish', arguing that contrary to popular opinion, 'it does not touch the pay of the worker. It is a method of measuring production; not increasing it'. Questioned by journalists as to how widely his system was in use, Bedaux suggested that one thousand factories were using it, totalling around one million workers. Repeatedly pressed for gossip on the royal couple's visit, an exasperated Bedaux, secretly under strict orders from the Duke not to discuss the couple's planned visit to the White House, refused to name 'our friends', refused to pose for photographs, and, following advice from his press advisor, answered 'no comment' to many questions.¹²⁶

The conference attracted more interest in Charles E. Bedaux, a mysterious man who clearly had the confidence of two of the most famous and enigmatic people in the world, and whose curious work measurement system had apparently earned him a fortune vast enough to enable him to buy a medieval French castle.¹²⁷ The most serious issue which developed for Bedaux was that Joe McCurdy, President of the Baltimore Federation of Labor (BFL), passed a public resolution resolving against the 'emissaries of dictatorships or uniformed sentimentalists' who 'support a stretch-out system, whether it be

¹²⁶'Bedaux says Windsors will Inspect 15 Basic Industries in 37 Days' *Baltimore Sun*, 4 November 1937. For the Duke's orders to Bedaux, see Ronald Lindsay to Sir A. Hardinge, p.3, 10 November 1937, NA FO 954/33A/143, which states that 'Bedaux told me that the Duke had forbidden him absolutely to say a word either to himself or to any American authority about the White House audience'.

¹²⁷See 'The Windsors: Pilgrims Run Afoul of Transatlantic Plot' *Newsweek*, 15 November 1937 and 'Housing: Mr Bedaux's Friends' *Time*, 15 November 1937,

the old Taylor system or the more modern Bedaux anti-labor stretch-out'. Moreover,

Charles Bedaux, whose vicious adaptation of the Taylor system like unto the labor appeasement program of Germany, would apply the stretch-out system to labor in this country. Whereas Baltimore, the former residence of the wife of the Duke of Windsor, is the first city whose labor is to be studied by one who while resident here in no way showed the slightest concern nor sympathy for the problems of labor, or the poor and needy.¹²⁸

When Bedaux appealed to the AFL to fight the BFL, he was told that the BFL 'fairly represented the attitude of American labor'. Moreover, in a solitary moment of agreement with the AFL, the CIO, who had been fighting the Bedaux 'stretch-out' system in Southern textile mills and the 'speed up' at GM, denounced Bedaux as 'father of the most completely exhausting, inhuman "efficiency" system ever invented'.¹²⁹ As *Newsweek* put it, 'The Duke's visit was an unprecedented opportunity to link Bedaux and fascism with a blaze of publicity, thus enlisting public support against the system'.¹³⁰ The controversial claim that a close friend of the Duke and Duchess should have anti-labour, pro-fascist leanings was a gift to the media, who demonised Bedaux as an enemy of labour.

Bedaux was totally ill-equipped to deal with such concerted attempts to destroy him.

As Ramond put it,

It all came out of a clear sky. We had occasional difficulties with labor but nothing serious except in the south where Craft, the Bedaux Southern Manager, had frequently taken a leading anti-union position in the Southern Textile Industry.¹³¹

Bedaux came under a barrage of questions from the media. He stated to *The Washington Post* that 'Reichsfuehrer Hitler had ejected him [Bedaux] from Germany four years ago'.¹³²

The *Daily Express* reported that Bedaux had declared that

before Hitler came to power we had a big business in Germany ... We had to close. And they say I'm a Fascist!

128'Text of Resolution' *New York Times*, 4 November 1937; 'Royal Family' *News Review*, 11 November 1937

129The singularly unusual nature of the AFL and CIO alliance over Bedaux was noticed. See 'The Bedaux System: Why Labor Fights It' *Social Justice*, 13 December 1937. The Taylor Society also responded to the Bedaux fiasco: Harlow Person, the society's former Managing Director, explained at length that as the Bedaux system involved little or no reorganisation of work processes, the Taylor and Bedaux systems were opposite to one another. See Harlow S. Person, 'The Bedaux System', *The New Republic* Vol. 24 November 1937, p.71.

130'The Windsors: Pilgrims Run Afoul of Transatlantic Plot' *Newsweek*, 15 November 1937.

131Ramond, *Memoirs*, p.219. The Taylor Society had been siding with Southern textile workers over the Bedaux system for some time. See Milton Nadworny, *Scientific Management and the Unions: 1900-1932. A Historical Analysis* (Cambridge: Harvard University Press, 1955), p.134.

132'Bedaux Denies System Hit' *The Washington Post*, 5 November 1937.

Mussolini was our friend at one time, but in 1935 he prohibited Bedaux and we haven't been reinstated yet. And they say I'm Fascist!¹³³

Bedaux also claimed to *Newsweek* that he had personally investigated the 'Russian system' of Stakhanovism where 'I found them counting on 240 B-Units. That is a mistake. No human being can do it'.¹³⁴ He declared pessimistically that 'We are all human. Nothing is certain. Some of us may die. Some of us may become sick. Some of us may be displeased. Out of 100 chances for the trip, 90 are gone'.¹³⁵

That day the Duke, still in Paris, telephoned the British Ambassador to the United States, Sir Ronald Lindsay. The Duke informed Lindsay that Bedaux and Kudner wished to abandon the trip but that the US Ambassador to France, William Bullitt, and 'everyone else in Paris', were keen for it to continue. The Duke asked whether Bedaux was the only problematic element of the visit and Lindsay replied that 'there is more than that I should think'. The Duke procrastinated, declaring that enough arrangements had been made so Bedaux could be jettisoned and the trip still go ahead. He also realised that if he visited the USA 'he would disclaim any political intentions or Nazi affiliations'. Lindsay responded that 'If your tour is a failure it casts a certain discredit on the American view of the British Monarchy'. The Duke concluded with 'You have helped me a great deal'.¹³⁶

Despite the Duke's vacillation, Bedaux had made up his mind. Bedaux cabled the Duke, and, with a faux-medieval flourish, resigned his assistance:

Sire,- I am compelled in honesty and friendship to advise you that because of a mistaken attack upon me here I am convinced that your proposed study will be difficult under my guidance. Since my sole object has been to serve your repeatedly expressed desire to obtain first-hand information from personal observation, I respectfully suggest, and, on your behalf, implore you to relieve me of all duties in connexion with your American tour.

I will be happy to extend to the person designated by you as my successor every possible assistance and cooperation.

Grateful as I am for your request that I should continue, I nevertheless beg you to be guided by the knowledge that my deepest wish is the full attainment of the object

¹³³'Bedaux Says it isn't True' *Daily Express*, 8 November 1937.

¹³⁴'The Windsors: Pilgrims Run Afoul of Transatlantic Plot' *Newsweek*, 15 November 1937.

¹³⁵'Bedaux Denies System Hit' *The Washington Post*, 5 November 1937; 'Duke's U.S. Visit: Cancellation Denied' *Daily Express*, 5 November 1937.

¹³⁶Secret transcription of a phone call made between the Duke of Windsor and Sir R. Lindsay on 5 November 1937. NA, FO 954/33A/132.

of your visit to the United States.

I remain, Sire, your devoted friend, Charles E. Bedaux.¹³⁷

The telegram was reprinted in many newspapers and magazines around the globe. After a few days of the furore, with huge crowds gathered outside their Paris hotel, the Duke and Duchess cancelled their trip. In an official statement, the Duke emphasised that he was not 'allied to any industrial system, or that he is for or against any particular political or racial doctrine'.¹³⁸ This news garnered Bedaux a mention in a Paramount newsreel story which was shown in cinemas across the United States:

In Paris, the Duke and Duchess of Windsor fill the public eye again as they cancel their trip to the United States. Unfriendly comment from American labor is said to be the cause of their change in plan. It seems to be a case of uneasy lies the head without a crown. In Washington, Charles E. Bedaux ... disliked by labor as the inventor of an efficiency system, intimates that his friendship should embarrass the Duke.¹³⁹

Ramond, who was with Bedaux at the time of the media storm, and appeared in the newsreel at Bedaux's side, remembered Bedaux's response to these events:

Bedaux was crushed. His hopes for grandeur sank ... He brought in a bottle of cognac with a label showing that it had been a special bottling for the King. Bedaux bitterly commented that a twelve-bottle case of that cognac was all he had received for the \$50,000 of \$60,000 he had spent to keep and marry the Windsors at his chateau.¹⁴⁰

Bedaux then caught an overnight train to Canada where he travelled by ship to Britain under the pseudonym *Charles E. Jones*.¹⁴¹ Three days later, under embarrassed pressure from his London office, Bedaux resigned from British Bedaux Ltd.¹⁴² The firm was renamed Associated Industrial Consultants (AIC) soon afterwards. In the US, Bedaux stayed on as company chairman but passed control of all four North American Bedaux companies to

¹³⁷'The Duke of Windsor - American Tour Postponed' *The Times*, 6 November 1937; 'Labour and Mr Bedaux' *Manchester Guardian*, 6 November 1937.

¹³⁸'The Duke Cancels His Trip to the U.S.A.' *Daily Express*, 6 November 1937.

¹³⁹The news story is contained in *The Champagne Safari* (1995) and is shown from 52:22-52:53. I am grateful to George Ungar for pointing out that this was the film's original narration.

¹⁴⁰Ramond, *Memoirs*, p.220

¹⁴¹'Bedaux Mystery: On His Way to England' *Daily Express*, 13 November 1937; 'C.E. Bedaux and Wife Embark for Europe' *Baltimore Sun*, 17 November 1937. He also admitted to this in 'Record of Hearing before a Board of Special Inquiry: Charles Eugene Bedaux', 23-29 December 1943, p.10, NARA, FBI case files, RG65, Box 114, 100-499091, 281-306 (series 4).

¹⁴²'Mr Charles Bedaux Resignation from British Company's Board' *The Manchester Guardian*, 9 November 1937; 'City News in Brief' *The Times* 9 November 1937; 'Mr Bedaux Resigns From British Board' *Daily Express*, 9 November 1937; 'Mr C.E. Bedaux Resigns' *Daily Mirror*, 9 November 1937.

Ramond, who recalled that 'we nearly went under after the 1937 Bedaux-Windsor business'.¹⁴³

3.8. Charles E. Bedaux and the war: 1938-44¹⁴⁴

As Bedaux put it in an interview with *Liberty* the following month, he had been "'butchered" by the press - and the butchery was swift and complete'.¹⁴⁵ He later recalled that he 'broke down completely' and retreated to Bad Reichenhall in Bavaria for a spa cure.¹⁴⁶ There, he and other sources recalled, he developed a reliance on the German barbiturate Medinal.¹⁴⁷ Around this time he abandoned his plans for the Empire Ranch, leaving his former travelling companions with embarrassing debts.¹⁴⁸ The following February, it emerged that the Duke had accidentally cancelled his 1937 US trip by unwittingly taking advice from the British, rather than American, ambassador to France. 'The mystery was cleared up, but it was too late for the Duke to change his decision again'.¹⁴⁹ Additionally, McCurdy of the BFL retreated from his denunciation of the Duke and Duchess' association with 'Bedauxism', and apologised for the cancellation of their trip.¹⁵⁰

Ramond recalled that 'the late thirties was a period of serious difficulties for us [in the USA], business-wise'.¹⁵¹ It was far worse for Bedaux than it was for Ramond. Finding himself shunned in the USA and Britain, and pursued by the US authorities for income tax payments, Bedaux needed new markets. Having passed control of his US companies to

¹⁴³Ramond, *Memoirs*, p.223. See also the copy of the 1937 contract attached to the letter Ramond sent to Francis Henry Russell of the Division of World Trade Intelligence on 20 January 1943, NARA, FBI case files, RG65, Box 113, 1-100 (series 1), which declared that 'Mr. Bedaux has had nothing to do with the management and operation of these four companies since November, 1937'.

¹⁴⁴Research into Bedaux's activities during World War Two is difficult, not least due to the destruction of much source material during the war, but also the volume of contemporary mistakes and misinformation. There are, however, thousands of pages of declassified pages from the FBI in the US National Archives, which, in tandem with other sources, reveal much about his wartime activities.

¹⁴⁵'What Was Wrong With Bedaux?' *Liberty*, 18 December 1937, p.44. Presumably as a result of his new-found infamy, Bedaux entered *Who's Who in America* in 1938 and stayed in it until 1944.

¹⁴⁶Record of Hearing before a Board of Special Inquiry: Charles Eugene Bedaux', 23-29 December 1943, p.5, NARA, FBI case files, RG65, Box 114, 100-499091, 281-306 (series 4)

¹⁴⁷*Statement of Ambassador Robert D. Murphy*, 11 February 1944, IISG, Cees Wiebes papers, Microfilm 2, 10006-24.

¹⁴⁸Sherwood and White, *Bannock and Beans*, pp.238-234.

¹⁴⁹Phone Mixup Kept Windsor Out of U.S.' *Baltimore Sun*, 19 February 1938.

¹⁵⁰Jo Ann E. Argersinger, *Toward a New Deal In Baltimore* (Chapel Hill and London: North Carolina University Press, 1988), p160.

¹⁵¹Ramond, *Memoirs*, p.177.

Ramond, and resigned from his British company, Bedaux established Internationale Bedaux Mij N.V. in Amsterdam, a holding company for his companies in France, Sweden, Holland, and Australia, as well as other new companies, the Bedaux Company for Africa, based in Johannesburg, and the Eastern Bedaux Company in Bombay.¹⁵² He re-established a Bedaux company in the Third Reich by paying \$50,000, \$30,000 of which was a 'penetration expense'.¹⁵³ He also established a Bedaux company in Turkey in June.¹⁵⁴ A particularly notable example was his well-publicised attempt to reorganise the Greek economy for General Metaxas that summer.¹⁵⁵ In a speech to the Greek Technical Chamber, Bedaux argued that his system, used in '1,500 private enterprises of the largest in the world' could be used to triple the efficiency of the Greek workforce, negating the need to export Greek capital and gold to purchase foreign machines. Moreover,

What the Greek manager needs to know is what is the actual volume and productivity of labour in comparison to the desired maximum limit. When he knows this, he will be able to work successfully as any other and to develop the type of national stamp and national unity which, through its methodical work, has been developed in the United States despite the fact that its population comes from all over the world. I hope that with the help of rationalisation and to systematic control that within a few years you will show the world works that are executed by Greeks in Greece and to the benefit of the Greek people. I repeat, that we should give a better and higher standard of living to Greek citizens. In order for this to be achieved, in order to give the people a better and higher standard of life, people have to stop working in the darkness of ignorance and to strive within an environment of disagreement. Only the precise knowledge and the methodical action, and the very strict reduction of any waste will give the people the great and superior life that they should have. Greece is under circumstances such as it can today follow a much shorter path and be one of the first countries to reach a new social situation in which people will enjoy what they should really enjoy under the present circumstances of human knowledge.¹⁵⁶

Regardless of his pronouncements, things continued to go badly for Bedaux. In December, there was a strike over the Bedaux system at the Goodrich plant in Paris, which required the arbitration of the Prime Minister, who 'declared that the application of the Bedaux

¹⁵²'Record of Hearing before a Board of Special Inquiry: Charles Eugene Bedaux', 23 December 1943, p.2, NARA, FBI case files, RG65, Box 114, 100-499091, 281-306 (series 4).

¹⁵³G.A. Westrick papers, Bundesarchiv Koblenz, N1200, Box 1045 lists all these companies, and also Bedaux Britain. I have uncovered no evidence that it conducted any assignments.

¹⁵⁴'Record of Hearing before a Board of Special Inquiry: Charles Eugene Bedaux', 23-29 December 1943, p.2, NARA, FBI case files, RG65, Box 114, 100-499091, 281-306 (series 4), p.40.

¹⁵⁵'Bedaux to Reorganize Economy of Greece' *New York Times*, 2 August 1938.

¹⁵⁶Speech in *Greek Technical Chronicles*, issue 160, 15 August 1938, pp.733-736. For more on engineers in the Greek context, see Yiannis Antoniou, Michalis Assimakopoulos and Konstantinos Chatzis, 'The National Identity of Inter-War Greek Engineers: Elitism, Rationalization, Technocracy, and Reactionary Modernism', *History and Technology* Vol. 23, No. 3 (2007), pp.241-261.

system would require further investigation'.¹⁵⁷ In February 1939 Bedaux travelled to Johannesburg, where he was arrested and bailed for withholding stock from a former employee.¹⁵⁸ Having lost his case, Bedaux and his wife drove six thousand miles to Cairo via the Belgian Congo. He returned to Greece where, he later claimed, the Greek government signed a contract to implement his system on a national basis. Bedaux then travelled around Germany, France, the UK, Italy and the Netherlands. His German visit included meetings with Foreign Minister Joachim von Ribbentrop and the banker Hjalmar Schacht in Germany on 23 August.¹⁵⁹ Confused by Bedaux's occupation, Schacht allegedly asked Bedaux 'Tell me, are you an engineer, a banker, an economist, a fool or what?'.¹⁶⁰ Schacht's statement was not entirely misplaced: around 1939, Bedaux formulated a socio-political system named *Equivalism*, which promised to abolish the need for money.¹⁶¹ Also, during later interrogation, Bedaux claimed that in late 1939 he had flown to London and Scotland to act as a consultant to Lord McGowan of ICI and the Ministry of Supply in matters related to explosives production.¹⁶² He also conducted similar work for the French Ministry of Armaments at this time.¹⁶³

Bedaux spent most of 1940 at Candé and in Paris. In early 1940 Bedaux's abortive German company was closed.¹⁶⁴ On 14 February, discussing Bedaux, 'a shady French businessman, suspected German agent, and friend of the Duke of Windsor', the Deputy Director of MI5, Guy Liddell, noted in his diary that

The *Deuxieme Bureau* have let us down again by passing to their Ministry of Supply information which we gave them about Charles Bedaux. The French Ministry has informed Bedaux that one of his contracts had been held up owing to information

¹⁵⁷'Goodrich Tyre Dispute' *The Times*, 6 January 1938.

¹⁵⁸'An order was issued by the Supreme Court' *The Times*, 18 February 1939; 'Bedaux system chief sued by ex-director' *Daily Express*, 18 February 1939; 'Bedaux Loses Court Plea' *The New York Times*, 25 February 1939.

¹⁵⁹*Mr Bedaux's Itinerary*, NARA, RG65, Box 110, 100-49901-104 II.

¹⁶⁰Stauss, *Some Memories*, p.58.

¹⁶¹See Bedaux Company, *Application Experimentale de L'Equivalisme* (11 October 1940). For a much later polemic by Bedaux's former colleague at Société Française Bedaux, see Marcel Grolleau, *Manifesto of Equivalism* (privately printed, 14 February 1978), in which Grolleau attacked the accusation that equivalism was rooted in the American Technocracy movement of the 1930s. He denounced the Technocrats as 'socialist/communists'.

¹⁶²*Mr Bedaux's schedule, 1938/9*, NARA, RG65, Box 110, 100-49901-104 II. I was unable to verify or refute Bedaux's claim.

¹⁶³*Statement of Mr Hugh S. Fullerton*, 2 February 1944, IISG, Cees Wiebes archive, microfilm 2, 10026-35.

¹⁶⁴Bundesarchiv Koblenz, G.A. Westrick, N1200, Box 1045.

submitted by the British government through the French *Deuxieme Bureau*, and gave him documents in writing to this effect. Bedaux has now written to Sir Walter Monckton who has passed the correspondence to John Maude. I am taking the matter up with SIS and saying that in future if we cannot get some guarantee as to the handling of our information, it will be very difficult to continue our relations in the spirit of frankness and full co-operation.¹⁶⁵

In late 1939 or early 1940, Bedaux's passport was extended at the US Embassy in Paris.¹⁶⁶ After Paris fell in May, the entire US embassy was stationed at Candé from June to July.¹⁶⁷

To observers, Bedaux's behaviour was becoming erratic and suspicious. *The Washington Post* reported in June that Bedaux was speeding up aeroplane production for the French government.¹⁶⁸ Hugh Fullerton, then First Secretary at the Embassy, stayed at Candé during this period and remembered that Bedaux had no particular connections with 'taylorising or speeding up' German war industry. Fullerton believed of Bedaux's politics that he was not 'pro-German. I think it might be better to describe him as having no political sentiments or loyalties whatever, and being definitely an internationalist'.¹⁶⁹

That autumn, the five Bedaux companies based in Amsterdam were confiscated by the Germans and their funds frozen. Needing new business deals, Bedaux entered into an agreement with a Jewish client firm, Blin & Blin, to fictionally administer the company in order to comply with the German Aryanisation order.¹⁷⁰ That year, Bedaux also established a Bedaux company in Madrid and successfully transferred the Société Française Bedaux to his brother Gaston, a French citizen.¹⁷¹

1941 saw Bedaux travelling in France, Germany, north Africa, the Netherlands,

¹⁶⁵Nigel West (ed.), *The Guy Liddell Diaries, Vol. 1: 1939-1942* (London: Routledge, 2005), p.66.

¹⁶⁶*Statement of Mr Hugh S. Fullerton*, 2 February 1944, IISG, Cees Wiebes archive, microfilm 2, 10026-35, confirms that Bedaux 'validated or rather extended [his passport] in Paris during the winter of '39 and '40'.

¹⁶⁷Anticipating the German bombing of Paris, the US Embassy had stationed a Vice Consul at Candé from late 1939 onwards. For details of this stay, see *Statement of Mr Hugh S. Fullerton*, 2 February 1944, IISG, Cees Wiebes archive, microfilm 2, 10026-35.

¹⁶⁸Leonard Lyons, 'The New Yorker' *The Washington Post*, 15 June 1940.

¹⁶⁹Copy of Department of State Memorandum, 30 April 1943, IBI, Charles E. Bedaux Jr. papers.

¹⁷⁰Jean-Claude Daumas, *L'amour du drap: Blin & Blin, 1827-1975. Histoire d'une entreprise lainière familiale* (Paris: Presses universitaires franc-comtoises, 1999), pp.401-9. The firm was released to its owners after the liberation of France.

¹⁷¹For the Spanish company, see Michael Faust and Thorsten Kordon, 'The Development of Management Consulting in Spain', *Schriften zur Beratungsforschung* No. 3 (2008), p.14. For the French company, see *Statement of Ambassador Robert D. Murphy*, 11 February 1944, IISG, Cees Wiebes papers, Microfilm 2, 10006-24.

Belgium, and France. This included a trip to Algeria early that year to reorganise the Kenadsa coal fields on behalf of Vichy, a service for which he asked for such substantial payment that General Maxime Weygand 'referred to him as a burglar because the fee was so high'.¹⁷² In addition, between March and December 1941, Bedaux periodically conducted a variety of experiments with *Equivalism* at Roquefort.¹⁷³

Bedaux's presence in continental Europe was known in the USA and Britain. For example, it was public news that he was being pursued by the US authorities for income taxes and fines.¹⁷⁴ Additionally, in March 1941, Bedaux's former colleague at Bedaux Britain, Colwell Carney, informed the British Foreign Office that he had heard from a US Kodak manager that Bedaux was 'at present actively engaged in the reorganisation of the [French] coal industry for the Nazis'.¹⁷⁵ Following receipt of this news, British officials discussed the possibility of denouncing Bedaux's collaborationist activities for tactical reasons. One argued that 'I believe Mr B is much detested in the U.S. and I should think it would be a very popular move to blacklist him'. T. North Whitehead responded that the Bedaux system was popular among British and American industrialists and that the 'only possible effect of an attempt on our part to blacken Mr B would be to arouse natural resentment against us on the part of the business world.' Another civil servant responded that given Bedaux's 'widely-known close friendship with the Duke of Windsor, the motives might be misunderstood'. A fourth official, Mr Stubs, replied that 'I hope nevertheless we shall be able to get at such double-dyed enemies of this country in due course.' The Bedaux case was suppressed.¹⁷⁶

¹⁷²Statement of Ambassador Robert D. Murphy, 11 February 1944, IISG, Cees Wiebes papers, Microfilm 2, 10006-24.

¹⁷³ Yves Levant and Marc Nikitin, 'Charles Eugène Bedaux (1886-1944): "cost killer" or Utopian Socialist?', *Accounting, Business and Financial History* Vol. 19, No. 2 (2009), pp.167-187 have shown that the experiments amounted to tinkering which locals hardly noticed.

¹⁷⁴The *Baltimore Sun* of 9 March 1941, p.8 reported that the Tax Appeals Board was pursuing him for \$22,095 in income tax and \$11,047 in fraud penalties.

¹⁷⁵Richard Vinen, 'The French Coal Industry during the Occupation' *The Historical Journal* Vol. 33, No. 1 (1990), pp.105-130 records a violent coal strike over the Bedaux system in the Nord and Pas de Calais in May and June 1941.

¹⁷⁶'Activities of Mr. Charles E. Bedaux', March-April 1941, NA, FO 371/28741. As noted in this file, at some point between 1941 and 2007 three forged papers were placed in this file. Allegedly dating from December 1939-March 1940, the forgeries attempted to implicate Bedaux as an important German intelligence informant involved in undermining the French war effort.

Later that year, Bedaux travelled to Berlin where he briefed the German authorities for four weeks about civil defences which he argued could be erected should the Germans capture the AIOC plant at Abadan, and which, Bedaux argued, had the support of AIOC in London.¹⁷⁷ At this time, in addition to MI5, the FBI were also increasingly curious as to his political activities related to Germany and Vichy. Having returned to France, and responding to a letter about his US income tax arrears, Bedaux sent a long and rambling letter to the US Consul General in Lisbon explaining that his involvement with the Germans and Vichy were actually acts of patriotism: once the Germans had returned his Amsterdam companies to him, their funds would be unfrozen and he would be able to pay his US income tax bill.¹⁷⁸

The following day, the Japanese bombed Pearl Harbor, and, after the US declared war on Germany, Bedaux, his wife and son were imprisoned by the *Sicherheitsdienst*. For the first two months of 1942, the Bedauxs were under house arrest at Candé, though some sources reported that Bedaux was seen at the Paris Ritz, lunching with German officers.¹⁷⁹ In April, Bedaux asked the German war administrator in Vichy, Dr Franz Medicus, for an *Ausweis* in order that he could travel to Amsterdam to arrange his businesses there. He was granted his *Ausweis* on 7 May and subsequent passes to conduct a variety of additional industrial projects in coordination with Vichy head Pierre Laval.¹⁸⁰ On 13 June, Bedaux refused the US Consul's 'Notice of Repatriation' on the grounds that he was now 'official charged' with 'humanitarian activity' such as increasing mineral extraction, 'in a pacific way, to help in the reconstruction of all that which war destroys'.¹⁸¹

Particularly significant was a letter Bedaux received from Pierre Laval endorsing Bedaux's plan to construct a trans-Saharan pipeline to convey tonnes of edible oils from

¹⁷⁷Nigel West (ed.), *The Guy Liddell Diaries, Vol. 2: 1942-1945* (London: Routledge, 2005), p.143.

¹⁷⁸Charles Bedaux to W.E. Hagerman, 6 December 1941, IBI, Charles E. Bedaux Jr. papers.

¹⁷⁹Hagerman-American Consulate General in Lisbon, 9 June 1942.

¹⁸⁰Charles Bedaux to Pierre Laval, 5 August 1942, NARA, RG65, Box 113, 100-49901, 101-104 (series 2).

That Bedaux and Laval were coordinating over Bedaux's projects was known to the Americans. See *Statement of Mr Hugh S. Fullerton*, 2 February 1944, IISG, Cees Wiebes archive, microfilm 2, 10026-35.

¹⁸¹Charles Bedaux to the Swiss Consul, 13 June 1942, NARA, RG65, Box 112, 4. 100-49901-349.

Senegal to Algeria.¹⁸² The plan required setting up a business syndicate with four million francs of capital, half a million of which was to be donated by Bedaux.¹⁸³ On hearing about Bedaux's apparently bizarre scheme, the FBI recorded that Bedaux was 'mentally immoral' and considered himself 'as a person gifted with unusual qualifications and feels that his refusal to accept financial remuneration for his services to mankind justifies the international character of his activities'.¹⁸⁴ His planned reconnaissance trip was due to take fifty days, travel over nine thousand kilometres, much of which would be spent exploring the Mopti region of southern Mali. The excursion required six metric tonnes of equipment and seventeen thousand litres of fuel.¹⁸⁵

The plan was set back by Bedaux and his wife being interned at Compiègne on 28 September along with at least 250 other Americans.¹⁸⁶ A fellow internee of the camp recalled seeing Mrs Bedaux arrive:

My attention was drawn to a woman who was sitting on the edge of a cot with an ermine wrap around her feet. She was passing around a five-pound box of chocolates to her friends. I learned that she was Mrs. Charles Bedaux, at whose chateau the Duke of Windsor married Mrs. Simpson. Mrs. Bedaux said in a very loud voice that she did not expect to be with us long, and that she was waiting for Otto Abetz, Nazi fifth columnist in France before the war and the new Nazi Ambassador to France, to come and get her and her sister released. Next morning a group of French collaborationists, obviously personages high in treachery, arrived with an important German in uniform. They were very respectful to Mrs. Bedaux, helped her pack her things, and out she swept, while the rest of us were enraged at this exhibition of the power of social and political influence.¹⁸⁷

Bedaux senior was released with a new *Ausweis* on 1 October. He left France on the 23rd and arrived in Algiers on the 27th. There he sought out the German and Vichy authorities, and on either the 28th or the 29th, Bedaux presented himself to the US Ambassador, Robert

¹⁸²Statement of Ambassador Robert D. Murphy, 11 February 1944, IISG, Cees Wiebes papers, Microfilm 2, 10006-24.

¹⁸³'Bedaux Mission Syndicate of Study', 21 October 1942, NARA, RG65, Box 113, 100-49901, 101-104 (series 2).

¹⁸⁴'Charles Eugene Bedaux: Background and Personal History' NARA, RG65, Box 113, 100-49901, 1-100 (series 1).

¹⁸⁵*Mission confiée à Monsieur Charles BEDAUX par le Chef du Gouvernement (ordre de mission du 25 Août 1942)*, LAC, MG30-B169 Vol 1, 1.2.

¹⁸⁶'Americans Rounded Up' *The Times*, 28 September 1942 reported that many of the internees 'are at present living in the monkey-house at the Bois de Boulogne Zoo'. 'Mr. Charles Bedaux, in whose Château de Candé, near Tours, the Duke of Windsor was married, is reported to be among those arrested'. The *Baltimore Sun* of 29 September 1942 declared that the whereabouts of the 'friend of the Duke and Duchess of Windsor' 'could not be ascertained'.

¹⁸⁷Drue Tartière, *An American Woman's Story of Traffic in Patriots* (New York: Simon and Schuster, 1946), p.105.

Murphy, proudly showing off his German *Ausweisen*.¹⁸⁸

Along with numerous other characters in Algiers on Vichy business, Bedaux and his son took up residence in the Hotel Aletti in Algiers. He met several people here who later testified that Bedaux's conduct was suspicious, including the journalist John MacVane, OSS 'lone wolf' Edmond Taylor, and a German, Major Richard Wurmman.¹⁸⁹ When a German general's arrival displaced many residents, Wurmman was billeted in the room beside Bedaux. Unbeknownst to Bedaux, Wurmman was not only an Abwehr agent but also an MI5 double agent, codename HARLEQUIN, who had been sent to north Africa to gather intelligence on Vichy forces.¹⁹⁰ After Bedaux claimed to Wurmman 'that he [Bedaux] was an agent of the Abwehr', Wurmman anonymously pushed a list of questions about Vichy naval manoeuvres under Bedaux's door, intending that Bedaux would ask Murphy the questions at lunch. Under later interrogation, Bedaux claimed not to have done so, and stated that he gave the list to Wurmman with 'rien dit' (*nothing said*) written next to each question.¹⁹¹ Bedaux then claimed that

The German glanced at the paper and made some remark to the effect that I was making fun of him. I replied 'better luck next time'. My only purpose in writing anything at all on the paper and giving it back to him was to keep him interested in getting the Medal and to secure my gasoline allotment.¹⁹²

As a consequence of his encounters with Bedaux, Wurmman later declared under British interrogation that although Bedaux possessed 'exceptional intelligence and experience',

¹⁸⁸For the *Ausweisen*, see *Statement of Ambassador Robert D. Murphy*, 11 February 1944, IISG, Cees Wiebes papers, Microfilm 2, 10006-24. Murphy's office staff were amazed that Bedaux seemed unaware that possessing such documents could be construed as collaborating with the enemy.

¹⁸⁹The quote on Taylor belongs to 'Memorandum for the Director', RG65, Box 113, 100-49901, 105-188 (series) 2. For MacVane's take on the situation, in which he remarked that Bedaux's 'voice dripped with cordiality but no one who saw those hard, shifting eyes behind the heavy spectacles would have trusted him on sight', see John MacVane, 'Department of Amplification' *The New Yorker*, 23 October 1945.

¹⁹⁰See Arthur M. Thurston to J. Edgar Hoover, 24 May 1943, NARA, Army Staff, IRR/X8062007, in which Thurston, Legal Attache to the American Embassy in London, states that he had been told about Wurmman, HARLEQUIN and Bedaux in February that year. Guy Liddell noted in his diary on 10 February 1943 that HARLEQUIN had been promised British naturalisation in exchange for his defection to MI5. See Nigel West (ed), *The Guy Liddell Diaries, Vol. 2: 1942-1945* (London: Routledge, 2005), p.46. According to Christopher Andrew, *Defence of the Realm: the Authorised History of MI5* (London: Allen Lane, 2009), p.252, MI5 ran nearly 120 Abwehr double agents during the war.

¹⁹¹Later questioned about whether Bedaux did ask him the questions on the list, Murphy stated 'I don't recall anything like that'. See *Statement of Ambassador Robert D. Murphy*, 11 February 1944, IISG, Cees Wiebes papers, Microfilm 2, 10006-24.

¹⁹²Charles E. Bedaux written statement to the FBI at El Biar, 16 June 1943, NARA, RG65, Box 111, 100-499091-231.

Wurmann was 'far from convinced' that Bedaux was an Abwehr agent or 'V-mann'.¹⁹³

Wurmann instead stated of Bedaux's political opinions that

the deciding factor of his strongly anti-communist attitude was, not that he showed any particular love for the national-socialist or fascist outlook towards the question of the Jews but that he regarded the Axis states with sympathy as being the only instruments likely to protect his personal capitalist interests against the inroads of Communism.¹⁹⁴

Bedaux did not get far with building the pipeline, as on 8 November the Allied invasion of North Africa, Operation Torch, took place. According to Wurmann, Bedaux woke him that night 'rather worried at what was going to happen'.¹⁹⁵ Soon afterwards, Wurmann was arrested by the British, while Bedaux remained free.¹⁹⁶ One later memoir by the OSS agent Donald Downes, who was in Algiers at the time, recalled that

No one could have welcomed his fellow countrymen with a greater show of patriotism than Mr Bedeaux (sic). He stood innumerable Allied officers innumerable drinks in innumerable bars. Hadn't these fine fellows liberated him from the Huns and their Vichy pimps?¹⁹⁷

Bedaux initially did well in the newly liberated Algiers, until the assassination of Admiral Darlan on 24 December triggered the arrest of Bedaux and his son by the French *Sécurité Militaire*.¹⁹⁸ It is unclear why Bedaux was not summarily executed as a collaborator, as some were, although several sources reported that the *Sécurité Militaire* were told he was a US citizen.¹⁹⁹ On 29 and 31 December respectively, Charles Bedaux Jr. and Charles E. Bedaux were released from French custody.

1943 started badly for Charles E. Bedaux. At the request of Colonel J.C. Holmes and Edmond Taylor, Bedaux and his son were rearrested by French police 2 days later. Taylor's memoirs indicate that he knew the French authorities had minimal interest in Bedaux, given that many French officials had been collaborating with the Germans more than Bedaux had. However, the fact that Bedaux was a US citizen, but French by birth,

¹⁹³Interview with HARLEQUIN on Bedeau (undated), NARA, RG65, Box 111, 100-49901-231.

¹⁹⁴'Bedeau', NA, KV 2/275.

¹⁹⁵E.B. Stamp to SIS, 11 June 1943, NA, KV 2/276. Notes made on this document indicates that Bedaux has, or at least had, an SIS file of his own.

¹⁹⁶J. Edgar Hoover-General Strong, 16 February 1943, NARA, Army Staff, IRR/X8062007.

¹⁹⁷Donald Downes, *The Scarlet Thread* (London: Panther Book, 1959), p.95

¹⁹⁸Interview with HARLEQUIN on Bedeau (undated), NARA, RG65, Box 111, 100-49901-231. Downes, *Scarlet Thread*, pp.95-6 agrees with this.

¹⁹⁹MacVane, 'Department of Amplification', p.89.

and had dined with both 'influential and politically conservative French hostesses' and 'several of my superiors on G. Eisenhower's staff'

That, as far as I was concerned, made Bedeaux (sic) a convenient symbol of the unwholesome political promiscuities and of the collusion between defeatism and resistance that the Murphy-Darlan accords had inevitably encouraged. He was also reported to have close associations with several Vichy technocrats known to be members of the so-called *Synarchiste* movement which was viewed at the time - somewhat exaggeratedly - as a kind of sinister and powerful ideological mafia with fascist overtones. Without looking deeper into the affair, I made up my mind to have him put behind bars, and eventually, by grossly misrepresenting the French feelings about him to the Americans, and the American attitude to the French, thus making each side feel its good faith was being questioned by the other, I succeeded.²⁰⁰

The news of Bedaux's arrest reached the British and US newspapers, where the public heard substantive news of Bedaux for the first time since late 1937. Rumours circulated as to why he had been arrested, ranging from him being a Nazi agent on the run, a Vichy intelligence officer, to a stint as a merchant purchasing citrus fruit from Arabs. *Time* informed readers that Bedaux had made his fortune from the 'Bedaux system of workmen's pay based on units of production' and that more recently he had formulated a 'new Bedaux system of "economic and social appeasement" which was really 'disguised Nazi ideology'.²⁰¹ In Britain, recalling Bedaux's association with the Duke of Windsor, the *Manchester Guardian* reminded readers that through his 'industrial output speed-up plan' which was used 'for increasing labour productivity by "stream-lining" its movements', Bedaux had made 'a vast some of money'. In doing so, Bedaux had 'established an international reputation as an efficiency expert'.²⁰²

Bedaux and his son were transferred to US custody on 24 January.²⁰³ *Time* reported that 'Dark, affable, sharp-as-a-broken bottle Charles E. Bedaux was nabbed in North

²⁰⁰Edmond Taylor, *Awakening From History* (London: Chatto and Windus, 1971), pp.259-60. This is supported by 'Memorandum for the Director', RG65, Box 113, 100-49901, 105-188 (series) 2, which records that Taylor apparently functioned as a "lone wolf", keeping no records whatsoever.' When the case was 'dumped in Colonel Richmond's lap', by March 1943, Taylor had already abandoned it and returned to the USA.

²⁰¹'Too Many Systems' *Time*, 25 January 1943.

²⁰²'Bedaux Arrested in Deals with Foe' *New York Times*, 14 January 1943; 'Charles Bedaux Arrested in N. Africa' *The Manchester Guardian*, 14 January 1943; 'Bedaux (speed-up expert) Arrested' *Daily Express*, 14 January 1943.

²⁰³'Memorandum for the Director', RG65, Box 113, 100-49901, 105-188 (series) 2. In seizing Bedaux and his papers from the French, the FBI claimed that Bedaux was an American citizen and thus should be under their jurisdiction. See Downes, *Scarlet Thread*, p.96. Bedaux's son was eventually freed and joined the US Army.

Africa' and that Bedaux had declared that 'I am an out & out Fascist'. 'A great success story of the 20th Century ended last week with its hero in jail'.²⁰⁴ Bedaux was kept under house arrest in Algiers for most of 1943, where he was repeatedly questioned at great length and his valise of papers scrutinised by the FBI. The US authorities were particularly concerned to assess not only Bedaux's wartime activities but also in establishing that he had actually been an American citizen when conducting them. One of Bedaux's various defences was that he had accepted no money for any of this work, and that his projects in fact benefited humanity as a whole, regardless of regime.

Hearing the news of Bedaux's capture, thirteen of his business associates and acquaintances testified to the FBI that Bedaux had been 'very pro-German in sympathy and actions' since the 1930s.²⁰⁵ Terrified of the bad publicity, Albert Ramond encouraged the Department of State to rescue the remaining North American Bedaux companies from 'imminent ruin because of the activities of Charles Bedaux'. Ramond changed the name of the US Bedaux firms to Albert Ramond and Associates, and from then onwards claimed that he had founded the company in 1916.²⁰⁶

With Bedaux arrested but not charged, and this known to the media, the US authorities were in an awkward position. On 11 October, the Attorney General wrote to the Secretary of War, remarking that

I note with regret the decision of the military authorities to release Charles Eugene Bedaux from arrest and to return him with his son to the United States.

It has seemed to me that the case against the elder Bedaux is one which could be handled with a much better chance of success by the military authorities in North Africa than by the civil authorities here. Indeed, it is doubtful that we could make out a case which would stand up in the civil courts.²⁰⁷

In Britain, considering the Bedaux case, Guy Liddell of MI5 concluded that Bedaux was

204 'Too Many Systems', *Time*, 25 January 1943.

205 NARA, Army Staff, IRR/X8062007.

206 Memorandum of conversation, 30 December 1943, IBI, Charles E. Bedaux Jr. papers. See also Ramond, *Memoirs*, p.222. For a brief postwar examination of the 'followers or successors of Bedaux', including Ramond, see Abraham Cohen, *Time Study and Common Sense* (London: Macdonald & Evans, 1947), p.83. Cohen stated of himself that he was a 'Late Management Consultant' and Department Director General at the NFFs.

207 Attorney General to the Secretary of War, 11 October 1943, NARA, RG65, Box 114, 100-49901, 232-280 (series 3).

almost certainly 'a whole-hearted collaborationist but probably he is more interested in Bedaux than anything else'.²⁰⁸ Even so, MI5 looked further into the Bedaux case, and questioned senior AIOC figures as to whether they had sanctioned Bedaux's Berlin trip in October 1941, as Bedaux claimed. MI5 were told in no uncertain terms that Bedaux had nothing to do with AIOC, and that he had caused similar trouble for AIOC with the Persian government in the past.²⁰⁹ Related to this, MI5 informed the FBI of the importance of this issue, as 'the largest controlling shareholder in the Anglo-Iranian Oil Company is the British Government'. 'Bedaux' allegations concerning Elkington and the Anglo-Iranian Oil Company could in fact be interpreted as direct accusations against the British government'.²¹⁰

Under conflicting orders to those of the Attorney General, Bedaux was flown in a US Army aircraft to the USA, arriving on 23 December 1943.²¹¹ Upon arrival in Miami, he was told he could go free. However, as his valise of papers, including his passport, had been sent to Washington DC, he was arrested again, this time by the US immigration services. The authorities attempted to work out whether, as it had been over five years since he was last in the US, Bedaux was still a US citizen. After extensive interviews with Bedaux, Robert Murphy, Hugh Fullerton, Richard Wurmman, Albert Ramond, and others, and further scrutiny of several German *Ausweisen* in Bedaux's papers, the FBI decided to question Bedaux again. They also launched an investigation of Bedaux's former colleagues, some of whom had been given posts in the US military.²¹²

In January, Wurmman, held in London, refused to testify against Bedaux. Hearing this, the FBI, under personal direction from J. Edgar Hoover, pressed on with the case anyway.²¹³ After days of intensive interrogation, on 14 February, it was decided that

208Nigel West (ed.), *The Guy Liddell Diaries, Vol. 2: 1942-1945* (London: Routledge, 2005), p.143.

209Nigel West (ed.), *The Guy Liddell Diaries, Vol. 2: 1942-1945* (London: Routledge, 2005), p.148.

210Arthur Thurston to J. Edgar Hoover, 20 April 1943, NARA, RG65, Box 110, 100-49901-189-280.

211'Record of Hearing before a Board of Special Inquiry: Charles Eugene Bedaux', 23-29 December 1943, p.2, NARA, RG65, Box 114, 100-499091, 281-306 (series 4).

212British Bedaux's former director, Colwell Carney, was now a Lieutenant Colonel at Materiel Command, Wright Field, Dayton, Ohio, where he had 'access to a great deal of material'. See Colonel Roy Boberg to FBI, 28 December 1943, NARA, RG65, Box110, 100-49901-189-280. Frank Mead, another former British Bedaux director, was also now a Lieutenant Colonel and also fell under FBI scrutiny. See E.E. Conroy to J. Edgar Hoover, 'Charles Eugene Bedaux: Internal Security - G', NARA, RG65, Box 109, 100-49901.

213J. Edgar Hoover to Assistant Attorney General, 25 January 1944, NARA, RG65, Box 114, 100-49901,

'Bedaux will be admitted to his citizenship, but will be prosecuted for Treason'.²¹⁴ He was told this. Bedaux took an overdose of Luminal that night and died four days later.²¹⁵ His suicide note, which was addressed to his New York secretary Isabella Waite, read as follows:

Dear friend,

I cannot defend my good name now without endangering those I love.

After the War my beloved wife and my son will prove that I am a good, honest, deserving American. I want you to give her this letter as a token of my undying love.

Give my thanks to all those who have faith in me.

To you dear friend my eternal gratitude for your absolute faith and devotion.

I kept the Luminal the authorities gave me.

Chas. E. Bedaux 2/14-44.²¹⁶

Bedaux was buried on 22 February 1944 at the Christian Science cemetery at Mount Auburn near Boston, Massachusetts. His funeral, which was closely surveilled by the FBI, was 'attended by only a handful of mourners'.²¹⁷ Within two years from his funeral, the retrospective reputation of Bedaux's career and the *B* would be shaped by newspaper journalists and many people who had never met him.

3.9. The demonisation of Charles E. Bedaux, the Bedaux system, and the *B*

The demonisation of Charles E. Bedaux, the Bedaux system, and the *B*, which had begun in late 1937, accelerated as soon as Bedaux's death hit the newspapers. In reporting Bedaux's suicide, the *New York Times*, *The Times*, and many other newspapers, informed

281-306. The Bedaux case is absent from biographies of Hoover.

214D.M. Ladd to E.A. Tamm, 14 February 1944, NARA, RG65, Box 112, 3. 100-49901-281-348.

215The FBI files contain contradictory statements about the Luminal. Bedaux had been requesting Medinal or Luminal from his former colleagues. See Chas. E. Bedaux to Isabella Waite, Albert Ramond and George Link, 27 December 1944, NARA, RG65, Box 112, 3.100-149901-281-348. Bedaux's secretary Isabella Waite had soon obtained some 'medicine' for him. See Isabella Waite to Albert Ramond, 1 January 1944, NARA, RG65, Box 114, 100-49901, 281-306 (series 4). It is unclear whether Bedaux received Waite's medicine, or whether, as he mentioned in his suicide note, he was given Luminal by the authorities. Ramond, *Memoirs*, p.222 recalled receiving Bedaux's request but claimed he was told by an anonymous telephone call not to visit Bedaux in Miami and so did not.

216NARA, RG65, Box 112, 3. 100-49901-281-348.

217'Bedaux Buried in Boston after Private Services', *Washington Star*, 23 February 1944.

readers that he had been a friend of the Duke and Duchess, and that his industrial speed-up system had made him a deeply hated millionaire.²¹⁸ Conspiracy theories came thick and fast.²¹⁹ For example, the former Mountie Philip Godsell reflected on Bedaux's 1934 Canadian trip, and wondered 'if, as some suspected at the time, he wasn't actually working for some foreign government'.²²⁰ Some went further. The *New York Times* described Bedaux as

one of a half-dozen or so figures who moved strangely in this generation behind the mantles of monarchy and the tyranny of totalitarian rule as well as on the back stairs of democratic governments and became legendary, even before his death as the Mystery Men of international intrigue.²²¹

Hints of foul play were leaked. *The New Republic* reported that Bedaux's list of character references contained some of the presidents of America's greatest corporations and banks. *The New Republic* continued:

There is so much in his life and death worthy of direction by Alfred Hitchcock that it seems to destroy artistic unity to point out the shabbiness of the man, and to remind ourselves that fascism is not necessarily something in Europe. It may be flowering next door to our democratic-minded family, with its true viciousness deceptively covered by the familiar, the ridiculous or even the moral aspects of everyday life.²²²

Suspicious were that one or more people who had shared secrets with Bedaux had him murdered, or at least encouraged his suicide.²²³ *The Nation* said of his death that

Charles Bedaux had many influential friends but a vast host of enemies - all the democrats of the world. It is, however, his enemies who should mourn his death for if he had lived he had told all they might have learned much to their advantage. Many of his friends, on the other hand, probably heard the news cheerfully. If they sighed at all, it was a sigh of relief.²²⁴

While evading calls for information about Bedaux's property, documents, and death from Bedaux's secretary, the FBI, under Hoover's personal direction, launched an extensive

218'Labor Disliked Bedaux', *New York Times*, 20 February 1944; 'Charles Bedaux Dead' *The Times*, 21 February 1944.

219A 1944 Eric Godal cartoon depicted Bedaux as a 'Member of the Quisling Society', alongside Quisling, Laval, Pétain, Mussert and Ribbentrop. Ribbentrop was informing the others that 'I have the grave duty to inform you, that we lost one of our most distinguished members, a man who succeeded in betraying two countries at once'.

220Godsell, *Romance*, p.107.

221'Bedaux Legendary as Mystery Man' *New York Times*, 20 February 1944.

222Edwin Lahey, 'Bedaux and His Friends' *The New Republic*, 6 March 1944, pp.307-8. It remains to be established if Alfred Hitchcock's *Notorious* (1946), which bore remarkable similarities to the Bedaux story, was in any way derived from Bedaux's fate.

223Albert Ramond recalled that a year after Bedaux's death, a former civil servant applying for employment told him that 'Bedaux knew too much, and the FBI got rid of him'. See Ramond, *Memoirs*, p.222

224'Dead Men Don't Blab' *The Nation*, 11 March 1944

internal investigation into what had happened. It included a full autopsy and a specialist inspection of his papers for hidden cyphers.²²⁵ Following the investigation, Bedaux's death was listed as suicide and his case shelved.

Most of his former employees and business associates had long been distancing themselves from Bedaux but in February 1944 it got much worse. Albert Ramond recalled the situation:

In 1937 and during the war years, our clients had not liked the Bedaux bad publicity at all. There had been the Windsor fiasco in '37 and later the worse publicity about Bedaux' German connections. We were THE Bedaux Company until Bedaux' death in February 1944.²²⁶

The FBI were concerned about whether any of these rumours were true. They investigated Bedaux's former engineer Charles W. English for espionage, reporting from one source that English was

one of the coldest and most designing individuals he had ever met and that he 'instinctively' would have been reluctant to trust him. He advised that in view of the subsequent publicity surrounding the suicide of CHARLES BEDAUX he suspected that ENGLISH was an enemy agent and that the BEDAUX system was being used to transmit information regarding United States war production to hostile nations.²²⁷

It was in this context of witch-hunting zeal that Janet Flanner began to prepare her articles for *The New Yorker* which have retrospectively defined Bedaux's entire life and the reputation of his *B* system.²²⁸ Although Flanner did not supply her sources, research has revealed that Flanner had two principal sources, each of whom had every interest in isolating and damning Charles E. Bedaux: firstly, sensitive government documents, and lists of Bedaux's possessions, were leaked to her by the US Department of Justice.²²⁹ Secondly, Bedaux's former Amsterdam secretary, Amelia Ter Hart, provided information on him having been embittered by his abandonment of her during the war.²³⁰

²²⁵They found no secret messages in Bedaux's documents.

²²⁶Ramond, *Memoirs*, p.223.

²²⁷R.P. Kramer to J. Edgar Hoover, 23 February 1944, NARA, RG65, Box 112, 3. 100-49901-281-348. As seen in section 3.5, English was in charge of Bedaux Pacific.

²²⁸Brenda Wineapple, *Genêt: A Biography of Janet Flanner* (London: Pandora, 1994), p.181 records that Flanner wrote the articles on Bedaux as she was stuck in the United States and bored. At her time of writing, Flanner specialised in writing provocative and ambivalently transfixed biopics of senior Nazi figures. For an examination of Flanner's *New Yorker* features on Göring, Hitler, and Riefenstahl, see Annalisa Zox-Weaver, 'At Home with Hitler: Janet Flanner's *Führer* Profiles for the *New Yorker*' *New German Critique* Vol. 34, No. 3 (2007), pp.101-125.

²²⁹Hawley Truax to Janet Flanner, 22 February 1946, NYPL, *New Yorker* archive, file 1310.

²³⁰Noted on a draft of Flanner's articles on Bedaux, summer 1944, NYPL, *New Yorker* archive, file 1365.

By 18 October 1944 the first drafts were complete.²³¹ At this stage in her writing, a representative of the Duke of Windsor contacted Flanner and informed her that 'his Grace would be pleased if Miss Flanner could do the Bedaux piece without making mention of the Duke though.' Flanner regarded this as equivalent to writing 'a piece on the French Revolution without mentioning Louis XVI -- but she did not tell his nibs so'. In agreement with *The New Yorker's* editor, Flanner removed much detail on Bedaux's involvement with the former king, particularly the details on how the Duke and Duchess had chosen to engage with Bedaux's overtures rather than other offers.²³²

An important feature of Flanner's account was that she described him as considerably overstating his system's originality. He was in fact a

Superegotist to whom the peak of his career as a self-appointed, semi-salvationist world organizer seemed the only suitable altitude at which to picture himself ... [an] international fascist-favoring millionaire and inventor of the Bedaux industrial speedup system.

She described how Bedaux had made his fortune boasting, using 'pseudo-scientific language', to be the 'discoverer of the measurement of human energy', the *B*, despite the fact that 'the Bedaux System did not differ much from the old Frederick Winslow Taylor shop-management system of the nineties'. His system sold, argued Flanner, not because it was original or effective but because Bedaux had 'a demagogic gift for convincing hardheaded businessmen that they were public benefactors, as he essentially believed he was himself'.²³³ Particularly important in Flanner's agenda was her depiction of Bedaux as a unpatriotic and selfish internationalist obsessed with gaining business in Nazi Germany and Vichy France. Moreover, to Flanner, he was indicative of something much larger: 'in his reaction to the war, Bedaux was perfectly typical of all collaborationists with a certain rich, rootless, unpatriotic, cartel type of big-business brain'.²³⁴

On 22 September 1945, Flanner's *Equivalism I* was published. The following week

²³¹Draft articles, NYPL, *New Yorker* archive, file 1365.

²³²Janet Flanner to *New Yorker* (undated), NYPL, *New Yorker* archive, file 405. Flanner noted on p.30: 'SHAWN: here comes, I think, the cut and shortening requested by HRH the Duke you have it in your desk, plus all other cuts or additions not belatedly worked out.'

²³³Janet Flanner, 'Annals of Collaboration: Equivalism I' *New Yorker*, 22 September 1945, pp.28-30.

²³⁴Janet Flanner, 'Annals of Collaboration: Equivalism II' *New Yorker*, 6 October 1945, p.35.

Rebecca West's coverage of the treason trial of William 'Lord Haw-Haw' Joyce was published in the *New Yorker*.²³⁵ The two remaining Flanner pieces on Bedaux were published in the *New Yorker* over the following fortnight.²³⁶ In the following months, the *New Yorker* covered the Nuremberg trials, including those of Albert Speer, Hermann Göring, Hjalmar Schacht, and Philippe Pétain. Given this inquisition-like atmosphere, it is entirely unsurprising that Bedaux entered, and has stayed in, history books as an isolated and diabolical Nazi collaborator who swindled businesses with the charlatantry of the *B*.

The notoriety of both Bedaux and the *B* is unfair and distracts from Bedaux's earlier achievements. Given his reputation as a Nazi collaborator, which, as seen in this chapter, was in part based on fact, it is ironic that his work measurement system, and those derived from it, were in greater use by Germany's wartime enemies than historians have realised. The expansion of work measurement in Britain during the war is examined in chapter 5. As examined in the following chapter, Bedaux had actually already been more indirectly influential than many contemporary specialists understood. Chapter 4 therefore examines the group of managers and industrial consultants who emerged from the Rowntree milieu at York from the early 1920s onwards. It analyses their implementation of additional work measurement systems in Britain, such as the Rowntree *Mark* and UOP *Point*, which had their roots in the Bedaux *B*, and, by extension, Taylor's *unit-times*. Indeed, as will be examined, the Rowntree *Mark* system, based on the *B*, and implemented at the Rowntree Cocoa Works at York from 1923 onwards, arrived in Britain three years earlier than Bedaux's British consultancy and was arguably more successful than even Bedaux Britain's highest profile clients such as ICI.

²³⁵Rebecca West, 'The Crown Versus William Joyce', *The New Yorker*, 29 September 1945.

²³⁶Janet Flanner, 'Annals of Collaboration: Equivalism II' *New Yorker*, 6 October 1945 and Janet Flanner, 'Annals of Collaboration: Equivalism III' *New Yorker*, 13 October 1945.

Chapter 4.

Rowntree, Urwick, work measurement, and the York connection, 1921-39

4.1. Introduction

As examined in chapter 3, industrial consultancies, particularly Bedaux and its offshoots but also Suffern & Son, and Emerson Consulting, were important in transforming the way work was analysed and measured in hundreds of British factories in the interwar period. This chapter explores several additional aspects of how, where and when work measurement developed in interwar Britain. Its focus is the Rowntree Cocoa works and the circle of influential management intellectuals who emerged from it, namely B. Seebohm Rowntree, Lyndall Urwick, Oliver Sheldon and Clarence Northcott.

The extensive historical literature on the Rowntree circle at York is consistent in its acknowledgement that Rowntree, and these figures around him, particularly Urwick, bore some similarities to F.W. Taylor, insofar as they believed in a science of management, formalised production and management experts, and cooperative 'industrial democracy'. Moreover, as discussed in chapter 1, some historians have also argued that the Rowntree and Urwick circle were influential pioneers, with this approach and attitude reaching public and government acceptance in the postwar period.

However, the same literature observes that each of these individuals rejected the use of the Taylor System and Taylorism in practice, in favour of looser managerial structures.¹ More recent studies of the York group, and the Cocoa Works at York, have extrapolated from this observation that Rowntree, Urwick and Northcott rejected the Bedaux system.² Given the hitherto bad reputation of Charles E. Bedaux, the Bedaux system, and the *B*, examined in chapter 3, coupled with the Cocoa Works' contemporary

¹ Asa Briggs, *Social Thought and Social Action: A Study of the Work of Seebohm Rowntree, 1871-1954* (London: Longmans, 1961), p.169; John Child, *British Management Thought: A Critical Analysis* (London: George Allen & Unwin, 1969); Merkle, *Management and Ideology*, chapter 7; Guillén, *Models of Management*, chapter 5; Katherine A. Webb, *Oliver Sheldon and the Foundations of the University of York* (York: Borthwick Institute, 2009), pp.7-11.

² Robert Fitzgerald, *Rowntree and the Marketing Revolution* (Cambridge: Cambridge University Press, 1995), p.268; Ferguson, *Rise of Management Consulting*, pp.59-61; Brech, Thomson, and Wilson, *Lyndall Urwick*, p.95.

reputation for humanist management practices and industrial welfare, this assumption was understandable. However, some revisionist historians such as Whitston and Fitzgerald have hinted at a different, albeit unclear, story: 'extensive time studies' of work processes were conducted at the Cocoa Works in the 1920s and a planning office was instituted in the 1930s, apparently without the presence of "efficiency engineers" or consultants'.³

This chapter aims to reveal that a copy of the Bedaux *B*, the *Mark* system, was implemented at the Cocoa Works from 1923 onwards, and also that Rowntree and his circle were important in propagating *B*-based work measurement methods more widely, both in terms of providing model practices which other firms copied, and also via consultancy offshoots. In effect, the chapter provides case studies of the *B* system being implemented without Bedaux engineers present, or present in a clandestine or advisory sense. It is the story of how firms internalised work measurement unit systems derived from Taylor's *unit-times* into their daily operations. It also aims to paint a broader picture in which Seebom Rowntree, his circle, and the interwar Rowntree Cocoa Works at York, had a more prominent place in the history of interwar British management methods, particularly *unit-time*-based work measurement, than extant studies suggest.

As examined in this chapter, the Rowntree *Mark* system, derived from the *B*, was in fact instituted earlier and more comprehensively than even the Bedaux showpiece firm ICI. Moreover, I build on observations by Braverman and Brech, examined in chapter 2, that work measurement could be, and was, transferred, without the need for time studies, from industrial production processes on the factory floor into repetitive office tasks such as typing and calculating. It examines similar reforms at Mander's, which went hand-in-hand with the reduction of work hours at the firm's Wolverhampton plant. The chapter then goes on to examine the operations of Urwick's industrial consultancy, UOP, and explores the recent claim by a former UOP consultant that UOP actually installed a copy of the Bedaux system from the outset. It concludes by examining a case study of a UOP client and it is

³ Fitzgerald, *Rowntree and the Marketing Revolution*, pp.263-8, Whitston, 'Scientific Management Practice' (1996).

found that this claim is correct: UOP installed and used a copy of the Bedaux *B* named the *Point*.

Sources used for the sections on the Rowntree Cocoa Works include the many publications by Rowntree's staff at the Cocoa Works, the *Bulletin of the Taylor Society*, and extensive Rowntree & Company and Seebohm Rowntree archival material held at the Borthwick Institute. Sources used for the study of Mander's included the archive of the Management Research Groups, held at the LSE, and materials from the Mander archive in Wolverhampton. The UOP sections draw on materials held in the Lyndall Urwick archive at Henley Business School, the E.F.L. Brech archive at the Open University, and unused and extensive UOP reports held in the National Archives of Scotland.

4.2. B. Seebohm Rowntree

Benjamin Seebohm Rowntree (1871-1954) came from a wealthy Quaker, Liberal background and was educated at the Quaker school at York. He studied chemistry for five terms at Owen's College, Manchester, before returning to York to conduct laboratory research at his family's expanding Cocoa Works. In 1897 Rowntree & Company went public, and Seebohm was made a director of the company. Inspired by Charles Booth's study of poverty in London, and similar work by his father Joseph, Seebohm conducted a study of poverty in York from 1897-8, in which he revealed that around one third of the town's population were living in poverty.⁴ His first study was published as *Poverty: A Study of Town Life* in 1901, to great acclaim.

In the industrial sphere, Rowntree was particularly concerned about wages, and keen that men's jobs should pay a minimum wage

sufficient to allow him to marry, to live in a decent house, and to maintain a household of normal size (generally taken as consisting of five persons) in physical efficiency, with a moderate margin for contingencies and recreation.⁵

⁴ B. Seebohm Rowntree, *Poverty: A Study of Town Life* (London: Macmillan, 1901). To the present day, Rowntree's studies of York remain iconic in narratives about the trajectory of the British welfare state. As seen in chapter 2, Rowntree's study of poverty in York was one of the principal pieces of evidence that F.W. Taylor used to demonstrate the intolerable level of poverty in England.

⁵ Rowntree, *Human Factor in Business*, pp.1-2. The phrase *physical efficiency* appears in Rowntree's book *Poverty* many times.

A firm believer in the moral rectitude of thrift, Rowntree was also socially conservative and strongly encouraged sobriety: drinking alcohol, gambling and other forms of wasteful or damaging luxury were to be discouraged. He also discouraged excessive individualism and aimed to achieve an improved corporate spirit among workers the Cocoa Works. For this reason, he favoured employing *in situ* specialists rather than consultants.

A friend of David Lloyd George, and convenor of the Welfare Workers' Association (founded by Rowntree in 1913), Rowntree was brought into government in late 1915 as head of the Health of Munition Workers' Committee at the Ministry of Munitions. Here Rowntree first heard of the work of Frederick Taylor and other figures in the scientific management movement.⁶ As noted by his father, Seebohm Rowntree heard of it as head of the Health of Munitions Workers' Committee:

B.S.R. is giving thought to Scientific Management, and I expect good results will follow the enquiry. But the forms of S.M. so far reported upon, while probably greatly helping the individual worker, do not promise help towards the creation of a corporate spirit.⁷

He also cannot have failed to hear the rumours that weak labour cost controls and primitive wage incentive plans at Ministry plants were enabling workers, especially young female conscripts, to earn extremely high wages.⁸ In March 1917 Lloyd George, by then Prime Minister, also appointed Rowntree to his reconstruction committee. The committee issued a pamphlet of advice for British business, in which they stressed the importance of closer attention to employee welfare, strong leadership, the importance of bonus plans in incentivising greater output, the use of labour-saving equipment, and better training for managers and workers alike. Above all the committee stressed that 'One of the most important factors in the direction of a concern lies in the cost system, which might be

⁶ Briggs, *Social Thought and Social Action*, p.118. For studies of the HMWC, see Arthur McIvor, 'Manual Work, Technology, and Industrial Health, 1918-39' *Medical History* Vol. 31 (1987), pp.160-189; Arthur McIvor, 'Employers, the Government, and Industrial Health in Britain, 1890-1918' *British Journal of Industrial Medicine*, Vol. 44 (1987), pp.724-732; Steven Kreis, 'Early Experiments in British Scientific Management: Health of Munitions Workers' Committee, 1915-1920, *Journal of Management History* Vol. 1, No.2 (1995), pp.65-78.

⁷ Joseph Rowntree, *The Labour Question at the Cocoa Works* (January 1916). BI, Rowntree archives, R&Co 93/IX/2.

⁸ For contemporary rumours about the extravagance created by high munitions workers' wages, see Mrs Humphry Ward, *England's Effort: Letters to an American Friend* (New York: Charles Scribner's Sons, 1916), pp.177-8

described as the pulse of the whole organisation'.⁹

Over the following years, Rowntree established an international reputation as one of Britain's leading business intellectuals. His focus was on increasing industrial cooperation, worker welfare, and industrial efficiency. Costing was a particular focus, as it tessellated well with his desire to quantitatively analyse and monitor his works as closely as possible. Delivering a speech in Manchester in 1918, he stressed that these three goals were interlinked, but that costing and efficiency assessment came first:

What is needed here is a critical examination of each process, to see whether the productivity of every unit of labour cannot be increased ... [a specialist engineer] will (perhaps with the aid of an accountant) closely analyse the working costs, and, if possible, compare them with costs elsewhere. The splitting up of costs and their comparison with those in other factories are a wonderful means of enabling an employer to place his finger on the weak spots. It is not enough to compare the total working costs with those of other manufacturers - they must be split up as minutely as possible ... only when every process in the factory has been submitted to a minute examination is an employer really in a position to say whether his industry can or cannot afford to pay higher wages.¹⁰

Intensely anti-Bolshevik and pacifist, with a scientific belief in the power of expert decision-making, and with an 'optimistic and positivist conviction that through steady application and careful thought all problems could be solved', Rowntree had become alert to the increased leverage that labour had gained during and after the war.¹¹ As such, he warmed to trade unions and instituted collective bargaining in this period.¹² He was well known for his desire for industrial peace, so much so that in delivering a lecture at Cambridge in July 1919, Robert Stelling compared Rowntree's thoughts on industrial peace with F.W. Taylor's third principle from Taylor's *Principles of Scientific Management*, that is, obtaining the 'hearty cooperation of the worker'.¹³

Using his experience in business and government, Rowntree published *The Human Factor in Business* in 1921, the same year of the foundation of the National Institute of

⁹ Ministry of Reconstruction, *Scientific Business Management* (London: HMSO, 1919), p.8.

¹⁰ *Social Obligations of Industry to Labour*, 12 November 1918, pp.9-10. Held at BI, Rowntree archive, LEC/7.

¹¹ Quote from the ODNB.

¹² Fitzgerald, *Rowntree*, pp.243-263.

¹³ A. Robert Stelling, 'Taylor's Principles in Modern British Management' in Bernard Muscio (ed.) *Lectures on Industrial Administration* (London: Sir Isaac Pitman and Sons, 1920), p.70.

Industrial Psychology, in which Rowntree was involved and later President.¹⁴ The book was reprinted numerous times in the interwar period and was one of the most developed volumes published by an interwar British business intellectual. From the outset, Rowntree made it clear that higher wages were an employers' responsibility but that

the wages of unskilled workers in industry to-day are too low, largely because the industries cannot afford to increase them. It is, then, one of the first responsibilities of employers towards the workers to raise the standard of efficiency within the factory.¹⁵

Moreover, this would allow employers to peg wages to a minimum wage, as calculated by qualified specialists. To Rowntree, the minimum wage was the ideal way of fixing the minimum level of production which could be expected of workers. The two should be directly linked:

It is, then, one of the first responsibilities of employers towards the workers to raise the standard of efficiency within the factory; for substantially higher wages can only be paid in proportion as they are earned.¹⁶

He described how the Cocoa Works had recently established a centralised Wages Department, which monitored wages and the cost of living, and applied appropriate piecework bonuses and worker grading. He downplayed the importance of profit-sharing as

I feel that real efficiency cannot be attained until every worker is given some direct interest, not only in the performance of his individual job, but in the success of the whole undertaking, and is completely secured against any exploitation by his employer. It seems quite possible that these ends might be achieved, without detriment to the interests of organised Labour, by a judicious blend of payment by results, profit-sharing and control-sharing.¹⁷

Also in 1921, Rowntree visited the USA, and inspected a variety of factories, including Bedaux's clients Kodak, Swift's, and Hood Rubber. As seen in chapter 2, he was particularly complimentary about the *B*-based labour costing system at Hood's.

Rowntree was made acting Chairman of Rowntree's that year, and Chairman in 1923. Since Rowntree had become a director of the firm, the factory had grown very

¹⁴ For a study of the interwar NIIP, see D.C. Doyle, 'Aspects of the Institutionalisation of British Psychology: the National Institute of Industrial Psychology, 1921-1939' (PhD thesis, Manchester University, 1979).

¹⁵ Rowntree, *Human Factor*, p.4.

¹⁶ Rowntree, *Human Factor*, p.4.

¹⁷ Rowntree, *Human Factor*, p.19.

considerably, and many other industrial firms had grown even more. Rowntree argued that due to the 'remarkable growth in the size of the business unit' since the turn of the century, 'modern enterprise requires new methods and standards of skill in the control of its affairs' and that 'such methods can only be developed by those who are prepared to work upon problems of administration in the scientific spirit'. Specifically

Science works by analysis, classification, measurement, experimentation, and comparison. The scientific spirit seeks to use, in all humility, the knowledge accumulated by the work of others, and to add, if possible, a contribution, however small, to the common stock. The professional attitude requires that experimental work should be submitted to the criticism of other workers in the profession and that no opportunity should be lost of uniting those engaged in like tasks around the common problems of their craft. The structure of a better industrial order can only be built brick by brick, each company and each country adding its quota of experience and experiment.¹⁸

Rowntree praised US firms for having specialist labour and psychology departments, and summarised the American organisation of work:

There, the best employers realise that there is a science of administration, just as there is a science of chemistry or of physics; and they are trying to define and understand this science ... Every job in the factory has been closely time-studied and job-studied. No piece-rate is fixed carelessly, and the workers are trained to do the job in the best way. A standard time is set for every operation.¹⁹

Rowntree became increasingly involved with Americans and American businessmen admired him. He became a particular friend of Henry Dennison, and was increasingly drawn to the Taylor Society from the 1920s onwards.²⁰ In summer 1924, the Managing Director of the Taylor Society, H.S. Person, visited the plant and described it as 'one of the best examples of advanced management in England'.²¹ Rowntree and his staff were known for their American leanings to the extent that one speaker at an event remarked that since the book he was referring to was 'an American book, probably only two or three people, even in Rowntree's works, have ever seen it - and they will not give me away!'²²

¹⁸ Introduction to Lyndall Urwick, E. Aston and F.H. Cordukes, *Organising a Sales Office* (London: Gollancz, 1928).

¹⁹ B. Seebohm Rowntree, 'A Study of American Efficiency Methods' *Lecture Conference for Works Directors, Managers, Foremen and Forewomen*, 6-10 April 1922, pp.35-8. See also B. Seebohm Rowntree, *Human Factor*, pp.12-15.

²⁰ Kyle Bruce, 'Henry S. Dennison, Elton Mayo, and Human Relations historiography' *Management & Organizational History* Vol. 1, No. 2 (2006), pp.177-199.

²¹ H.S. Person, 'The Managing Director Meets French and English Members', *Bulletin of the Taylor Society* Vol. 9, No.5 (October 1924), p.199.

²² J.H. Jones, 'How Can One Measure Industrial Efficiency?' *Twenty-Fifth Lecture Conference for Works Directors, Managers, Foremen and Forewomen*, 29 September to 3 October 1927, p.9.

In an attempt to combat British industry's entrenched secrecy and share best practices, Rowntree established the Management Research Groups (MRG) in 1926. He put Urwick in charge of them, who was joined by C.F. Merriam of BX, as seen in chapters 2 and 3, a firm keen on both Taylor and Bedaux.²³ The MRG consisted of non-competing private sector manufacturers and had the purpose of privately sharing best practices among prominent business leaders. Other large and influential members of the MRG included ICI, Unilever, and Dunlop's.²⁴

The Rowntree approach to factory management continued to expand its influence in the late 1920s, particularly in the publication of the Liberal Party's 'Yellow Book' *Britain's Industrial Future* in 1928. Relevant participants included the party's leader Lloyd George, Rowntree on the executive committee, and Urwick, Renold and Cadbury on special committees. *Britain's Industrial Future* drew heavily on arguments made in Rowntree's *Human Factor in Business*, and argued for high wages correlating to high levels of work efficiency, and the importance of trades unions in increasing worker efficiency and wages. It also advocated the use of piece work or fellowship systems in as many industries as possible. These would in turn generate useful wage data which could be used for comparison with other industries to ensure that workers were receiving both *minimum* and *standard* wages.²⁵ Moreover, *Britain's Industrial Future* praised the USA for state intervention in standardisation, argued for the creation of a Ministry of Industry to stimulate 'and encouraging the efficiency of industry' and an Institute of Management,

the functions of which would not be so much the promotion of pure research as the discussion of problems of organisation, and a policy of fostering the application of the results of research throughout the whole of industry. We recommend that such an institute should be founded by Industrialists, Labour Organisations, and the State working together, and that the State should take whatever steps are necessary towards its foundation.²⁶

²³ Rowntree had obtained the idea from Henry Dennison, whose Management Research Association Rowntree had seen in operation. See Brech, Thomson, and Wilson, *Lyndall Urwick*, pp.38-9. According to Fitzgerald, *Rowntree*, p.266, Dennison 'became Seebohm's model enterprise'.

²⁴ Had the MRG publicly published its debates, its activities would no doubt be better known to historians. Their confidential nature makes them a valuable source for the historian of interwar British industry. The sector was subtly, but importantly, extremely secretive. This is a feature of the period not immediately obvious when consulting these sources.

²⁵ Liberal Party, *Britain's Industrial Future: Being the Report of the Liberal Industrial Inquiry of 1928* (2nd edition, London and Tonbridge: Ernest Benn Limited, 1977), chapter 16.

²⁶ Liberal Party, *Britain's Industrial Future*, pp.131-2.

The debate about work incentives and pay particularly came to the fore in a debate between Henry Ford, Seebohm Rowntree and Sir Herbert Austin in *The Spectator* the following year, when the depression was at its deepest and it was obvious that greater management intervention had become necessary. Ford's argument was that British industry was too conservative in its management methods, and also that state intervention or subsidies would not work. He argued that higher wages instead of the British 'pinch and scrape' attitude would help to boost demand and thus consumption. 'And as demand increases efficiency will also increase, since the better-paid workers will work better'. Of businesses which were 'not efficient enough to pay high wages, the sooner they go the better'. Ford concluded that

The high wages which must come if British industry is to be saved will only come though this one thing - the birth of a new spirit of enterprise and initiative among the leaders of British industry. The wages will be the evidence of that spirit - an act of confidence in a fundamental principle of social well-being.²⁷

Ford's comments, 'aroused considerable interest,' and Rowntree and Sir Herbert Austin were invited to respond. Austin agreed with Ford's remarks on higher wages and suggested that British unemployment could be cured by reducing American import duties and the deferment of British war debts to the USA. Rowntree, on the other hand, replied that higher wages would be welcome, and would indeed increase consumption, but that the core issue facing British industry was that British factories were not efficient enough. He also agreed with Ford that the instantaneous raising of wages would have a dramatic effect,

But I am afraid that the result, though certainly instantaneous, would be similar to that of electrocution! There is only one way to solve our many difficulties - it is to make the standard of efficiency in British industry compare favourably with that of every other country. And each employer should make it his duty to see that wages increase in proportion with the increasing efficiency of the factory. Every industry, every factory which pays low wages is a menace to the welfare of the community, because it is not providing its due share of purchasing power.²⁸

Which commentator won the debate, and others like them, depended on one's geographical location. There is evidence that Ford's approach was influential in the United

²⁷ 'Mr Henry Ford on British Unemployment' *The Spectator*, 29 March 1930.

²⁸ 'Mr Ford and British Industry' *The Spectator*, 5 April 1930.

States, including on President Hoover.²⁹ Indeed, it is certainly possible that work measurement systems like Bedaux which were connected to payment-by-results became increasingly unfashionable in the United States in the early depression years due precisely to the popularity of Ford's mutually exclusive approach.³⁰ In contrast, in Britain, Ford's calls fell largely on deaf ears, with notable exceptions being an assorted mixture including the British Union of Fascists, the rubber magnate Sir Eric Geddes, and the novelist Aldous Huxley, whose *Brave New World* (1932) featured Ford as a central, godlike character.³¹ British manufacturers were actually far more likely to adopt payment-by-results methods which synchronised well with dominant ideas in influential nonconformist business circles related to earnings, measurement, and efficiency.³²

Significant in the management cause was the staging of the Sixth International Congress of Scientific Management in London in 1935. Of course, the event did not take place in a vacuum. Hitler had come to power in Germany, and the fact that Mussolini had been the keynote speaker at the equivalent event in Rome in 1927, at which two thousand officials and military officers, plus Urwick and the Taylor Society, had listened to him praise Frederick Taylor, cannot have been lost on Urwick and many others who attended the London event.³³

London was a particularly suitable location as Lord Leverhulme of Unilever had

²⁹ Roger Babson, *Washington and the Depression: Including the Career of W.N. Noak* (New York and London: Harper & Brothers, 1932), pp.79-80 remarked that 'unfortunately Mr. Henry Ford and certain other of the newer rich manufacturers' had convinced President Hoover that 'high wages are necessary to keep the people's purchasing power high'. For Ford's maintenance of high wages at his works during the depression, see Charles E. Sorensen, *Forty Years With Ford* (London: Jonathan Cape, 1957), chapter 18.

³⁰ See McKenna, *World's Newest Profession* for broader issues related to this discussion and consultants.

³¹ Sir Eric Geddes, *Mass Production: the Revolution Which Changes Everything* (London: Pelican Press, 1931), was positive about Ford, though Geddes was writing as Chairman of Dunlop and was presumably angling to supply Ford's new British plant with rubber tyres. Sir Oswald Mosley was more cautious. For his visit to Ford's Detroit works, see Sir Oswald Mosley, *My Life* (London: Thomas Nelson and Sons, 1968), chapter 11. In an explicit mimicry of Mussolini, 'Production Under Fascism' *The Blackshirt* No. 34 16-22 December 1933 called for 'scientific management and [a] National Council of Corporations' to combat 'relative over-production' and to increase industrial efficiency.

³² See Lyndall Urwick archive, Henley Business School, box 9, *Ford Principles of Management* (25 May 1923). As examined in chapters 5 and 6, Rowntree's beliefs in merit-based reward, individual responsibility, and the moral rectitude of thrift were also generally supported by leading members of the labour movement such as Bevin and Cripps. It is therefore not surprising that such increasingly broad agreement from across the political spectrum would create fertile ground for such work measurement systems as Bedaux in the postwar period.

³³ Taylor's former assistant, Morris L. Cooke, now head of the Taylor Society, preceded Mussolini with a speech. Full details on the event can be found in SI, F.W. Taylor papers, Box 121B.

been chairman of CIOS from 1933-5. Largely cultivated by the MRG, and backed by the FBrl, it was the first such international congress to be funded by the private sector. One historian has noted that the London event 'brought a radical change' to CIOS as 'not only did top executives turn up for the first time, they even took over direction of the CIOS'.³⁴ Rowntree and Urwick were on the executive committee of the huge event, and the Cocoa Works was one of ten model British factories visited by delegates. Sir George Beharrell of Dunlop's and Imperial Airways was its chairman, and the Prince of Wales, later Edward VIII, was its patron. In his speech at the event, the Prince remarked that the prior congresses 'bore valuable fruit in inspiration and in increased efficiency'.³⁵ Its Vice-Patrons were the Prime Minister, the President of the Board of Trade, the Minister of Agriculture, the Lord Mayor of London, the President of the FBrl, and the President of the Association of British Chambers of Commerce.³⁶

The congress was a success, and was attended by an exhaustive list of 1,443 British, and international business people, academics, management professionals, MPs, and industrial consultants of all kinds. The Bedaux company was a donor, and, supporting chapter 3's examination of Bedaux's later demonisation, no eyebrows appear to have been raised.³⁷ Discussion of the factory floor at the London event was largely absent due to the desire to avoid confrontation with the labour movement, so 'great care has been taken to keep the programme clear of all labour issues whatsoever'.³⁸ Following the congress, the influence of Rowntree and other manufacturers continued to expand. The formation of the British Management Council in January 1937, with Leverhulme as its chair, helped to link their cause to other professional organisations and augment the MRG's research.³⁹ Most

³⁴ Erik Bloemen, 'The Movement for Scientific Management in Europe Between the Wars' in J-C Spender and Hugo Kline (eds.), *Scientific Management: Frederick Winslow Taylor's Gift To The World?* (New Jersey: Rutgers University Press, 1996), pp.111-133.

³⁵ CIOS, *Proceedings of the Sixth International Congress for Scientific Management* (London: PS King and Son, 1935), p.172.

³⁶ CIOS, *Proceedings*, p.9.

³⁷ There are too many to list individually, but its council consisted of 62 British professional bodies and related organisations.

³⁸ See summary of event, NA, BT 64/33, dated 23 February 1935. When asked, 'Mr Citrine saw no TUC objection to the FB[r]l's plans for the organisation of the International Congress on Scientific Management'.

³⁹ It was also from this point onwards that Urwick began to argue that scientific management had British roots, specifically in the form of Charles Babbage. See L. Urwick, 'How the Scientific Management

importantly, it also laid the first and tangible foundations for the British Institute of Management, examined in chapter 5.

Rowntree's contemplations on the merits of consultants continued into the later 1930s, although he still remained in favour of *in situ* specialists. In 1937, he even made a rare reference to Taylor:

There is among industrialists a suspicion of 'efficiency experts' which is sometimes justified. It can be traced nearly always to experience of the application of some 'system' which, while it has yielded immediate savings, was not properly adapted to the particular situation or was introduced too quickly for the minds of the staff who would have to work it, to grasp and appreciate the principles involved. On the withdrawal of the 'expert' the economies have disappeared progressively from the accounts. The elements of what may have been a well-conceived practice have been whittled away under pressure of circumstances, because it lacked the support of principles which were understood and accepted. Within a few years the company has realized that there remains no appreciable result to show for it.

Reorganization work, if it is to be sound and enduring, must be educational. F.W. Taylor once wrote of Scientific Management that it involved a 'mental revolution.' Unless that 'revolution' has taken place in the minds of the personnel concerned, the best of 'systems' will not prove of great value in practice.⁴⁰

However, the explicit linking of Taylor and scientific management with Bedaux and Nazi Germany in November that year presented a problem for British manufacturers, particularly for Rowntree and his circle, who had been praising Taylor some time.⁴¹ The Urwick's response to the Bedaux fiasco, or at least in tandem with it, was to start to write histories of British management which did not contain Bedaux.⁴² Perhaps related, when a revised edition of Rowntree's *Human Factor in Business* newly subtitled *Further Experiments in Industrial Democracy*, was republished in 1938, all prior references to scientific management by name were gone.⁴³ Moreover, both British and American manufacturers increasingly praised Rowntree and his long-standing efforts to achieve

Movement is Developing Here' *Industry Illustrated* (May, 1937), pp.18-19.

⁴⁰ Lyndall Urwick, *Organizing a Sales Office* (London: Isaac Pitman and Sons, 1937), pp.xvii-xviii.

⁴¹ *The New Statesman and Nation* described how the Bedaux system dated back 'as long ago as 1911, in the early days of "Scientific Management" and the "Taylor system"' and that workers and trades unionists 'will never accept the claim that "Bedaux" is scientific, any more than they accepted the same claim when it was made for the Taylor system'. See 'Why Labour Hates Bedaux' *The New Statesman and Nation*, 13 November 1937.

⁴² The only mention of 'C.E. Bedaux' in Urwick's published histories of scientific management was in Lyndall Urwick, 'The Development of Scientific Management in Great Britain', *British Management Review* (1938), p.68. See chapter 7 for more discussion of this issue.

⁴³ B. Seebohm Rowntree, *The Human Factor in Business: Further Experiments in Industrial Democracy* (Edinburgh: Longman's, Green & Co., 1938).

industrial democracy.⁴⁴ They also continued to publicly link Rowntree and scientific management, as a philosophy at least. Addressing the Oxford conference on Optimum Productivity in Modern Industry in 1938, Taylor's former friend and co-author Sanford Thompson remarked that Americans had inadequate knowledge of how much scientific management had developed as a *philosophy* in Britain, particularly in the Rowntree circle:

Judging from the ideals and accomplishments of Mr. B. Seebohm Rowntree, whom I had the pleasure of meeting in New York City this winter, I feel that our position in certain aspects of scientific management may be sadly lacking in comparison with the British attainments. Certainly no American can be named with a broader vision and comprehension of the basic factors underlying the problems which are being discussed at this present conference.⁴⁵

His reputation in the USA increased: Rowntree's sixteen-point business philosophy was used as the cover for the February 1939 edition of the *Bulletin of the Society of the Advancement of Management*, the successor to the Taylor Society. He was the only business leader apart from Taylor, of any nationality, to receive such treatment. The next section examines the circle Rowntree recruited to the Cocoa Works in the 1920s.

4.3. Key personnel at the Rowntree Cocoa Works

In contrast to other manufacturers, such as ICI, the Cadburys, Mander, and Leverhulme, Rowntree chose to employ specialists as internal consultants at the plant, or to give new work to extant staff, rather than employing outside consultants. Rowntree employed numerous young graduates, four of whom, Lyndall Urwick, Oliver Sheldon, Clarence Northcott, and William Wallace, will be examined. Each became published and well-known members of the British business community.⁴⁶ Many other individuals and publications

⁴⁴ Commentators in Britain connected to Rowntree spoke much of *industrial democracy*. See C.H. Northcott, 'Leadership in a Free Society' *Industry Illustrated* Vol. 6, No. 3 (March, 1938), pp.11-12; C.H. Northcott, 'Survey of the Conditions Necessary for Optimum Productivity' *British Management Review* Vol. 3, No. 3 (1938), pp.213-223, in which Northcott concluded by stating that 'the more I see of the struggle between totalitarian states and democracy, the most I am coming to believe, not merely in democracy, but in a democratic organisation of industry'. See chapter 5 for similar discussions involving Northcott during the war. For similar pronouncements in the US by Morris L. Cooke, see Nyland, Bruce and Burns, 'Taylorism'.

⁴⁵ Sanford E. Thompson, 'Optimum Productivity in the Workshop' *British Management Review* (1938), p.132.

⁴⁶ Other figures of note employed by Rowntree's were its first works psychologist Dr Victor Morreess, Dr J.B. Morrell, J.W. Wardropper, and Nigel Balchin. Industrial psychology at the Cocoa Works has received the attention of historians. See Wendy Hollway, 'Efficiency and Welfare: Industrial Psychology at Rowntree's Cocoa Works' *Theory Psychology* Vol. 3, No. 3 (1993), pp.303-322; Geoff Bunn, 'Charlie and

connected to Rowntree and the Cocoa Works could be examined.⁴⁷ Rowntree's focus on sharing best practices and principles of industrial management were boosted when his staff published two books in 1928, one on the operations of the Cocoa Works, the other on changes made at the plant's offices. The purpose of these books, and the many others which poured out of the Cocoa Works and its staff, was to propagate 'a more scientific business attitude'.⁴⁸

The personal life and publications of Lyndall Urwick (1891-1983) have been examined in detail in a recent biography, though his biographers did not examine Urwick's industrial practices.⁴⁹ It is possible to draw on Urwick's unpublished autobiography, and a number of other sources, to explore much about these additional aspects of Urwick's life. Urwick was born into a Liberal family which owned Fownes Bros., a Worcester-based gloves factory. He studied Modern History at New College, Oxford, and returned to family business as a manager.⁵⁰ He served as an officer working in supply and logistics during the First World War, where, he recalled in later life, he was informed about Taylor's *Shop Management* by a superior officer:

I first read it sitting on the firestep just short of Hooze crater on some Summer mornings in July 1915. And I knew the minute I had read it, that this is what I had been looking for unconsciously at Oxford. This book made of being in business not a mere scramble for more money ... Taylor's book made of managing the family business, if that was what fate had in store for me, a fascinating intellectual adventure. I made up my mind then and there that, if I survived, that which nothing at the moment seemed less probable, this was what I would do. The practice of management and the study of management though its practice was my 'calling', what I had to do to try and make myself useful as a man and as a citizen. But it was also wanted to do as an individual.⁵¹

the Chocolate Factory', *The Psychologist* Vol. 14, No. 11 (2001), p.576-9; Derek M. Collett, 'Mixing Business with Pleasure - an Evaluation of Nigel Balchin's Twin Careers as Industrial Psychologist and Writer' *History & Philosophy of Psychology* Vol. 11, No. 2 (2009), pp.12-24.

⁴⁷ One of the most colourful is Trebitsch Lincoln, the pathological con man and Liberal MP for Darlington from 1910-11. Completely absent from standard accounts of Rowntree's life, Lincoln stole large sums from Rowntree, abused his trust on many occasions, and used Rowntree's political connections to gain access to Foreign Office networks overseas. He was later a spy for Nazi Germany and the Japanese, as well as being consulted as an alleged expert on Buddhism and Tibet, which only deepened the interest that senior Nazis had in him. For Lincoln's life story, see Bernard Wasserstein, *The Secret Lives of Trebitsch Lincoln* (London: Penguin, 1989).

⁴⁸ They were published as Urwick, Aston and Cordukes, *Organising a Sales Office* and Clarence Northcott, Oliver Sheldon, J.W. Wardropper, L. Urwick, *Factory Organization* (London: Isaac Pitman, 1928).

⁴⁹ Brech, Thomson and Wilson, *Lyndall Urwick*.

⁵⁰ It remains to be seen if Urwick was able to implement any elements of scientific management at the family firm before he left in late 1920. I spoke with the present-day Chairman of the successor company, Dent's, on 19 May 2013, and was informed that they do not hold Fownes' records.

⁵¹ L.F. Urwick, *Management Pilgrimage* (unpublished autobiography), HBS, Lyndall Urwick papers, Box 12,

Due to his well-known enthusiasm for scientific management, Urwick was invited to address Rowntree's Oxford conference in 1921, where he delivered a paper on 'Management as a Science', which argued that F.W. Taylor's scientific management could be compared to laboratory research.⁵² Impressed, Rowntree offered to fund a PhD in industrial psychology at Cambridge, to study under Charles Myers, which Urwick rejected because he thought the industrial psychology approach was too reductive.⁵³ He was instead given a variety of organisational jobs as an internal consultant at the Cocoa Works, examined later in this chapter.

During his time at Rowntree's, Urwick was recruited as Director of the American-funded IMI, based in Geneva from November 1928 until January 1933. While at the IMI, Urwick published *The Meaning of Rationalisation* (1929) and *The Management of Tomorrow* (1933), his most explicit expositions of F.W. Taylor and an increasingly philosophical 'scientific management'. His appointment helped to secure his place on the international management circuit, with the Taylor Society describing Urwick in 1931 as one of its 'distinguished members'.⁵⁴ In addition to Urwick and Bedaux Britain (examined chapter 3), British industry was represented at the IMI by Seebohm Rowntree and Charles Renold, both of whom were members of the institute.⁵⁵

Clarence Hunter Northcott (1880-1968) was an Australian Methodist who studied sociology at the University of Sydney, while also teaching at the Workers' Educational Association. Northcott moved to Columbia University in New York in 1916 to conduct doctoral research under the renowned sociologist and recent president of the American Sociological Association, Franklin Giddings. Northcott's PhD thesis was published as a book entitled *Australian Social Development* in 1918, and was an examination of the

8/3/1, chapter 2, p.8.

⁵² Lyndall Urwick, 'Management as a Science' in *Lecture Conference for Works Directors, Managers, Foreman and Forewomen, April 14th to 18th, 1921*.

⁵³ He nevertheless described the National Institute of Industrial Psychology as 'essentially in line with Taylor's cast of mind'. See Lyndall Urwick, *The Meaning of Rationalisation* (London, Nisbet & Co., 1929), p.60. Urwick recorded in *Management Pilgrimage* that he was friends with the Webbs and began a PhD under them at the LSE, doctoral research into the history of the British glove industry. He did not complete his doctorate.

⁵⁴ 'Major Urwick', *Bulletin of the Taylor Society* Vol. 16, No. 2 (April 1931), p.83.

⁵⁵ *Bulletin of the International Management Institute* Vol. 6, No. 4 (April 1932).

Australian social character and the place of efficiency within it.⁵⁶ As a consequence of his work in this field, and his Australian familiarity with questions surrounding the minimum wage, Northcott was recruited to the National Industrial Conference Board (NICB) at Boston.⁵⁷ He was recruited from the NICB by Seeborn Rowntree as Head of Wages at the Cocoa Works, where he then held the position of Labour Manager from 1924-46. He was also appointed as the Chairman of the Labour Section of the MRG. Northcott was a key player in the reframing of the Institute of Welfare Workers into the Institute of Labour Management in 1931, and subsequently became president of its successor organisation, the Institute of Personnel Management. He conducted a survey of the efficiency of African workers after the war.⁵⁸ He also published several volumes including *Personnel Management* (1945) and *Christian Principles in Industry* (1958).

Both Rowntree and Northcott were alert to the notion that standard times for work would have to be set by precise experiments, and that these experiments would have to be conducted under agreement with the workers and their representatives. Northcott stressed the 'much quoted advice of Mr Sidney Webb concerning the introduction of scientific management', which stated that workers' greatest fear was that rates may be cut by future managers. Webb's advice was to openly introduce scientific management to a factory's workers as a whole, with the consent of the works committee or shop stewards, rather than to surreptitiously test it on a small number of workers.⁵⁹ As examined later in this chapter, it would be difficult to find a British factory at which Webb's advice was followed more closely.

Like Urwick, Oliver Sheldon (1894-1951) was an Oxford University history graduate. Sheldon served in the Royal Engineers in World War One and after the war he applied to the Civil Service but instead went to work for Rowntree at York. Sheldon was initially employed under Northcott but by July 1920 was reassigned as Rowntree's personal

⁵⁶ C.H. Northcott, *Australian Social Development* (New York: Longmans, Green & Co., 1918), p.135.

⁵⁷ For his experience with the minimum wage in Australia, see C.H. Northcott, 'The Human Factor in Industry IV' *Industrial Management* (c.1921), pp.18-19.

⁵⁸ This research was published as C.H. Northcott, *African Labour Efficiency Survey* (London: HMSO, 1949).

⁵⁹ C.H. Northcott, 'Human Factor in Industry III' *Industrial Management* (c.1921), pp.14-15.

assistant. In 1921, poor sales forced the company to restructure and Sheldon was put in charge of the new Organisation Office and was made editor of the *Cocoa Staff Works Journal*. Like Rowntree and Urwick, Sheldon was similar to many US management theorists who believed that Taylor's scientific management needed to be combined with worker and union consultation, and provisions for welfare.⁶⁰ Sheldon's volume *The Philosophy of Management* (1923) was well known, and his frequent contributions to the *Bulletin of the Taylor Society* in which he stressed the fundamentals of Taylor's scientific management were, despite American claims to the contrary, being used on a significant scale in both British industry and higher education.⁶¹ By 1929, both Sheldon and the Rowntree firm had joined the Taylor Society and, with Urwick, Sheldon was a delegate at the Stevens Institute's 1933 celebration of Taylor's graduation.⁶²

Sheldon argued that the principal purpose of his proposed reforms was to 'to make the best and fullest use of human power' because 'the operative components of an organization are the human beings'. 'We speak of an organization as a machine, but each cog and shaft is a human being. If, therefore, the machine is to run easily and efficiently, the conditions must be such as will induce human beings to work easily and efficiently'.⁶³ He believed that 'Management is elaborate planning systems, employment departments, welfare schemes, time studies, foremen's development courses, costing systems, research bodies'. Most importantly, Sheldon, like Taylor and many other business leaders of the time, believed that the main challenge to increasing worker output was to study the a corpus of industrial management knowledge and to produce a standardised oeuvre of best management practice from it.⁶⁴

⁶⁰ Sheldon believed that 'Taylor the Creative Leader' was an epoch-making philosopher of the order of Jean-Jacques Rousseau. To Sheldon, scientific management 'was not a static system but a dynamic philosophy', 'a management directed by a social motive, yet operating by severely practical and scientific means. See Oliver Sheldon, 'Taylor the Creative Leader: An Analysis of Taylor's Contribution to the Problem of Human Welfare', *Bulletin of the Taylor Society* Vol. 10, No. 1 (February, 1925). Sheldon's opinions of Taylor were drawn from Copley's biography of Taylor.

⁶¹ Oliver Sheldon, 'The Art of Management from a British Point of View', *Bulletin of the Taylor Society* Vol. 8, No. 6 (December 1923), pp.209-214.

⁶² 'List of Participants of the Fiftieth Anniversary Celebration of the Graduation of Frederick Winslow Taylor', held in SI, F.W. Taylor papers, Box 162.

⁶³ Oliver Sheldon, 'Organization of Business Control' in Clarence Northcott, Oliver Sheldon, J.W. Wardropper, L. Urwick, *Factory Organization* (London: Isaac Pitman, 1928), pp.16-17.

⁶⁴ Oliver Sheldon, *The Philosophy of Management* (London: Isaac Pitman & Sons, 1923), p.154.

Specifically on Taylor, Sheldon's praised 'Taylor and his fellow exponents of "Scientific Management"' for subjecting manufacturing problems to 'scientific treatment' but rejected the notion of eight functional foremen as 'impracticable in British workshops' and asserted that it was in fact higher management which should be functionalised. Plus, 'the traditional idea of the foreman as the autocrat of the shop must also pass'. He thus advocated the professionalisation of the foreman and the use of 'additional experts in the different fields of management'. Sheldon also accepted that Taylor's call for industrial cooperation would yield positive results, but claimed that Taylor had misunderstood how workers' psychology operated and that industrial cooperation could not be enforced from above.⁶⁵

William Wallace (1891-1976) was the tee-totalling Quaker son of a Sunderland shipping lawyer. His autobiography contains much relevant information about his life. He studied law and, like Urwick, became acquainted with Fabians such as the Webbs and also H.G. Wells. Wallace passed his law examinations first out of six hundred candidates, and spent his spare time advising the poor on legal matters. After a trip to Tsarist Russia in 1913, during which he read Rowntree's *Poverty: A Study of Town Life*, Wallace wrote to Seebohm Rowntree describing him as 'the first real British social scientist'. He was summoned to aid Rowntree in the Reconstruction Committee, who appointed Wallace and a young Repton master, Victor Gollancz, to the newly formed Ministry of Reconstruction in summer 1917. Here Wallace worked on housing policy before being recruited by Rowntree to conduct research into co-partnership and profit-sharing.

Wallace got on well at Rowntree's. In 1923 Wallace was asked to set up the firm's Business and Economic Research Department circulating information on economics and trade to the firm's management. In 1924 Wallace established, with friends from similar firms, the Business Research and Management Association, which, he remembered with pride was later a component of the British Institute of Management, of which Wallace was a founder member. He attended all the meetings of the Rowntree's Management Research

⁶⁵ Sheldon, *Philosophy of Management*, chapter 4.

Groups. He took the new London University BCom degree as an external student and passed with flying colours. He then took the second ever MCom degree in Britain, after the Prince of Wales (later Edward VIII) had been awarded the first, and published it as a book, *Business Forecasting and its Practical Application* (1927).⁶⁶ Wallace was also responsible for dividing the firm into Functions instead of Departments and also took over Lyndall Urwick's job of Organising Secretary when he resigned in 1928. Like Rowntree, Wallace was also a lifelong Liberal, a friend of David Lloyd George and John Maynard Keynes, and formulated unemployment policies subsequent to the publishing of the Liberal *Yellow Book*. In 1931 he was also promoted to be a Director of Rowntree and in 1938 he was made responsible for all the overseas companies, including the Republic of Ireland, Canada, Australia and South Africa.⁶⁷ Having examined key personnel, the next section examines the Cocoa Works itself.

4.4. The Rowntree Cocoa Works

The British cocoa sector had benefited from the First World War, as it meant Britain had minimal access to the Swiss and French chocolate supplies on which many customers and retailers had hitherto been reliant. After the war, however, prices for cocoa and sugar increased considerably, leading to a necessary increase in product prices. Cadbury's response to this was to merge with Fry, forming Cadbury-Fry in 1919. By the 1920s Cadbury-Fry were not only the dominant confectionary company in Britain but were purveyors of Britain's best selling chocolate product, Dairy Milk.⁶⁸

Rowntree's formal appointment as Chairman of Rowntree's in 1923 marked the beginning of a new phase of experimental industrial management at the Cocoa Works, and indeed in Britain. Rowntree's protégé Urwick argued of the Cocoa Works that during

⁶⁶ William Wallace, *Business Forecasting and its Practical Application* (London: Pitman & Sons, 1927).

⁶⁷ Wallace was appointed to the Grand Council of the FBrl, and, in 1952, was appointed Chairman of Rowntree's. He, along with Sheldon, was instrumental in establishing the University of York. This information has been drawn from Wallace's autobiography, William Wallace, *I Was Concerned: the Autobiography of William Wallace* (York: Rowntree Mackintosh, 1985).

⁶⁸ For details of Cadbury-Fry, see Robert Fitzgerald, 'Products, Firms and Consumption: Cadbury and the Development of Marketing, 1900-1939' *Business History* Vol. 47, No. 4 (October, 2005), pp.511-31.

Rowntree's time as Chairman, 'the Cocoa Works at York was the finest practical university of management to be found anywhere in the world'.⁶⁹ It was certainly a site of much innovation related to business structures, marketing, food research and accountancy practices.⁷⁰ 1923 also saw the first Works Psychologist employed at Rowntree's, as opposed to being supplied by an outside consultancy; the first in Britain.⁷¹ 31 May 1923 also saw the visit of the Prince of Wales to the Cocoa Works, where Rowntree showed him around the factory and presented him with a custom-made 'Prince of Wales' selection of chocolates. The visit received extensive press coverage.⁷²

In an already competitive market, coupled with the slump of 1923-6, both Cadbury-Fry and Rowntree deepened marketing and product innovation.⁷³ They also innovated in the personnel management and work measurement sphere. Rowntree's increased focus on costing and work incentives on the factory floor is evident from the ways in which payment changed at the plant over time. In 1919, there were 5,159 employees (2,431 males and 2,728 females), numbers which had been static since 1917. 55% of males and 81.5% of females were on piecework, respectively down from 60% and 88% in 1914. These proportions varied considerably from one department to another, with the proportion of male pieceworkers varying from 99% in the Melangeur Department to 0% in the railway and elect departments. A similar story could be told for the female employees, with 100% of employees in the Gum Department being paid by piece work.⁷⁴

From this point onwards, there was a concerted effort to bring more workers under the remit of piece work, and then to tie this work to output incentives. By 1926 piece work levels in the Gum Department had surpassed their prewar amounts with males at 66.2%

⁶⁹ Urwick, 'Father of British Management', p.43.

⁷⁰ For the former, see Fitzgerald, *Marketing Revolution*. For scientific research at Rowntree's, see Sally Horrocks, 'Consuming Science: Science, Technology and Food in Britain, 1870-1939' (PhD thesis, Manchester University, 1993). For the latter, see White, 'Historical Study'.

⁷¹ From this point onwards, Rowntree's also introduced a plethora of motion studies, vocational tests, employee interviews, and experiments to determine the most effective methods of payment incentives. For details of these interventions, see Sheldon, Wardropper, Urwick, *Factory Organization*. See also Patricia Hall and H.W. Locke, *Incentives and Contentment* (London: Sir Isaac Pitman & Sons, 1938).

⁷² There are extensive clippings in BI, Rowntree archive, ARCH 721

⁷³ By far the best account of this activity at Rowntree's is Fitzgerald, *Rowntree*. On Cadbury, see Fitzgerald, 'Products, Firms and Consumption' and John Bradley, *Cadbury's Purple Reign: The Story Behind Chocolate's Best-Loved Brand* (Chichester: John Wiley & Sons, 2008).

⁷⁴ *Wage Report, 1919-1921*, BI, Rowntree archives, R/DL/LA/1/3.

and females at 81.8 %. The number of workers paid on bonus schemes had increased but stayed small, with 15.6% of men and 10.2% of women being paid on a variety of bespoke collective bonus schemes.⁷⁵ The proportion of piece workers continued to rise and was at 58.3% (male) and 86.7 % (female) by 1928-9.⁷⁶ By 1937 these proportions had decreased to 27.3% (male) and 21% (female) of a total workforce of 8,067.⁷⁷ Most of these workers were working under a work measurement system named the *Mark*, to which we next turn.

4.5. The Rowntree *Mark*

As seen in chapter 2, when Rowntree saw Bedaux's *Point* system in action at Hood Rubber in late 1921 he was impressed with it. But what did he do about it? Rowntree's management created a very similar work measurement system named the *Mark*. Like the *B*, the Rowntree *Mark* was a standardised measure of output which required prior and precise measurement of work processes thus: 'Each unit of work earned a definite number of marks and payment was made to the girls at the rate of 3½ *d* per 100 Marks, a higher rate being employed for men and a lower rate for juniors.' *Marks* produced by each worker were sometimes aggregated into group or departmental outputs for comparison with other such groups. If, as later happened in the Enrober Room, where payment was shifted to a group bonus system, different pay rates could be preserved. Like the Bedaux *B*, the *Mark* was used to calculate the relative efficiencies of different departments, although Rowntree reported departmental efficiencies in percentages rather than in absolute terms as Bedaux did.⁷⁸ The *Mark* became linked to time study in October-December 1923, after the Interim Industrial Reconstructions Committee of the Cocoa, Chocolate, Sugar Confectionery and Jam Industry (IIRC) had renegotiated its wage rates, which in turn necessitated time study across the works.⁷⁹

⁷⁵ *Wage Report, 1926*, BI, Rowntree archives, R/DL/LA/1/8.

⁷⁶ *Wage Report, 1930-1*, BI, Rowntree archives, R/DL/LA/1/11.

⁷⁷ *Wage Report, 1937-41*, BI, Rowntree archives, R/DL/LA/1/12. Data for the intervening period appear not to have survived.

⁷⁸ There is no evidence that Rowntree attempted to use *Marks* to compare their output with other firms, an explicit aim of the Bedaux system. However, there is no evidence that the Bedaux *B* was used for this purpose either.

⁷⁹ *Wage Report, 1928-9*, BI, Rowntree archives, R/DL/LA/1/10.

The operations of the Rowntree *Mark*, and the practices which developed around it, were very similar to the Bedaux *B* indeed. Both at ICI and at Rowntree's, the existence of a dedicated personnel manager appears to have been important, though job was not yet a formal profession. Both were usually connected to payment by results, and required extensive trade union negotiation and bureaucracy to ensure the system ran smoothly. Indeed, it is worth noting that the Rowntree *Mark* was instituted at the Cocoa Works in 1923, three years before the founding of Bedaux's British consultancy, and a full six years before the *B*'s institution at its showpiece British firm, ICI. Moreover, the Rowntree *Mark* covered a higher proportion of Rowntree's workers than the Bedaux engineers were able to achieve at ICI (see chapter 3); as will be seen, as the *Mark*'s use was expanded throughout the 1920s and 30s, the *Mark* even covered such jobbing tasks as maintenance and loading at sites remote from the York Cocoa Works. Other similarities with the Bedaux system were the *Mark*'s utility for comparisons between workers, groups of workers, and for departmental efficiency comparisons, and its requirement for a dedicated time study staff to measure work processes. Also like the Bedaux system, workers and departments scoring under 100% efficiency were marked in red.⁸⁰

Throughout the 1920s, Rowntree and his staff stayed in detailed touch with managerial developments in US factories, and with the Bedaux system specifically. Northcott proudly announced that 'that today they [American manufacturers] regard Rowntree's as an up-to-date efficiently-managed place'.⁸¹ Northcott visited twenty US factories in October 1926, of which five (F.N. Burt, Eastman Kodak, White Motor, Gillette Razor, and Hood Rubber) were using the Bedaux *B*.⁸² The majority of the remainder used combinations of piecework, incentive bonus systems, and time studies. A minority, such as

⁸⁰ Littler, *Development of the Labour Process*, chapter 8.

⁸¹ C.H. Northcott comment in 'The Labour Situation in the United States', *Cocoa Works Magazine* (Christmas, 1926), p.258.

⁸² During his visit to Hood, Northcott was also introduced to the concept of a foreman's manual. See C.H. Northcott, *Personnel Management: Its Scope and Practice* (3rd edition, London: Sir Isaac Pitman and Sons, 1947), p.156-7. For a detailed explication of an anonymised version of the Bedaux system at White Motor from a worker's perspective, see Hyacinthe Dubreuil, *Robots or men? A French workman's experience in American industry* (Taylor Society: Harper, 1930), pp.67-82, where Dubreuil states that 'there is no better example' of a 'Taylorized factory' than 'White Company's factory in Cleveland, Ohio'.

the National Candy Factory did not use a 'scientific method of fixing standards'. Four Bedaux clients had positive opinions on the Bedaux system, although the representative from Hood Rubber, a firm so important in the initial phase of Bedaux's career, had three criticisms.⁸³ Firstly, the Bedaux premium encouraged workers to spread their work over a longer period of time than necessary. Secondly, workers going beyond 100Bs per hour had led to arbitrary rate cutting and labour disputes. Thirdly, foremen were unhappy that when workers achieved over 80Bs foremen did not received their customary percentage of the workers' bonus.⁸⁴

Rowntree and his staff continued to expand these new practices to additional kinds of work. In the event of employees who could not be easily placed on piece work, this spurred the Rowntree Time Study department to be more imaginative with the way they measured work. Surviving records from time studies in the Despatch Department from c.1926-8 indicate the level to which work processes could be, and were, measured with microscopic precision. For example, the packing of a case for an Easter order was broken down into twelve 'elements' and each element was then recorded to the hundredth of a minute, which necessitated a decimal stop watch.⁸⁵ This allowed the time studier to calculate average times for the packing and loading of cases, and thus the relative efficiencies of each individual worker. In the week 6-14 October 1927, Despatch ran at an average of 106% efficiency, which had been calculated by comparing the relative efficiencies of each worker. In turn, worker efficiencies had been calculated by comparing the rate of weight X moved in time Y with the theoretical amount of time (compared with the standard) that it should have taken to move weight X. This allowed Time Study to calculate and permanently record the efficiency ratings for that week for each worker, from the highest (118%) to the lowest (90%).⁸⁶

By then the measurement of work and the assessment of standard times was fully

⁸³ For Hood Rubber and Bedaux, see chapter 3.

⁸⁴ Materials held in *America, 1922-28*, BI, Rowntree archives, Box 11.

⁸⁵ The elements in question were: check goods, bring cases, lid off, prep to pack, pack case, cut and fit, stencil, clean tops, nail lids, wheel to stage, wire lids, and write out check.

⁸⁶ Time Study Department records, BI, Rowntree archives, R/DP/PT/1.

codified. It set the standard outputs per 44 hour week, and, like the Bedaux system, included allowances for delays and fatigue. B. Moorhouse of the Time Study Department explained to the MRG that after materials, equipment, conditions and methods had been standardised, preliminary times studies were conducted in an experimental room. The majority of the time study staff were 'trained engineers'. Average workers were selected for the tests, with 'average' being determined on the previous quarters' earnings. When the work passed from the experimental room to the factory proper, time studies were conducted again, observed by a committee of management and workers, and rates agreed by both parties. Plus,

If the job were on a packing conveyor, probably as many as ten girls would be timed, each girl doing an operation. At the end of the test, their various times would be combined to arrive at the average for the whole job.

Moorhouse continued that allowances were added for fatigue, and, extrapolating out to the full working week, this allowed the investigator to arrive at standard outputs for each worker per week. These provisional rates were then forwarded to the Production Department, and, after agreement by the Assistant Production Manager, the overlooker and the shop steward, replaced the estimated experimental rates. After three months, the job was reviewed and it was usually found that 'the provisional rate was satisfactory, and it automatically became the final time studied standard'. By this point 92% of females and 82% of males at the Cocoa Works were paid by results, and 'many trades in collective agreements or otherwise provided for piece earnings to exceed time earnings'.⁸⁷ Asked whether workers tended to 'hang back', Moorhouse responded that

It was a rare occurrence, and in such cases the time study was immediately stopped. There had been a certain amount of suspicion and resistance on the part of the workers when time study was first introduced; the girls objected to being tested by men who knew very little about the job. Later, it had been suggested to the workers that girls actually in the workrooms should be trained to do stop watch work, and this idea had been accepted. It had played a great part in securing the workers' understanding of the time study system.⁸⁸

Moorhouse added that time studies had helped the workers to think of the business as a

⁸⁷ 'Time Study in Connection with Payment By Results', 5 September 1929, LSE, MRG archive, MRG/8/5.

⁸⁸ For more negative worker responses to time studies, see chapter 6.

whole, and the increased efficiency did not necessarily create unemployment.⁸⁹ Due to an expansion of new product lines and output more generally, it had not been necessary to lay off many workers. Moreover, the only workers who belonged to a skilled union, the maintenance staff, had also accepted being placed on payment-by-results. In contrast, production workers and mechanics worked on a collective bonus system. He explained that employees were divided into three grades (Tradesmen, Labourers, and Apprentices), and bonuses calculated on the number of jobs completed in a standard week of 7,400 hours. Two rates of bonus were then applied: as it was deemed that electricians' jobs were of less value than those of mechanics, the latter received a bonus rate of four times that of the former. 'To cover the work of certain men whose efforts cannot be measured, but who share in the pool, 3% is added to the average number of jobs completed'.⁹⁰

The *Mark* system was used extensively at the plant for years, and the volume of data it generated was enormous. In the Cream Manufacturing Department during January-June 1931 alone, 3,029,906½ *Marks* were earned by experienced girls on shell piping. Cross referencing this to the amount of time spent earning those *Marks* (47,614 hours, 31 minutes) allowed the costing clerk to calculate that the job was being conducted across the Department at a mean average of 106% efficiency.⁹¹ Similar calculations were conducted in the Gum Department from 1927-30 at the very least, with efficiency for all fourteen of its sections. No section fell below 100% efficiency for the entire period, despite difficult trading conditions caused by depression. The highest, with a mean average of 127.5% was the Jelly Packing section, and the lowest was tube pastille packing, which had a mean efficiency rating of 101.7%.⁹² Like the *B*, the *Mark* system thus allowed senior management to examine at a glance the relative efficiencies of each department and section, and to act if it fell below the minimum of 100%.

The large volumes of time study-related activity conducted during the Rowntree

⁸⁹ 'Time Study in Connection with Payment By Results', 5 September 1929, LSE, MRG archive, MRG/8/5.

⁹⁰ 'Time Study in Connection with Payment By Results', 5 September 1929, LSE, MRG archive, MRG/8/5.

⁹¹ *Cream Manuf. Dept. Experienced Girls' Efficiency on Shell Piping*, 3 July 1931, BI, Rowntree archives, R/DP/PC/2.

⁹² *Gum Department Report, 1929*, BI, Rowntree archives, R/DP/PG/1

efficiency drive in the depression period reveal much about the company's priorities, and how it defined success. Across the 1931-2 period in the Cream Manufacturing Department, 3,552 hours and 16 minutes of time studies were undertaken by fifteen Time Study Observers.⁹³ In the last quarter of 1932, 1,505 out of 4,209 piece rates were set or revised, 278 costs estimated, 134 'SPI's made, and 10 experimental tests conducted.⁹⁴ Added to this, 1,300 employee interviews were conducted in a manner self-consciously similar to the contemporaneous Hawthorne studies in the USA.⁹⁵

By 1932, "Standard" times are known for practically every packing operation, and standard output can be fixed by an analysis of each job and a synthesis of the time for operation'. The total number of time studies were reduced by 763 hours leading to a saving of £34 13s 8d.⁹⁶ The following figure is reproduced from Rowntree's Time Study Department, and indicates how the time study system was envisaged:

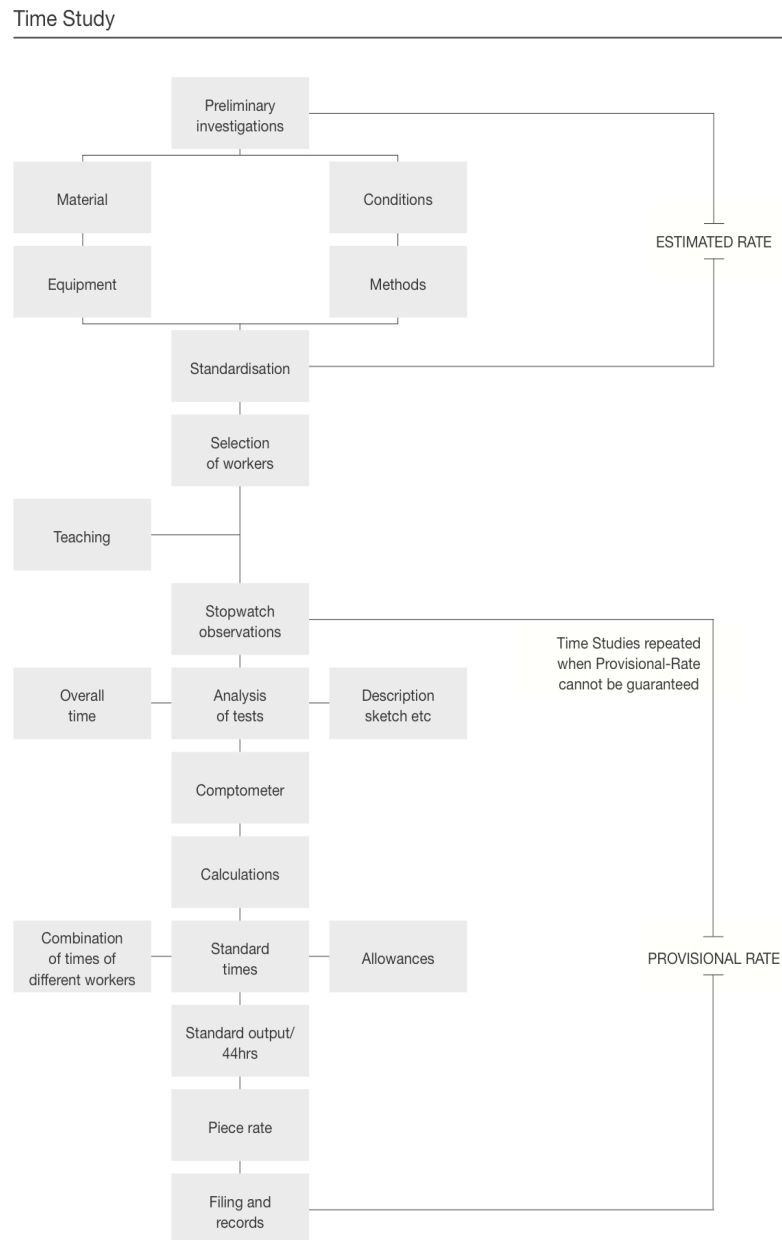
⁹³ Time Study Observers, 21 March 1933, BI, Rowntree archives, R/DP/PC/2.

⁹⁴ Time Study Report, 9 January 1933, BI, Rowntree archives, R/DP/PC/2.

⁹⁵ The results were published as Hall and Locke, *Incentives and Contentment*. It is unclear whether the Rowntree studies were influenced by the Hawthorne studies, though Northcott claimed that their similarity was a coincidence. See his comments in 'Optimum Productivity in British Industry' *British Management Review* Vol. 3, No. 3, (1938), p.17. Contemporaries did compare the Hawthorne and Rowntree studies. See Hyacinthe Dubreuil, *A Chance for Everybody; a Liberal Basis for the Organization of Work* (London: Chatto and Windus, 1939), the introduction of which was written by Aldous Huxley.

⁹⁶ Cream Manufacturing Department: Statement of Programme and Accomplishment - 1932, BI, Rowntree archives, R/DP/PC/2.

Figure 4.1. The time study system at Rowntree's Cocoa Works



Source: LSE, MRG/8/5.

In addition, many product lines were closely scrutinised and attempts made to increase

efficiency in production, mixing, cleaning, loading, inventory control, clerical work, and many other areas. Most departments were, according to the Production Office and Time Study department's calculations, operating at, or above, 100% efficiency. Even so, Rowntree later recalled that he was anxious that the Cocoa Works was under-performing, so

got a leading management consultant to come over from America. When he was leaving he said to me 'I don't know what you've been worrying about. I should place your firm among the first dozen in the USA from the standpoint of efficiency'.⁹⁷

Factory management, and industry more generally, remained controversial. In addition, by this point the Bedaux system had caused strikes which had made the newspapers. This was important as it was this precise time that key management individuals such as Northcott of Rowntree's and Lloyd-Roberts of ICI, examined in chapter 3, had reconfigured labour management into a profession which was directed from the boardroom rather than on the factory floor. Indicative of this shift was the renaming of the Institute of Industrial Welfare Workers as the Institute of Labour Management in 1931.⁹⁸

Presumably responding to the labour unrest caused by the Bedaux system at Wolsey and other factories in the early 1930s, examined in chapter 6, Northcott sought to debunk the Bedaux company's assertion that Bedaux was more scientific than systems similar to the *B*. He argued that Bedaux was no more scientific than the *Mark*, and reminded readers that he had much personal experience of these practices:

A factory known to the writer has for half a generation expressed its piece rate prices in "marks", at the rate of say, ten a penny, instead of ugly and awkward fractions. When, about nine years ago, systematic time study was introduced, this payment was linked up with time allowed, so that the number of marks per unit came to indicate the number of minutes allowed the ordinary worker.⁹⁹

Northcott asserted that Bedaux was no better than most other work measurement unit systems as 'time study men in any part of the world attempt the same thing, but almost all of them will admit that their ranking is arbitrary, not scientific; it is an estimate not a

⁹⁷ B. Seebohm Rowntree 'Incentives and the "Practical Man".' *Nineteenth Century*, Vol. 145 (March 1949), p.16.

⁹⁸ For more on the institute's reframing at this time, see M. Niven, *Personnel Management, 1913-63* (3rd edition, London: Institute of Personnel Management, 1978, pp.83-5.

⁹⁹ C.H. Northcott, 'The Bedaux System of Human Labour Measurement' *Unity* Vol. 11, No. 2 (March, 1932), p.63.

measurement'. Moreover, Northcott argued that in using time studies, posting sheets, and incentive bonus systems, Bedaux was in most ways like numerous other American systems on the market, particularly the Haynes Manitt scheme, which used *Manitts* or *man-minutes* instead of points. He praised the *B* as it could be used for pay incentives, production control, and costing. However, he disapproved of the way Bedaux's engineers acted as visiting experts, as 'it is not good policy to introduce an outside organisation to promote, establish and conserve the efficiency of a business'.¹⁰⁰

Rowntree's time study department later expanded its operations to other areas of the firm's supply chain. For example, the loading and unloading of Rowntree products at various railway stations was deemed to be suitable for this, particularly at Christmas when order volumes were high. The jobs involved the loading of a wide variety of products in several locations, making clear measurements difficult. Nevertheless, the Time Study Dept set to work in October 1935, studying loading and unloading in locations in York, Norwich and London. The loading processes of eleven loaders were broken down into separate actions for loading and unloading a variety of products. While each man's times per work element varied considerably, 'the time under "Miscellaneous" presents a serious problem, as this time is mostly waste time'. The results of the studies were then calculated to have a mean average of 9.95 cwts per hour, or 21 tons 18 cwts per 44 hour week. November was spent conducting more time studies, this time on fourteen workmen carrying loads up from cellars, and similar standard times per weight and volume were arrived at. By January 1936 standard times per bogie loaded had been determined for sixteen different Rowntree products. Standard outputs were also calculated for three different kinds of packing cases, depending on the products' destination, with the sharp edges of tin-lined cases being made blunter as 'Time Study thought that if all the cases were so treated, the removal of the danger of the packer cutting himself would increased his rate of packing'.¹⁰¹ The next section examines the expansion of work measurement methods into the Rowntree offices.

¹⁰⁰ C.H. Northcott, 'The Bedaux System of Human Labour Measurement'.

¹⁰¹ *Production studies*, BI, Rowntree archives, R/DP/PT/2.

4.6. Work Measurement in the Rowntree offices

This chapter has so far been concerned with the activities of the Rowntree time study department and its use of the *Mark*. However, as examined in chapter 2, the time study was only *symbolic* of work measurement; however, as Taylor himself pointed out, it was the work measurement data (as he termed them, *unit-times*) which were the crucial feature of work measurement systems. This section, which examines the implementation of work measurement in the Rowntree's offices, where no time studies were allowed, demonstrates this point. Moreover, as examined in chapter 2, some commentators such as Braverman and Brech have argued that work organisation methods related to Taylor, and perhaps Bedaux, were transferred from factory production tasks to repetitive office jobs. This section therefore provides an empirical account as to how this process took place at the Rowntree works.

After the *Mark* had been in operation for two years on the factory floor, Rowntree believed that it was working so well that he assigned Urwick, as a kind of internal consultant, to reorder and incentivise clerical processes at the Works' offices. It was the first time such an attempt was made in Britain, and, as examined in this chapter and chapter 5, elements of these practices were mimicked in other firms, and so deserves particular attention.¹⁰² Due to union arrangements the Time Study men were not allowed to time clerical workers, nor use payment by results systems, so Urwick could not introduce the *Mark* system here. He was forced to innovate and did so by explicitly combining Taylor's *Shop Management* (1903) with obscure experiments into non-financial incentives which had been conducted in the Ontarian pulping industry.¹⁰³

In their published account of Rowntree's offices, Urwick and colleagues firstly

¹⁰² In addition to other examples presented in this thesis, it is worth noting that the 1937 reprinting of *Organising a Sales Office* contained a parallel study of similar procedures implemented in the 'Unified Sales Office' of branch in John Player & Sons' branch in Nottingham.

¹⁰³ Urwick cited such incentive experiments as Robert B. Wolf, 'Non-Financial Incentives' *Transactions of the American Society of Mechanical Engineers* Vol. 40 (1918), pp.925-946. In *Organising a Sales Office*, quotes from Taylor's *Shop Management* were cited alongside descriptions of its authors' activities in the Rowntree offices in order to demonstrate that they had been modifying work processes as Taylor had instructed.

described how they had purchased the most modern clerical equipment, and introduced a largely open plan office. They were then stuck with the problem of how to increase machine output. While male clerks' work was too varied to be individually compared, the repetitive work of the women working on statement machines, posting machines, invoice typing, and Addressographs was singled out. As clerical employees could not be put on piece work or timed, they were assessed on standard times relative to the speed of the other workers. This gave birth to the Rowntree clerical *unit* system.

The Burroughs machinists were the first experimental subjects for the new *unit*. Proportions for more difficult pieces of work were discussed with the machine operators and fractions agreed upon. Posting work was conducted in batches, with a cover (or 'control') sheet attached to the front. Each control sheet counted as one *unit*, and each piece of posting work counted as one *unit*. 'Thus, if a cover sheet indicated that there were 7 copy invoices on a particular day, the whole posting counted as 8 units'. Receipt posting was deemed more difficult so each piece of posting work counted as 1½ *units*.

The authors recorded that the manageress then compiled the output records but did not use them for anything. After a few months, two or three posting girls asked if they could see their output statistics. They were told they could not, as this might be construed as preparation for introducing a payment by results system. After a few more weeks, the entire posting team were pestering the manageress to see their individual output statistics. In the end the manageress and union official relented and the statistics were released. Production output increased. Small rises were given to the most productive four girls at the end of the year and the *unit* system even cut down administration time from one day to 1¼ hours per day. When any operator's score fell suddenly, it was 'very often the index of trouble at home' so management would be able to rapidly intervene 'with a view to helping the individual'.¹⁰⁴ The maximum efficiency of 90%, achieved in 1925, was superseded by a maximum of over 130% the following year.

As the authors put it 'the machine "ran in"', and the new system worked well.

¹⁰⁴ Urwick, Aston and Cordukes, *Organising*, p.116.

Output improved across the board and Urwick noted that the staff were much livelier.

Urwick recalled that 'The spirit of the whole team of Burroughs machine operators has been excellent ever since the system was introduced. Many visitors to the department, including the shop stewards of some of the factory departments, have been astonished at the speed of output developed'.¹⁰⁵ In addition, the National Union of Clerks and Administrative Workers (NUCAW) shop steward wrote to him thanking Urwick for his interventions:

You feel that your responsibilities are such that you have ceased to be a mere cog in the wheel, but that you are now a vital unit in the concern. Of course I deeply regret that the reorganization inevitably meant a reduction in staff, but for those of us who remain I am certain I am expressing the opinion of all when I saw how willingly we parted with the old love and are much taken up with the new.¹⁰⁶

Seeing as the system was a success, on its own terms, it was then applied to the more difficult task of invoice typing, which required even closer monitoring. The most useful unit for this was deemed to be the lines of type produced in a given period. Typists filled in their daily outputs on analysis sheets, and the next morning these sheets were passed to a Comptometer operator, who totalled output amounts and adjusted the totals according to the *unit* values attached to different kinds of invoice. Thus daily totals were kept by management, and a weekly note was sent to each operator to let her know her performance relative to the section average. This system too, was successful: total output of the section rose from a starting total of 200,000 lines of type per week, to nearly 350,000 lines of type per week six months later. Urwick calculated that this led to an increase in the average output of the section from around 1,350 lines of type per hour in April to 1,800 per hour in October, an increase of 33% in the first six months alone.¹⁰⁷

The ultimate result of these interventions was to drive down clerical costs per order, from 15.6d per order in early 1923, to 7.7d per order in late 1926. The new office efficiency system had been so successful that Rowntree's laid off forty clerks and output still continued to increase.¹⁰⁸ When Urwick's book was republished in 1937, Rowntree noted

¹⁰⁵ Urwick, Aston and Cordukes, *Organising*, p.120.

¹⁰⁶ Urwick, Aston and Cordukes, *Organising*, p.111.

¹⁰⁷ Urwick, Aston and Cordukes, *Organising*, p.123.

¹⁰⁸ Urwick, Aston and Cordukes, *Organising*, pp.64-5, 105.

that the system had lowered clerical costs to 4.16d per order. Rowntree argued that this continuous improvement demonstrated that while exterior 'efficiency experts' delivered savings while they were there to operate their system, permanent economies could only be delivered by in-house staff. Indeed, to Rowntree, permanence itself demonstrated that the system was working well: 'I think it is a particularly interesting feature of the reorganisation [of clerical work at the Cocoa Works] described in this [Urwick's] book that it should have manifested this quality of endurance.'¹⁰⁹ Moreover, Rowntree were not unique in transferring work measurement from the factory floor to the office desks which administered clerical and sales jobs. A very similar process happened at Mander's in Wolverhampton, the firm to which we next turn.

4.7. Mander's, Bedaux and the *Work Unit*

The negotiations over the 40 hour working week at Mander's Paints in Wolverhampton offer additional insights, particularly as studies of Mander's have suggested reforms related to *Taylorism* were put into use in the early 1930s, but have downplayed the implementation of the Bedaux system at the factory.¹¹⁰ Mander's is also significant as it is clear example in which, unlike Rowntree's, a manufacturing firm negotiated the introduction of the Bedaux system with the Bedaux consultancy and the TGWU.

The chairman of Mander Brothers Ltd., Geoffrey Mander, had a degree in Natural Sciences from Cambridge and was Liberal MP for Wolverhampton East from 1929-1945. Long a family firm, Mander's had established a works committee in May 1920, and introduced a raft of welfare reforms such as improved pensions, sports facilities, a suggestion scheme, and a works magazine, *The Green Can*. This was coupled with an

¹⁰⁹ Urwick, *Organizing* (1937) pp.xviii.

¹¹⁰ C.N. Mander, *Varnished Leaves: A Biography of the Mander Family of Wolverhampton, 1750-1950* (Dursley: Owlpen Press, 2004), p.310 claims that the firm rejected the Bedaux system and its 'science, which seemed to reduce people to automatons whose performance never varied and could be computed in statistics and graphs. The unions refused to cooperate'. See also Whitston, 'Scientific Management Practice Between the Wars', p.51. Littler, 'The Bureaucratization of the Shop-Floor: the Development of Modern Work Systems', Vol. 2, records that Mander's was a Bedaux client from May 1932-January 1934. For Mander's life and political activity, see Nicholas Mander, 'Last of the Midland Radicals: Sir Geoffrey Mander, Liberal MP, 1929-45' *Journal of Liberal History* Vol. 53 (2006-7), pp.26-32.

increase in focus on punctuality: the firm monitored the punctuality of the entire workforce, and studied mean tardiness on a quarterly basis to two decimal places. Mander also sent the firm's secretary to Rowntree's management conferences at Oxford from 1921 onwards. Similar to Rowntree's, a variety of industrial experiments were conducted at the plant throughout the 1920s, including in industrial psychology and fatigue monitoring. The experiments were agreed to by the workers' representatives, and were soon underway in the Can Department.¹¹¹ The five day week was also discussed in 1929, but the workforce rejected it, preferring to work fewer hours per day rather than fewer days per week.¹¹²

By 1931 Mander's had decided to reduce the working week to 40 hours. The firm hired the Bedaux company, 'a firm of experts to assist us in our rationalisation just as, when other kinds of expert advice are required, one consults an architect or a lawyer'. However, Mander recalled

this move turned out to be a first class blunder as, unfortunately, the particular firm in question, quite wrongly I think, is in the eyes of the Trade Union movement of this country in the nature of a red rag to a bull.

At Mander's, as in many other examples, the Bedaux name was quickly suppressed.¹¹³

After realising the mistake of mentioning the Bedaux name, 'we adopted the policy of taking upon ourselves the responsibility of making any statements and keeping our advisers in the background as much as we possibly could'. As part of the trial negotiations, 'Mr Ernest Bevin himself came along and we were very soon able to come to an agreement by which we undertook to try the system for six months'.¹¹⁴

¹¹¹ Mander Brothers' Works Joint Committee Minutes, 23 March 1921, WALs, DB-26/1/1.

¹¹² Mander Brothers' Works Joint Committee Minutes, 22 April 1929, WALs DB-26/1/2.

¹¹³ Colwell Carney of Bedaux Ltd. was interviewed about this intervention. It appears in full in Tisdall, *Agents of Change*, pp.27-8. Carney also recalled that a similar such scheme was introduced into J&J Colman to reduce working hours from 44 to 40.

¹¹⁴ 'The shorter working week', 15 June 1933, LSE, Management Research Groups archives, MRG/8/5.



Figure 5.2. Ernest Bevin (centre) and other TGWU officials arriving to successfully negotiate the introduction of the *Work Unit* system to Mander Brothers, 1932. Image courtesy of WALs

Following this, the Bedaux engineer Ernest Meuhleck addressed the works council of Mander's on 18 April 1932. He observed that the Bedaux system was already in operation in Wolverhampton, at the ICI subsidiary John Marston Ltd., 'where output had been improved with increased wages to the men, and reduction of cost'. He asked for volunteers between the ages of 25 and 35 to receive training in how to operate and administer the new system. Receiving them, the system was duly put into practice in the Mander's warehouse from May onwards. Debates over concerns of expanding the *Work Unit* system, based on the *B*, to other areas of Mander's operations continued through summer and autumn 1932, with increasing numbers of TGWU representatives present, including Bevin, and also Carney and Meuhleck from the Bedaux company.¹¹⁵

¹¹⁵ Mander Brothers' Works Joint Committee Minutes, 1932, WALs, DB-26/1/2.

An agreement between the firm and the TGWU on introducing the 'new system of Piecework', according to which 'Work shall be timed and controlled by a system known as "Work Units"' was signed by Geoffrey Mander and Ernest Bevin on 27 September. The agreement also guaranteed basic wages, pension terms, a 40 hour working week (the first factory to do so in Britain), the worker's right to request the re-timing or re-pricing of any job, and guaranteed that no workers would be laid off as a consequence of the reorganisation. The agreement between Mander's and the TGWU was hailed by the *Daily Herald* as possessing 'a potential importance' which 'would be difficult to exaggerate' and rewriting the industrial relations 'story in a new way - a model way, let us hope, for more and more factories and industries'.¹¹⁶ In addition, in a similar timeframe to Rowntree's, examined earlier in this chapter, three years later Mander's *Work Unit* system was expanded to include the office, which consisted of ninety girls, where, unlike the Rowntree case, the time study could be used:

Each job had been analyzed into component operations by time study. Bonus earnings had been computed for various standards of performance on each job. The incentives provided had been most effective and the clerical work connected with the scheme was not expensive. It was dealt with by two girl clerks. They had commenced the study in the checking of invoices department and had gradually introduced it throughout the offices. Typists were on the scheme and meters had been placed on the typewriters.¹¹⁷

Similar contemporaneous reports indicate that work measurement grew on repetitious tasks in the office alongside similarly repetitive factory floor processes, often at the time office machines were introduced.¹¹⁸ Many other examples of the standardisation and measurement of office work in this period could be considered, as could the work measurement units and the role of the time study within them.¹¹⁹ Moreover, additional units

¹¹⁶ 'Agreement Made', *The Green Can* (October 1932), pp.184-5. It was: the TGWU signed similar Bedaux deals that year, including with extremely large firms such as ICI and Crosse and Blackwell. See communications on Bedaux and the TGWU in MRC, MSS.126/TG.

¹¹⁷ Management Research Group 6 minutes, 6 August 1937, LSE, MRG/6/4.

¹¹⁸ 'Tour of Representative Offices' *British Management Review* Vol.1, No. 4 (1936), pp.79-96 considered extensive systems similar to those at Rowntree and Mander at the Gramophone Company, Cadbury's, and Boot's. In May 1937 *Industry Illustrated* reported that alongside new office machines, 'the practice of studying repetition work and paying bonuses on output in clerical operations is increasing'. See 'New Office Appliances', *Industry Illustrated* (May 1937), pp.65.

¹¹⁹ For example, see 'Work Measurement Group' *Industry Illustrated* (April 1937), pp.14, which reported that the Works Management and Office Management Associations shared a Work Measurement Group headed by W.D.A. Clewes of Crosse and Blackwell. Clewes, described to me by Ray Scott as an 'avuncular old gent' and the 'philosopher of Crosse and Blackwell' wrote a novel about his experience of

were created and deployed in the period. The creation and implementation of the UOP *Point*, derived from the Bedaux *B*, and its implementation are examined next.

4.8. Urwick, Orr & Partners, 1934-1939

As has been seen, the Rowntree plant was important in Lyndall Urwick's early career. Having left Rowntree's to join the IMI in 1928, Urwick's time in Geneva was mostly spent delivering speeches, coordinating research reports, and related issues. The IMI published numerous reports on scientific management practices in Europe, including an examination of use of scientific management practices in small British factories, a full study of Hans Renold's, and many others.¹²⁰ Throughout his publications, Urwick expressed dismay at the alleged conservatism, empiricism, and individualism displayed by British manufacturers and government and their corresponding lack of support for the institute.¹²¹

The IMI closed in 1933 when the value of the dollar dropped and some of its board members were involved too closely with the Italian fascist regime for its funders' liking.¹²² Dejected and unemployed, Urwick formed an industrial consultancy, UOP, with a former Bedaux engineer, Leslie Orr. At Rowntree's Urwick had learned of the importance of worker and trade union cooperation while introducing work measurement to a British factory. He also learned from his involvement with Rowntree and the experience of the Bedaux consultancy that British workers were strongly averse to what they perceived as *Americanisation*.

Urwick's recent biographers remark of his consultancy that 'Urwick was largely responsible for introducing a different culture than the abrasive approach taken by Bedaux

personnel management in factories. It was published as Winston Clewes, *Men at Work* (privately published, 1951).

¹²⁰ See IMI, *Scientific Management in a Group of Small Factories* (Geneva: IMI, 1931) and Renold, *Budgetary Control*.

¹²¹ NA, BT 64/33, undated minute. In fact, when Urwick approached the British Board of Trade with a view to membership, his suggestion was taken seriously but the board abandoned the idea on learning from the Minister of Labour, Margaret Bondfield, that even an associate membership might be 'embarrassing'.

¹²² For an examination of the contemporary politics surrounding industrial management in Europe and the USA, and the place of Urwick and the IMI in them, see Charles D. Wrege, Ronald G. Greenwood, and Sakae Hata, 'The International Management Institute and Political Opposition to its Efforts in Europe, 1925-1934' *Business and Economic History* Vol. 16 (1987), pp.249-265.

in the 1920s and the 1930s'.¹²³ To reach this conclusion, Urwick's biographers cited the following quotation from Urwick's unpublished autobiography to demonstrate that UOP had differentiated their services from the Bedaux company:

There was nothing secret or patent about it [the Bedaux system]. It was just applying more exact knowledge to the problems, all kinds of problems, facing the leaders of business or other undertakings. British Bedaux Ltd, who initially had American directors, had tried to pretend that they some secret formula to sell, a patent 'gimmick', This 'approach' had been useful in first breaking the ice in a conservative society. But it was essentially the sales technique of the quack, the unqualified vendor peddling cure-alls to susceptible 'innocents' at a country fair. And their American directors had not the remotest conception of the strength, depth and fundamental good sense of the British trade union movement.¹²⁴

Indeed, historians who consider Urwick and UOP have consistently asserted that he rejected the Bedaux approach of sales, 'slogans' and 'jargon', instead implying that he had a more intellectual and humanitarian approach to management.¹²⁵ However, when Urwick's unpublished autobiography is examined more closely, it can be seen that he actually emphasised British management's *debt* to Charles E. Bedaux for introducing the notion of formalised management knowledge to the British business community:

I have often wondered since whether the late Charles E. Bedaux really deserved the tragic fate which overcame him. Out of the proceeds of selling 'The Bedaux System' all over the world, he bought himself a large chateau in France. There, prior to 1939, he became friendly with and entertained some of the leaders of Nazi Germany. When the USA entered the 1939-1945 war he was arrested and charged with treason. While awaiting transshipment to the USA for trial - he was, I understand, a Canadian who had taken out American citizenship - he committed suicide. Gt. Britain undoubtedly owes him a debt of gratitude. He did a great deal to 'break the ice' of prejudice and to convince British businessmen that there was something to be learned about managing. If he was a rogue, he was a constructive one.¹²⁶

He also believed that the Bedaux company's approach to unions had been wrong:

Their American directors in London seemed to me to be totally blind to the significance of the British Trade Union movement and to the inevitable conflicts they would cause if they tried to introduce scientific management techniques in British undertakings without taking the kind of steps to win the confidence of the Trade Unions which I had seen Seeborn Rowntree take in the 1920s.¹²⁷

Urwick even formulated a poem about the *B* which he recited at meetings and

¹²³ Brech, Thomson and Wilson, *Lyndall Urwick*, p.225.

¹²⁴ Brech, Thomson and Wilson, *Lyndall Urwick*, p.95.

¹²⁵ Tisdall, *Agents of Change*, p.8.

¹²⁶ Urwick, *Management Pilgrimage*, HBS, Lyndall Urwick papers, Box 12, 8/3/1, chapter 7, p.7-8.

¹²⁷ Brech, Thomson and Wilson, *Lyndall Urwick*, p.95.

conferences, in which he clearly pointed out that the *B* was not unique, and was in fact no better than the *Standard Hour* system:

How doth the little busy 'B'
Improve the 'standard hour'?
Although it smells
The same, it sells
Best as another flower.
Your excess cost
You analyse
And multiply controls.
What you have lost
Escapes your eyes.
You cannot measure souls.

The last line, of course, referred to the slogan 'Bedaux measures labour'.¹²⁸

It would be a mistake to assume that because Urwick denigrated the *B* in verse and elsewhere, that this means he rejected the use of standard time systems based on Taylor's *unit-times* and the *B* on the factory floor. Indeed, it has long been known that Urwick founded his company with a disgruntled Bedaux engineer.¹²⁹ But to assume that UOP were not implementing a system very similar to Bedaux is to misunderstand UOP's business operations, and to underestimate how much systems like Bedaux, and derivatives of it, were widely used in British industry by the end of the 1930s. Moreover, UOP were indeed conciliatory to trade unions, as Urwick had learnt at Rowntree, but as seen in chapter 3, so were the Bedaux company as the 1930s wore on. Moreover, as examined in chapter 6, trade unions helped to introduce the Bedaux *B* and similar work measurement units into many significant firms.

While UOP has received some historical attention in the last decade, literature which has claimed that the consultancy practiced Taylorism, what was not known until the private publication, in 2007, of a memoir by a former UOP consultant, E.F.L. Brech, was that UOP implemented a renamed version of the Bedaux system from the outset.¹³⁰ It was

¹²⁸ Brech, Thomson and Wilson, *Lyndall Urwick*, p.95.

¹²⁹ For example, see Tisdall, *Agents of Change*, pp.59-60.

¹³⁰ The memoir is contained in Lyndall Urwick Society, *Urwick Orr*. For an examination of what light a posthumous memoir can shed on well-known topics, see Christopher D. McKenna, 'Writing the ghost-

named, as the Bedaux system initially was, the *Point* system, which was used for precisely the same labour cost control procedures as the Bedaux system was. Brech recalled one consultant saying in 1936 that

The objective was not new, nor the broad line of approach, because in most assignments wherein 'labour cost control' was a feature in the manufacturing managerial improvement it had long been customary to seek correlation of the basic rates of pay for the various crafts, trades and operations, so that incentive award had an acceptable foundation comparatively across the range of skilled, semi-skilled and unskilled operational manpower. What the consultant had done anew lay in systematising the comparative analysis according to a cogently devised framework of characteristics and features, allotting to each a scoring or rating of points: sixteen items had been evaluated with a range of 'point evaluation' according to extent or importance of each. The approach was offered to his colleague consultants as recommended standard practice: at a later date the Partnership adopted the terminology 'Base Rate Analysis' as had formerly been used by the Bedaux Company.¹³¹

However, UOP instructed its consultants to avoid the expressions *units, standards, labour control, performance, labour measurement* and *time study*, as 'The aim should always be to employ simple commonplace words and never high sounding unfamiliar ones'.¹³² This was to avoid the 'persisting continuance of wordings that had been introduced during the past years from the spread of Bedaux Company assignments'. Similar to Bedaux, which assumed that operators should attain an hourly minimum of 60Bs, but aimed for 80Bs, UOP aimed at an hourly target level of 75-80 *Points*. At this time, UOP also introduced an optional posting sheet to encourage a competitive spirit among workers.¹³³ Throughout the 1930s, UOP's client list grew, and their system was applied to production and clerical work.

writer back in: Alfred Sloan, Alfred Chandler, John McDonald and the intellectual origins of corporate strategy' *Management & Organizational History* Vol. 1, No. 2 (2006), pp.107-126.

¹³¹ Lyndall Urwick Society, *Urwick Orr*, p.11.

¹³² Lyndall Urwick Society, *Urwick Orr*, p.28.

¹³³ Lyndall Urwick Society, *Urwick Orr*, pp.14-5.

Table 4.1. Number of new UOP clients, 1934-45

Year	Number of new UOP clients
1934-5	21
1936	26
1937	19
1938	13
1939	-
1940	30
1941	22
1942	27
1943	19
1944	25
1945	11

Source: Lyndall Urwick Society, *Urwick Orr Partnership*, pp. 9, 22, 54.

However, this information does provide evidence that the UOP *Point* actually functioned on the factory floor in a fashion like the *B*. The next section therefore examines a case study of the implementation of the UOP *Point* at a client firm.

4.9. UOP and the *Point* on the factory floor

When implemented, did the UOP *Point* system, as Brech suggested, function very similarly to the Bedaux system? Fresh evidence from unexamined UOP reports at MSF shows that, from the experience of daily working life, there was very little difference between the two. In fact, this dense cache of material clearly demonstrates that the UOP *Point* could be installed in a plant even when the workforce had successfully resisted the introduction of the Bedaux system.

MSF had established a subsidiary at Lancaster in 1921, named Standfast Printers and Dyers. Both MSF and Standfast were under the directorship of the Scottish Liberal

industrialist James (later Sir James) Morton. Part of the pre-war Arts and Crafts movement, during World War One Morton recruited a team of chemists to develop new fast dyes at his plant, particularly Solway Blue.¹³⁴ In 1918, Morton established the Dye Works at Grangemouth, later bought by ICI. It was during a visit to ICI's Grangemouth plant in the early 1930s that Morton saw the Bedaux system in action at the Dye Works, and, impressed by the apparent levels of efficiency obtained using Bedaux, returned to his plant with the intention of installing the Bedaux system there. In December 1931 the firm hired the Bedaux consultancy, who introduced the Bedaux system to the Despatch Department at Lancaster, which consisted of forty workers, twelve of whom were put on the Bedaux system and five of whom were earning premium bonuses.¹³⁵ As a response to this, and perhaps news about the contemporaneous strike over the Bedaux system at Wolsey, in February 1932 MSF suffered a stoppage of work. Although workers voted against strike action, they successfully gained concessions related to the Bedaux system. As at Wolsey, the daily posting sheet of each workers' *B* output was to be removed, and Ministry of Labour officials insisted that the 'American jargon' be removed from an otherwise good system, 'especially as it happens that the Bedaux representative at his Works is actually a Scotsman'.¹³⁶

It is not clear as to the fate of Bedaux at MSF, although the plan does not seem to have succeeded. It was certainly not expanded beyond the Dispatch Department into factory floor production. Morton looked elsewhere for a 'doctor' to cure the firm's two troublesome cloth-processing plants and selected UOP in 1935. When the two UOP consultants entered MSF and Standfast in late 1936, their remit was substantially larger than the Bedaux engineers had been given. A key issue UOP raised from the outset was the fact that as MSF was producing innumerable products at its Carlisle plant, the firm, in effect, owned six businesses operating under one roof. To coordinate production flows with sales requirements, a Progress Office was established whose job it was to monitor the

¹³⁴ For information on Morton's war work, see M.R. Fox, *Dye-Makers of Great Britain, 1856-1976: A History of Chemists, Companies, Products and Changes* (Manchester: ICI, 1987), pp.155-165.

¹³⁵ CCO-Ministry of Labour, 29 January 1932, NA, LAB 2/2061/IRI44/1938.

¹³⁶ CCO-Ministry of Labour, 18 February 1932, NA, LAB 2/2061/IRI44/1938.

flow of work and to prevent work flows becoming obstructed. UOP also detached Morton from daily factory management and unsuccessfully suggested that MSF introduce a functional, instead of departmental structure.¹³⁷ The interventions which UOP staged were therefore virtually all related to work measurement on the factory floor, payment by results, and the collation and comparison of detailed output statistics. As at ICI and Rowntree, examined in chapters 3 and 4, a local specialist was employed to conduct negotiations over the new system.¹³⁸ In this respect, their reforms were much like that which Bedaux conducted at many firms. However, unlike the Bedaux company in the years immediately prior, the key innovation UOP made was to consult with union representatives and management about their reforms.

It was axiomatic to UOP's entire approach at MSF that the firm's existing plant and machines were running seriously under capacity. At first, UOP's production and costing calculations were of necessity crude, and were mostly based on *Loom-Weeks*, *Yards per Minute* and *Cost per lb*. The stentering machines were particularly singled out as UOP's calculations in September and November 1936 suggested that the machines were operating at 'a performance which we consider low'.¹³⁹ The speed of processing also varied very considerably depending on the type of cloth being processed.¹⁴⁰

Despite their public pronouncements about principles and cooperation with unions, UOP were not above subterfuge in order to facilitate implementation of the *Point* system. In an attempt to raise output, UOP secretly experimented with one machine using a worker from another firm, using automatic clips instead of men to feed the cloth into the machine. After the experiments were deemed a success, UOP consulted the union as to their position about the replacement of an operative by an automatic clip. Union officials responded that they had no issue in principle, but were sceptical that the mechanical alternative would be accurate enough. The UOP consultants and management, who

¹³⁷ Jocelyn Morton, *Three Generations in a Family Textile Firm* (London: Routledge and Kegan Paul, 1971), pp.374-5, 411-2.

¹³⁸ Morton, *Three Generations*, pp.425-445.

¹³⁹ Report 4, p.1, NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁴⁰ Report 4, Tables, 1-4, NAS, Morton Sundour Fabrics archive, GD326/936.

already knew that the machine adaption option was perfectly viable, then demonstrated to the union and operatives that the clips could be used on all kinds of cloth, with ninety percent of feeds proceeding without direct supervision. At a cost of £170 all four stentering machines were fitted with the clips allowing the firm to dispense with four operatives per shift. The firm was also able to lay off six men, making a saving of £810 per annum.¹⁴¹ Now that the measurement of processing different kinds of cloth had been standardised, this allowed the UOP consultants to develop a more sophisticated work measurement unit, the *Standard Yard per Machine Hour*. Between March and May 1937, standard yards per stentering machine hour increased from just over 1,300 to nearly 1,800.¹⁴² UOP then generated *Machine Efficiency* and *Plant Efficiency* ratings for Standfast. Assuming that 95% plant efficiency was possible (the remaining 5% being contingency time for stoppages and repairs), UOP calculated that during April 1937, the Yarn Dyehouse at Lancaster was still only operating at 61% of reasonable capacity.¹⁴³

UOP's successes at MSF were measured in terms of financial savings and increased output.¹⁴⁴ The gathering, analysis and deployment of detailed costing statistics was paramount, as this allowed consultants and management to assess which workers worked best, and which equipment purchases would be cost effective in the short and long terms. Poor-selling products were axed from the firm's inventory and 'dead' stocks disposed of. Equipment and furniture was moved to facilitate more effective movement, areas of the plant were closed off to stop employees from 'lounging about the place', and purchasing and stock controls were rigorously set.¹⁴⁵ As with the use of the *B* at ICI (examined in chapter 3), and the *Mark* at Rowntree's (examined in chapter 4), departmental efficiency measures were established, when then fed into firm-wide

¹⁴¹ UOP Report 8, sheets 1-2, NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁴² UOP Report 13, Fig. 1, NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁴³ UOP Report 18, table 5, NAS, Morton Sundour Fabrics archive, GD326/936. Plant utilisation across the Dyehouse in April 1937 was calculated to have varied very considerably, from a low of 31% on Wool Machines to 80% on both Pressure Dying Machines and Farmer Norton Machines.

¹⁴⁴ No remarks related to worker psychology or welfare were made in the extensive reports. Improved lighting in the Dyers' Office was justified in terms of eliminating errors in shade matching and thus the prevention of waste. Report 29, p.17, NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁴⁵ Report 7, p.5, NAS, Morton Sundour Fabrics archive, GD326/936.

efficiency charts, which allowed managers and consultants to detect production bottlenecks. Sometimes these bottlenecks were due to rule-of-thumb working practices, which the consultants set to standardise. Piecework became standard practice, where it was not already, and foremen were often placed on a bonus system which correlated to their department's total output including lost time. When the union objected to the reduction of the piecework bonus from 60% to 25%, UOP simply discharged a large number of workers, 'including all the undesirable and incompetent ones' and the union was forced to accept the new rates.¹⁴⁶

Having succeeded here, the UOP consultants turned their 'proceedings and controls which collectively constitute scientific management' elsewhere in the factory.¹⁴⁷ The Dyehouse fell under particular scrutiny as it was discovered by chance that the manufacture of dyes was based on rule-of-thumb methods, both in securing the colour and quality of the dye. Moreover, the consultants discovered that even when procedures existed, operatives were not using established quality procedures. Dye was one of the most expensive commodities used by the firm and UOP thus set about making sure that quantities used were carefully weighed and monitored. This meant that much work had to be conducted by subsequent menders. Thus UOP established a system of control sheets which allowed scrutiny of the productivity of every individual Dyehouse operative, generating a culture in which 'the practice of regularly demanding explanations for faulty work is now creating a healthy interest in keeping down menders, as the operatives strongly dislike being seen at the Mender Conference'.¹⁴⁸ By the end of 1937, UOP had secured new piece rates at a lower bonus rate, a material cost control system, and more accurate costing procedures. Also, UOP calculated that they had already affected £21,690 of savings between November 1936 and November 1937.¹⁴⁹ Dyestuffs, Printing, and Velvet Finishing were earmarked for attention in 1938. To further tighten up operative performance, UOP suggested the further division of labour to the extent that operatives

¹⁴⁶ Report 20, p.8, NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁴⁷ Report 14, p.6, NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁴⁸ Report 11, p.3, NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁴⁹ Report 20, pp.14-16, NAS, Morton Sundour Fabrics archive, GD326/936.

should be mono-tasking:

In one operation they should become really expert and should perform all the work available on this operation within their capacity. A higher standard of workmanship will be obtained by thus specialising the operators on two or three processes rather than allowing them to cover the whole range inefficiently.¹⁵⁰

With final calculations complete by May 1938, UOP's *Point* system, a copy of the Bedaux *B*, designed to act as a universal measure of all manual work, was cast over the plant's daily working life like an invisible net.¹⁵¹ UOP's resident consultant, Arthur Collis Jones, reported that the survey studied 309 workers on 46 operations, which covered all productive departments.¹⁵² Working processes were broken down into four parts, then further into a total of sixteen 'elements'. The four parts were:

- ⤴ Working conditions surrounding the job
- ⤴ Losses, damage, or additional expense arising from the lack of attention to work.
- ⤴ Mental or physical requirements to do the job successfully.
- ⤴ Training time necessary to reach an operating performance of 75%.

In studying each operation, Collis Jones then used his 'considered judgement' to arrive at a *point* value for each process.¹⁵³ Such a *point* rating system, Collis Jones stressed, had 'proven satisfactory in many industries and [would] ensure determination of hourly wages with reasonable practical consistency operation by operation'.¹⁵⁴ The standard value for adult male, unskilled labour was taken to be 100 points, which allowed Collis Jones to calculate that the standard rate of payment should be 0.105*d* per hour per point.

Addressing the operatives studied in the Dentonhill Works, he noted that *point* values varied very considerably, from a low of 45 to a high of 137. Calculating backwards from prior earnings, Collis Jones then calculated which jobs were being underpaid and which were being overpaid.¹⁵⁵

¹⁵⁰ Report 26, p.11, NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁵¹ Littler referred to Bedaux as a system which 'spins a structure of routine data collection over the shopfloor and the worker'. See Littler, *Development of the Labour Process*, chapters 8-9.

¹⁵² Most processes employed only a few people. Those which required more than ten workers were: Tap weaving (84), Vel Weaving (26), Tap Finishing (18), Pirn Winding (16), Chen Finishing PG (14), Twg Twining (12), Tap Warping (11), and Tap Turning (11). Collis Jones was promoted from UOP Area Manager to the Board of UOP in 1951. See Urwick papers, Box 12, folder 8/7.

¹⁵³ As the UOP official history recorded, 'working in numbers gave a false impression that the scheme was objectively scientific'. The *Point* scheme was unpopular among workers and consultants alike: workers believed that comparisons were often unfair, and consultants found it difficult to arrive at meaningful comparisons in larger firms.

¹⁵⁴ Report 20, p.1. NAS, Morton Sundour Fabrics archive, GD326/938.

¹⁵⁵ In his calculations, piece work was deemed to operate at 94% effectiveness, whereas time work was

Once *point* values had been arrived at for each stage of the production process, it was then possible to assess wages across varying working practices and to synchronise them with other industrial rates. Like the *B*, the *Point* required the arbitrary assessment of the UOP consultant, with no checks or balances to ensure that his *Point* assessment was fair. And just as with other *Point* systems and the *B*, as work was converted into abstract units and then into wages, costing clerks were able to calibrate wage rates when appropriate.

This is not to say that UOP's work at MSF was immediately successful, or that everyone agreed they had been successful at all. Morton regarded UOP's intervention as a 'radical management investigation' which had rescued the firm from the losses it had been suffering over the prior decade.¹⁵⁶ On the other hand, workers were reluctant to meet performance targets and higher level managers were suspicious of exactly how successful UOP's interventions had been.¹⁵⁷ When challenged that increased profits were simply due to a pick up in the printing market, UOP observed that the principal savings they had made were due to tightening up in the particularly bad areas of the firm. 'It owes nothing to chance but it is the result of deliberate planning and the reward of eighteen months' continuous effort on the part of Management and Consultants'.¹⁵⁸ By March 1937, MSF owed UOP £1,847 but the firm was still losing money.¹⁵⁹ Losses of £5,350 made in 1938 were attributed to declines in the piece goods, yarns and prints trades, amounted to a reduction in turnover of 15%. This was down from a mean average loss of £22,740 per annum over the 1932-6 period and UOP certainly took the credit for the loss reduction.¹⁶⁰ By the time UOP exited the firm in December 1938 they had analysed 54 working practices, and, by their calculations, achieved the substantial sum of £25,518 in projected

deemed to be only 75% effective. He was also able to confidently conclude that MSF workers were, on average, being paid at a higher rate than those in other Carlisle firms.

¹⁵⁶ Morton, *Three Generations*, p.425.

¹⁵⁷ The fact that there was no predetermined metric of success was important in itself. As seen in chapter 3, this was a serious problem created by installing the Bedaux system.

¹⁵⁸ Report 26, p.4, NAS, Morton Sundour Fabrics archive, GD326/936./936.

¹⁵⁹ Report No. 10, 26 April 1937. NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁶⁰ Report 27. NAS, Morton Sundour Fabrics archive, GD326/936.

savings.¹⁶¹

The full history of UOP remains to be written, and, like the *B*, the UOP *Point* was no doubt modified to suit local circumstances and the particularities of specific union negotiations. Its work in areas other than the factory floor remain un-assessed: already by the late 1930s, two thirds of UOP's assignments were in manufacturing and one third were in offices.¹⁶² Indeed, by this point Urwick believed that factory work and office work could be treated in a very similar fashion: 'office work is a production job. The whole philosophy of scientific management can be applied to it just as it is to a factory, and with astonishing and dramatic results'.¹⁶³

This chapter has examined three private sector manufacturing firms and one industrial consultancy - Rowntree, Mander, MSF and UOP respectively - which some studies have suggested were not using the Bedaux system in daily working life, and demonstrated that all four were in fact using work measurement systems very similar to the Bedaux *B*, and by extension Taylor's *unit-times*. Similar to the *B*, all four used different names for their work measurement and comparison unit: the *Mark*, the *Work Unit*, the *Point*, and the *Point*. It has also shown that these work measurement practices could be, and were, applied to some clerical work practices too, sometimes without the need for time study.

More generally, as Littler and Kreis have noted, the economic pressures of the 1930s certainly played an important role in the substantial spread of the Bedaux system in British industry. This chapter has indicated that this spread was more substantial than either author realised, and happened in places which do not correlate to the existing historiography's claims. Moving into the 1940s, war would also play an important role in the British work measurement story. The next chapter examines the very considerable

¹⁶¹ Report 29. NAS, Morton Sundour Fabrics archive, GD326/936.

¹⁶² Lyndall Urwick Society, *Urwick Orr*, p.23.

¹⁶³ Lyndall Urwick, 'Management and the Outside Consultant' *Industry Illustrated* (1939), pp.12-13. In Lyndall Urwick Society, *Urwick Orr*, p.5, Brech recalled that the texture of work measurement in offices was different from factory work: 'While Work-study could be as pertinent in the clerical and administrative milieu, the "methods improvement" aspect became customarily more significant than the timing, and often the possibility of introducing mechanisation'.

expansion of work measurement across public sector industries during World War Two, and argues that its apparent success in the war ensured the continuance of work measurement on a substantial scale into peace, including in private manufacturing companies, postwar nationalised industries and the British Institute of Management.

Chapter 5.

Manpower, work measurement, and British manufacturing, 1940-48

5.1. Introduction

This chapter examines the large-scale expansion of work measurement in Britain during World War Two. While it is now well-known that the war brought many changes to British industry, often involving state intervention, the literature is unclear on what changes happened related either to the Bedaux system or Taylorism more generally. As examined in chapter 3, Kreis and Littler have argued that interventions the most significant interventions on the British factory floor took place in the 1930s, and argued for the central importance of the Bedaux system. A contrasting argument is presented by Whitston, who has argued, citing Braverman, that the most important management interventions in British industry related to Taylorism took place in the 1950s and 1960s. Of particular relevance to the latter perspective is the argument presented by Anthony Carew who, also following Braverman, argued that the postwar Marshall Plan and the Labour Party's productivity programmes such as the AACP strengthened managerial control and its 'Taylorian values' of 'scientific management', which undermined 'workers' scope for controlling the labour process' in Britain and other Western European countries.¹ Moreover, Carew noted the importance of the postwar British Institute of Management in promoting 'Work Study' in Britain, and characterised the Lyndall Urwick as the postwar 'British evangelist of scientific management'.²

Responding to Carew, Tiratsoo and Tomlinson argued that Labour's postwar industrial strategies actually emerged from within the Labour party and were given shape *during* the war, in part due to the publication of James Burnham's *The Managerial Revolution* (1941). While 'managerial socialism' had, they argued, been developing within Labour since the interwar period, the war forced British business, the Labour Party and the war government to enhance and formalise its position on industrial productivity and the

¹ Carew, *Labour Under the Marshall Plan*, p.250.

² Carew, *Labour Under the Marshall Plan*, , p.196.

'management question', particularly at the Ministry of Aircraft Production from 1941-2 onwards, by its minister from late 1942 onwards, Sir Stafford Cripps. These historians discovered that an important development at MAP was the creation of its Production Efficiency Board, later the Production Efficiency Service, under Cripps, which included specialists in personnel management and motion study, particularly Anne Shaw of Metropolitan-Vickers.³ They noted MAP's annexation of the Technical Costs Branch (TCB) from the Admiralty; an expanded body designed to measure costs using a variety of rate-fixers, cost accountants and 'time and motion study experts'. They explored how related efforts continued into the postwar Labour government's industrial policies, particularly in the formulation of the British Institute of Management, which had the backing of prominent industrialists and managers such as Lord Weir, Lyndall Urwick, Seebohm Rowntree, and Lord Leverhulme. They also recorded the Ministry of Labour's secondment of Richard Lloyd-Roberts of ICI, 'whose background was in personnel management'.⁴ However, they concluded that although Urwick and others gained much support in their calls for management training, Urwick's characterisation of 'scientific management' in the 1940s was 'not a Tayloristic emphasis on work practices so much as a *method*' and neither was it 'incompatible with a human relations approach.' They therefore concluded that postwar discussions of 'scientific management' should be not equated to the 'Taylorism' of the 1910s, as Carew had assumed.⁵

Most recently, studies of industrial consultants by Kipping, and Ferguson during, and after, World War Two suggests a different story: one in which industrial consultants was seriously listened to, and which had an important influence on industrial practices both during and after the war.⁶ Using materials from the UK National Archives, particularly a Ministry of Supply (MOS) study ICI's production methods, official studies such as *R.O.F. the Story of the Royal Ordnance Factories*, Mass Observation reports, DSIR/MRC reports,

³ Tiratsoo and Tomlinson, *Industrial Efficiency and State Intervention*, p.26.

⁴ Tiratsoo and Tomlinson, *Industrial Efficiency and State Intervention*, p.98.

⁵ Tiratsoo and Tomlinson, *Industrial Efficiency and State Intervention*, pp.114, 143. For more on this issue, see chapter 7.

⁶ Ferguson, *Rise of Management Consulting* and Kipping, 'Consultancies, Institutions and the Diffusion of Taylorism'.

and published articles, this chapter builds on this research by looking at the Ministries of Supply and Aircraft Production (MAP). It examines how Bedaux work measurement, based on the *B* and other derivatives of Taylor's original *unit-times*, expanded on a huge scale from ICI into the wartime Ministry of Supply, particularly the Ministry's National Filling Factories (NFFs). Consultants were also useful in organising the switchover from civilian to war products. The chapter also examines the use of work measurement consultants at MAP. In contrast to MOS, which built many new factories which it owned, many MAP contractors had already implemented work measurement via their employment of consultants (examined in chapter 3), and so private and public sector work measurement consultants were deployed at a higher level of intervention. Case studies of MAP's employment of AIC for centralised inventory control and UOP at Fairey for labour costing and organisation are examined. The chapter concludes by examining the absorption of work measurement into the postwar Labour government's industrial productivity policies, particularly Labour's permanent endorsement of work measurement with foundation of the British Institute of Management in 1948.

5.2. British manpower

Despite frequent contemporary, and subsequent, claims to the contrary on both left and right, Britain and its manufacturing sector entered the war relatively confidently.⁷ However, the unexpected fall of France in May 1940, and the sudden threat of a German invasion of Britain, retrospectively made the efforts of war industrialisation over the years immediately prior seem lacklustre. Winston Churchill, who was partially to blame for these rumours, made his first BBC speech as Prime Minister on 19 May 1940.⁸ He declared to Britain and the Empire that

If the battle is to be won, we must provide our men with ever increasing quantities of the weapons and ammunition they need. We must have, and have quickly, more aeroplanes, more tanks, more shells, more guns. There is imperious need for these

⁷ Michael M. Postan, *British War Production* (London: HMSO, 1952), p.102.

⁸ For comments on Churchill's behaviour, see Edgerton, David, *Britain's War Machine: Weapons, Resources and Experts in the Second World War* (2nd edition, London: Penguin, 2012 [2011]), p.14.

vital munitions ... In that supreme emergency we shall not hesitate to take every step, even the most drastic, to call forth from our people the last ounce and the last inch of effort of which they are capable. The interests of property, the hours of labour, are nothing compared to the struggle for life and honour, for right and freedom, to which we have vowed ourselves.⁹

Taking Churchill's speech, and similar rousing BBC speeches by Churchill's Minister of Aircraft Production, Lord Beaverbrook, as abandonments of the 1937 Factories Act and various sectoral agreements, 'supply Ministers exhorted their contractors to work full time seven days a week'.¹⁰ In some firms, working hours for men were extended to twelve hour shifts, seven days per week.¹¹ Aircraft suppliers such as Supermarine and Hawker extended the working week to 63 and 70 hours respectively.¹² The response, in the official accounts at least, was 'magnificent'.¹³ However, it proved impossible to sustain such excessively extended working hours for long. Following research in June and July into the recent drop in industrial production, a joint MRC/IHRB investigation concluded that

interviews with managers and workers in several factories showed that the outbursts of energy and patriotic enthusiasm which characterised the first phase of the emergency period were weakening under the strain of the long hours of work. The workers began to feel bored and stale and were easily irritated and annoyed.¹⁴

As the threat of invasion passed, over the coming eighteen months a desire for high production was replaced with a desire for high *and stable* production. From a labour supply perspective, munitions were particularly important not least due to the high rate of consumption by all three branches of the armed forces. With his ability to absorb technical details, Churchill kept a direct eye on precise labour issues related to munitions. On 20 February 1941, Churchill wrote to his Minister of Labour, Ernest Bevin, with specific demands for ammunition filling:

⁹ The audio of Churchill's speech is available at: http://en.wikipedia.org/wiki/File:Winston_Churchill_-_Be_Ye_Men_of_Valour.ogg; accessed 14 June 2014.

¹⁰ H. M. D. Parker, *Manpower: Study of War-Time Policy and Administration* (London: HMSO, 1957), p.442. For a Beaverbrook speech on the patriotic energy of workers, managers, and technical staff at A.V. Roe & Company on 24 July 1940, see <http://www.bbc.co.uk/archive/battleofbritain/11423.shtml>; accessed 15 June 2014. For a contemporary critique of Beaverbrook's allegedly counterproductive approach, see Mass Observation, *People in Production: an Enquiry into War Production* (Harmondsworth: Penguin, 1942), pp.57-60.

¹¹ Parker, *Manpower*, p.442.

¹² Sebastian Ritchie, *Industry and Air Power: The Expansion of British Aircraft Production, 1935-41* (London: Frank Cass, 1997), p.174.

¹³ Parker, *Manpower*, p.442.

¹⁴ IHRB/MRC, *Hours of Work, Lost Time and Labour Wastage* (London: HMSO, 1942), p.3.

We are very short of ammunition. Production is held up entirely on account of filling, which in turn is held up on account of labour. With our present factories we could increase the ammunition output two-and-a-half-fold by mid-May if we could provide the labour to run them. The additional labour required is:

	By March 31	By Mid-May
Skilled males	340	940
Other males	9,100	20,100
Females	22,500	40,900
Total	32,000	62,000

Please inform me what difficulties stand in the way of providing this labour and what measures are being taken to overcome them.¹⁵

As Churchill's remarks indicate, labour shortages were becoming apparent. He declared in the House of Commons on 2 December 1941:

The year 1941 has seen the major problems of creating war production capacity and manufacturing equipment largely solved or on the high road to solution. The crisis of equipment is largely over, and an ever-broadening flow is now assured. The crisis of man-power and woman-power is at hand, and will dominate the year 1942.¹⁶

As Churchill's remarks indicated, the extreme pressures on supplies of British workers at this time even necessitated newly masculine terminology: that of *manpower*. As one US report on British war manufacturing put it, 'MANPOWER' was a term 'virtually unheard a year ago' but it had 'come to be a byword because it expresses an entire set of assumptions about the way total war must be waged'.¹⁷

Following his trip to the USA that month, in which many matters of American war production were negotiated, the US's war administration reminded Churchill of an earlier stage in his career, in which manufacturing had a very important role:

The President, for instance, had appointed Mr Donald Nelson to supervise the whole field of production. Ought he not to have an opposite number? ... In the Ministry of Munitions in 1917 and 1918, I had presided over the spheres now covered by the Ministry of Supply and the Ministry of Aircraft Production. These departments were so closely interwoven in the fields of raw materials and skilled labour that a single directing authority would have great advantages. As everything

¹⁵ Winston S. Churchill, *The Second World War, Volume 3: The Grand Alliance* (Boston: Houghton Mifflin Company, 1950), pp.738-9

¹⁶ HC Deb 2 December 1941, vol. 376, cols 1009-95. M-O, *People in Production*, p.73 reported that 'The Prime Minister has called 1942 the crisis of man-power.

¹⁷ Eric H. Biddle, *Manpower, a Summary of the British Experience* (Chicago: Public Administration Service, 1942), p.1. To Biddle, Britain was a particularly useful case study, as the USA had never had to fully mobilise its manpower resources in a war, whereas Britain had done it twice in living memory.

became more gigantic, this applied with increasing force. Beaverbrook had the confidence of both the Russians and of the Americans, and no one seemed more fitted to head so great a combination as he.¹⁸

To coordinate between MOS and MAP, Churchill created the Ministry of Production (MOP) in February 1942, with Beaverbrook as its head. For unclear reasons, Beaverbrook resigned within a fortnight and was replaced by another of Churchill's friends, the metals magnate Oliver Lyttleton. Lyttleton augmented his new super-ministry with additional deputies. He appointed Norman Kipping, a former works manager of Standard Telephone, and President of the Institution of Production Engineers (IPE), as head Regional Division in the Ministry of Production.¹⁹ He invited Sir Ernest Lemon to join MOP, where Lemon introduced Gantt charts in planning production and changeover.²⁰ Also within MOP, Bevin established the Munitions, Management and Labour Efficiency Committee, which contained representatives from MOP, MAP, MOS, MOL, and the Admiralty.²¹

The dominant feature of the use of British manpower, was that the majority of both males and females were employed in non-combat military-industrial undertakings. Around one third of Britain's total manpower supply was deployed in manufacturing. The contours of manpower deployment throughout the war can be seen in this table:

¹⁸ Winston S. Churchill, *The Second World War, Volume 4: The Hinge of Fate* (Boston: Houghton Mifflin Company, 1950), p.62.

¹⁹ ODNB entry

²⁰ Terry Jenkins, *Sir Ernest Lemon: the Production Engineer who Modernised the LMS Eailway and Equipped the RAF for War: a Biography* (Oxford: Railway and Canal Historical Society, 2011).

²¹ Inman, *Labour in the Munitions Industries*, p.232, n.1.

Table 5.1. British manpower deployment, 1939-45

	1939	1940	1941	1942	1943	1944	1945
Total working population (in 000s)	19,750	20,676	21,332	22,056	22,285	22,008	21,649
Manufactures	6,815 (35%)				7,746 (35%)		6,820 (32%)
Working males, aged 14-64	14,656	15,104	15,222	15,141	15,032	14,901	14,881
Working females, aged 14-59	5,094	5,572	6,110	6,915	7,253	7,107	6,768
Industry (total)	17,920	17,413	17,368	17,494	17,121	16,685	16,289
Industry (male)	13,083	12,160	11,520	10,992	10,422	10,122	10,021
Industry (female)	4,837	5,253	5,848	6,502	6,699	6,563	6,268
Armed forces, and auxiliary services	560	2,618	3,766	4,475	5,084	5,249	5,217

Source: Parker, *Manpower*, pp.482-4.

There were several reasons why the British production effort required so much manpower, the changing geopolitical landscape being one of them. France's rapid collapse meant that the war had developed in an unexpected fashion. In 1939 and 1940, the allied division of labour had suggested that the French would be supplying the majority of land troops. It was therefore not known that much British manpower would later have to be absorbed into the infantry and related services. Secondly, the nature of warfare had changed. As Sir Godfrey Ince, wartime Director General of Manpower recalled, unlike in the prior world war, in which airforces were comparatively small, by the 1940s the massive British airforce and its operations absorbed three million men and women. He also noted that much

manpower, including 400,000 full-time men and women, and many more part-time workers, were also required for civil defence against enemy airforces.²²

Moreover, Britain was fighting a uniquely *labour-intensive* war. The very real threat of aerial bombing forced planners to disperse manufacturing concerns across large areas in which individual factories actually consisted of thousands of small workshops. In addition, given the British focus on innovation and new machines, this was no bad thing: maintaining flexibility to switchover to new products was vital, and British 'manufactories' which employed thousands of workers working by 'hand or by small tools' could achieve this.²³ But such a high rate of innovation also necessitated greater managerial intervention, as each innovation which made it off the drawing board into production required substantial reorganisation of equipment, the analysis and measurement of new production processes, and the setting of new incentive pay rates.

However, ongoing disappointment with output at MAP, and a series of military defeats in the Far East had, by 1942, seriously dented British confidence both in military and industrial terms.²⁴ Mass Observation (M-O) summed up the British attitude to war production that year: 'All is not well in our war-production effort at present. *Something* is seriously wrong somewhere. Different people point the accusing finger at different wrong points and potential strong points'. 'The person or thing pointed at differs, but the accompanying voice addresses itself primarily to one assumption: the need for a 100 per cent efficiency'.²⁵

As war continued to intensify, the pressure on manufacturing manpower increased. It was felt across all munitions production sectors, but, against Bevin's wishes, MAP was favoured from April 1943 onwards.²⁶ This table shows the relative size and increase of each of the three munitions producers from 1942-3:

²² Sir Godfrey Ince, 'Mobilisation of Man-Power in Great Britain for the Second World War' *Manchester School of Economic and Social Studies* Vol. 24 (1946), pp.31-2.

²³ Postan, *British War Production*, p.179.

²⁴ Edgerton, *War Machine*, chapter 5.

²⁵ M-O, *People in Production*, p.63. The M-O investigator discovered that complaints that 'real industrial change is necessary' increased with social class. Whereas only 32% of class D interviewees suggested changes were needed in war production, 41% of class C did, and 62% of class B did.

²⁶ Parker, *Manpower*, p.206.

Table 5.2. Balance of manpower deployment in the productive ministries, 1942-3

	Estimated labour at July 1942	Allocation up to the end of 1943	Total	Estimated labour at 31st December 1942	Balance of allocation for 1943
Admiralty	815,000	111,000	926,000	854,000	72,000
MAP	1,514,000	503,000	2,017,000	1,623,000	394,000
MOS	1,655,000	-78,000	1,577,000	1,698,000	-121,000
Total	3,984,000	536,000	4,520,000	4,175,000	345,000

Source: Parker, *Manpower*, p.200

By September 1943, 'the high water-mark in the mobilisation of the manpower of the country' had been reached.²⁷ Not only was all British manpower occupied by this point, additional sources of productive capacity, such as the Empire, the United States, the Republic of Ireland, and alien nationals in Britain had reached saturation too.²⁸ Any additional output had to come from using existing manpower, machines, and plant more efficiently, particularly at MOS, whose manpower supplies were being siphoned off to MAP and the armed forces. As Churchill put it in a speech to six thousand women at the Royal Albert Hall:

In the forthcoming year you will see larger armies fighting, you will see more powerful air forces striking at the heart of the enemy's country; but the actual demands made upon the British population cannot be greatly increased. The augmentation of munitions will follow from the smoother running of the great processes which are already at work, rather than from any multiplication of the human beings engaged in production.²⁹

Late 1943 and 1944 brought new challenges. Many of the problems present in British war

²⁷ Parker, *Manpower*, p.210. The employed population of Britain, including the Forces, was over 22 million out of a total working-age population of 33 million, and a total population of 45 million. See Postan, *British War Production*, p.222.

²⁸ Parker, *Manpower*, chapter 20. As Parker records, the only source of expanding manpower from 1941-5 was that of Italian and German POWs, of whom there were 224,000 in 1945.

²⁹ Churchill, 'The Women of Britain' in Winston Churchill, *War Speeches, 1940-45*, (London: Cassell, 1952), p.180. Speech delivered 29 September 1943.

manufacturing actually increased as an invasion of France became imminent. This not only necessitated shunting more manpower into the military and related logistics and support services, but also to maintain a high manufacturing output to equip the army and to fully switch from defence to offence.³⁰

Indeed, the armed forces were retained for longer than British war production was kept fully intact. It can be seen in Table 5.3 that while war production was being wound down to peacetime levels, the armed forces were actually still increasing in size:

Table 5.3. Manpower allocation in production and the armed forces, 1944

	Allocations, September 1944	Achievements
Armed Forces	332,000	359,000
Civil Defence	-50,000	-83,000
Admiralty (Supply)	-68,000	-68,000
Ministry of Supply	-170,000	-138,000
MAP	-198,000	-297,000
Other govt departments	13,000	94,000
Group II industries and services	75,000	30,000
Group III industries and services	-64,000	-70,000

Source: Parker, *Manpower*, p.234.

By 1944, the Ministry of Information had started to issue histories of the heroic wartime mobilisation of manpower, which, for propaganda reasons, downplayed the robust professionalism which the British war machine had been able to develop and direct at mobilising, equipping and training Britain's manpower.³¹ Even as the general demobilisation of both the military and industry continued throughout 1944 and 1945, the notion that Britain had been short of production experts, but that state direction of

³⁰ Parker, *Manpower*, pp.226-7.

³¹ Ministry of Information, *Manpower: The Story of Britain's Mobilisation for War* (London: HMSO, 1944).

manpower had been a success, became a central plank of postwar British industrial policy. The next section examines the British state's engagement with industrial consultancies during the war.

5.3.1. Experts: consultants

The wartime importance of Allied industrial consultants remained unknown until relatively recently, and much is still not known about them.³² Perhaps there are good reasons for this: Charles E. Bedaux, whose career is examined in chapter 3, is a case in point. However, industrial consultants' manufacturing experience, especially that of Bedaux and his offshoots, was particularly welcome to policymakers due to its function of standardising, measuring and costing work at the point of production, which, in turn, produced valuable labour costing data which could be used to measure and modify worker income (and thus buying power), to compare the efficiency of government contractors, and to monitor flows of value around the wartime industrial economy. Costing was also useful in manpower allocation, securing beneficial procurement contracts, and material supply.³³

The heads of all three British management consultancies were seconded into wartime service. P-E's Managing Director, Robert Bryson, was mobilised into the Royal Engineers.³⁴ The Earl of Verulam assisted the intelligence services in ways which remain unclear.³⁵ Another AIC director R.J. Gigli, joined MAP, where, some sources suggest, he was involved in solving the problem of light metal alloy supplies.³⁶ Lyndall Urwick of UOP was promoted to Lieutenant Colonel, and put in charge of the Treasury Research Station, where he investigated supplies at the Ministries of Supply and Shipping. In June 1942, Urwick joined the new Petroleum Research Department, where he was project manager

³² Much consultancy activity was conducted under a veil of secrecy and perhaps did not leave many records.

³³ This also took place within the living memory of the Ministry of Munitions having haemorrhaged millions of pounds of taxpayers' money in the prior war. See section 2.10 of this thesis, particularly Marriner, 'Ministry of Munitions'.

³⁴ Ferguson, *Rise of Management Consulting*, p.103

³⁵ A.W. Brian Simpson, *In the Highest Degree Odious: Detention Without Trial in Wartime Britain* (Oxford: Clarendon Press, 1992), p.334.

³⁶ Brownlow, *History of Inbucon*, p.57.

on the development of flamethrowers, FIDO, and PLUTO.³⁷

The war had brought AIC permanently under British control: at the outbreak of war, AIC's American directors fled the country, leading to the Earl of Verulam becoming the company's director, Norman Fleming its Managing Director and a new board of British engineers being permanently elected.³⁸ AIC blossomed as a consequence of the war contracts it won. In 1940 there were 55 AIC consultants, a figure which doubled to 100 during the war.³⁹ Due to a healthy supply of assignments, AIC continued to grow in terms of contracts and profits, particularly in the metal, mechanical engineering, and textile sectors.⁴⁰

³⁷ Brech, Thomson, and Wilson, *Lyndall Urwick*, chapter 6 where it can be seen that Urwick claimed to have named FIDO and PLUTO.

³⁸ See the material held in Open University, Brech papers, EB59/11. Three Bedaux Engineers were also promoted to the Board of AIC, all of whom were go on to be important in post-war consultancy. They were A.D. Wilson, R.G. Gigli and Ernest Butten. Also in 1939 AIC changed the name of its holding company from British Bedaux Ltd. to Inbucon. See Brownlow, *History of Inbucon*. For Fleming, see Kipping, 'Consultancies, Institutions and the Diffusion of Taylorism', p.82, n.50.

³⁹ Brownlow, *History of Inbucon*, p.53. Brech, *Productivity in Perspective*, p.112 claims that there were one hundred British consultants involved in the British war effort.

⁴⁰ British Bedaux's net profits increased from £22,949 in 1942 to £23,287 in 1943. See 'Company Results' *The Times*, 15 June 1943.

Table 5.4. Sectors of British firms employing AIC, 1939-49

	Number of Firms Using the Bedaux consultancy (1926- 1939)	Number of Firms Using the Bedaux consultancy (1939- 1949)
Food, Drink and Tobacco	22	13
Chemical and Allied Trades	26	28
Coal and Petroleum	3	2
Metal Manufacture	18	42
Mechanical Engineering	10	57
Electrical Engineering	9	6
Motor Vehicle Components	8	1
Textiles	36	115
Services/Distribution	11	58
Other	35	66
Total	178	388

Source: Kreis, 'Diffusion of an Idea', p.344.

AIC also appear to have been important in shipbuilding. One source recorded that AIC's new system of 'Forward Loading', which enabled better advance planning of production, increased output of destroyers by 33%.⁴¹ Russell Currie, who had escaped from a Japanese prison, started working for AIC as a consultant in the production of ships during the war.⁴²

⁴¹ Ferguson, *Rise of Management Consulting*, p.106

⁴² As noted in chapter 1, Currie went on to become head of ICI's Work Study section in the postwar period.

Surviving data indicate that AIC's 1940s clients remained modest in size:

Table 5.5. Size of British firms employing AIC, 1939-49

Number of employees	1926-39 (number)	1926-39 (percentage)	1940-49 (number)	1940-49 (percentage)	1926-1949 (percentage)
0-100	5	4.3	50	14.0	11.5
100-250	19	15.8	95	26.6	23.9
250-500	37	30.8	82	22.9	24.9
500-750	21	17.5	37	10.4	12.2
750-1000	9	7.5	31	8.7	8.4
1000-2000	16	13.3	33	9.2	10.3
2000-5000	6	5.0	16	4.5	4.6
Over 5000	7	5.8	13	3.7	4.2
Total	120		357		

Source: Kreis, 'Diffusion of an Idea', p.344. Note that these figures are consultations conducted by British Bedaux/AIC.

AIC's services were often used in measuring and analysing work in the switchover from civilian to war production, or from one war product to another:

Table 5.6. Production processes converted by AIC from civilian to war use

Civilian output	Converted war output
Motor accessories	Aircraft parts and gun turrets
Plywood	Plywood boards
Motor Bicycles	Aero engine components
Arc furnaces	Gun mountings and mines
Raincoats	Balloons
Furniture	Mosquito aircraft
Football pools	Barrage balloons
Cosmetics	Ammunition
Boilers	High explosive shells
Textile machinery	Shells
Chain welders	Aircraft control cables
Hair-brushes	Tubular rivets
Carpet weaving	Nuts and bolts

Source: Brownlow, *History of Inbucon*, pp.53-4.

Due to war secrecy and lack of archival material, much less is known about exactly what UOP and P-E did in the war. Some evidence survives. Like AIC, UOP also did well, though unlike AIC its number of consultants remained fixed at around 41.⁴³ As examined later in this chapter, MAP was a UOP client. They also intervened in changeovers in other locations such as a Derby car plant, where they assisted in changing over sections of the plant from hand to machine fitting.⁴⁴ One UOP consultant established a work study school for training consultants in efficiency methods.⁴⁵

Even less is known about P-E, although in the 1930s, they had already won major contracts with some of Britain's largest aeroplane companies, and were told to stay *in situ* when war broke out.⁴⁶ P-E certainly focused on production throughout the war: they

⁴³ The list of their names can be found in Lyndall Urwick Society, *The Urwick Orr Partnership, 1934-1984* (privately printed, Lyndall Urwick Society, 2007), p.343.

⁴⁴ Ferguson, *Rise of Management Consulting*, p.108.

⁴⁵ Brech, *Productivity in Perspective*, pp.156-7

⁴⁶ For P-E's orders to stay in place, see P-E, *Fifty Years of Professional Enterprise: the Story of P-E*

planned Merlin production in the USA, helped to design midget submarines, and set up the first jet engine production line for Rolls-Royce in an empty Birmingham Small Arms Co. factory in Stoke-on-Trent. Several P-E consultants were attached to Combined Operations where they designed processes for ordering and delivering equipment.⁴⁷ They also expanded: former Lucas employee and Works Manager and Chief Engineer of Welwyn Electrical Laboratories, K. Trickett, was taken on by P-E in 1940.⁴⁸

In May 1943, a fourth Bedaux-based British consultancy, Personnel Administration, was established. Formed by the experienced Bedaux engineers Ernest Butten and Derek McMullen, and the former National Institute of Industrial Psychology investigator David Seymour, Personnel Administration augmented the Bedaux system with a standardised method of testing aptitude named the Personnel Administration Method of Training (PAMT), a system which claimed to combine together work measurement and industrial psychology. PAMT involved training operators to Experienced Worker Speed (EWS), which 'probably related to approximately 80Bs in Bedaux methodology', after which operators were moved into the factory where they could begin work immediately.⁴⁹ They also believed that PAMT would help to rectify the situation that 'to increase output the most common aids were rough and ready time study, and piece-work systems'.⁵⁰

(privately printed, 1984), p.12. For an example of a large wartime P-E contract, the Rolls-Royce plant at Hillington, see Stephen E. Little and Margaret Grieco, 'Shadow Factories, Shallow Skills? An Analysis of Work Organisation in the Aircraft Industry in the Second World War' *Labor History* Vol. 52, No. 2 (2011), pp.193-216.

⁴⁷ P-E, *Fifty Years*, p.14

⁴⁸ K. Trickett, 'Investing in Better Materials Handling' *Journal of the Institution of Production Engineers* Vol. 35, No. 9 (September, 1956), p.546. By 1956, Trickett, who had an electrical engineering degree, was Southern Area Manager for P-E and a Director of another consultancy, Combined Technical Services Ltd.

⁴⁹ Ferguson, *Rise of Management Consulting*, pp.114-5

⁵⁰ Alan Fogg, *PA's Early History* (privately printed, 1980), p.4.

Like AIC, Personnel Administration grew quickly:

Table 5.7. Numbers of PA consultants, 1943-6

Date	Number of consultants
May 1943	3
December 1943	8
May 1944	16
May 1945	26
May 1946	38

Source: Fogg, *PA's Early History*, p.6

Industrial consultancies were not the only production experts to grow considerably, and permanently, in number, as a consequence of the needs of the wartime state. The next section examines the substantial growth of *in situ* industrial production specialists during the war.

5.3.2. Experts: specialists

The British military-industrial production and procurement complex did not just rely on state technocrats and industrial consultants. The rapidly expanding factory floor also needed thousands of production specialists in a number of fields, particularly those who could maintain high output levels while switching to new products. Within these structural changes, priority was given to managers with management expertise rather than expertise related to specific products or sectors:

As a result of their experience in the early years of rearmament and war, officials in the supply departments had come to attach an ever-greater importance to management. The better-managed firms were singled out and loaded with contracts to the point of overloading. The wartime story of a famous electrical firm and of its rapidly expanding responsibilities in war production is essentially one of a government department—in this case M.A.P.—imposing successive responsibilities on a group of managers who had proved themselves in the earlier stages of the war. Among the contractors of the Ministry of Supply there were quite a number of firms with managers whom the Ministry rated so high that they were invariably entrusted with difficult and urgent contracts. There was an engineering firm in the

North which before the war produced a small car in rather small quantities, but which was now expected to tackle one difficult munitions job after another; or a well-established firm in the Eastern Counties which before the war specialised in making large-scale equipment for the food industry, but which was now expected to lead the way in a variety of engineering jobs, mostly in the making of gun components and carriages; or a great motor firm in the Home Counties, and yet another firm of electrical manufacturers in the Midlands, both of which turned into veritable arsenals, making everything from tanks to components of small-calibre guns.

Indeed, on more than one occasion the existence of a manager of proved quality was sufficient to attract munitions contracts, however remote might be the field of the manager's pre-war activities. A famous firm of chocolate manufacturers in the Midlands was asked to undertake the manufacture of aeroplane parts and components for rockets at its home factory and to manage a new factory for 'jerricans' in London; a Scottish transport corporation was asked to make parts of aircraft. But nothing illustrates better the crucial importance of management than the wartime career of certain well-known promoters of football pools. They became a large unit of war production manufacturing not only parachutes and balloons, but also machining parts of aircraft, ammunition and gun carriages. What to some extent commended the firm to the officials was its experience in employing large numbers of young women and its extensive premises. But what qualified it most was the reputation of its directors for efficiency and drive.⁵¹

Manpower shortages were not just felt on the production line or work bench. They were also felt in lower and middle management. As part of Britain's massive war industrialisation drive, production engineers, labour managers, industrial administrators, and costing accountants were needed in large numbers. These specialists, and others, had been expanding in number since the First World War, largely due to the efforts of the circle around Rowntree and the MRG, but it was the Second World War that gave them the permanent endorsement by the British state.⁵² Moreover, all of the major professional management organisations expanded very considerably during the war.⁵³

To the IPE, as many others such as Churchill, the war came in two phases. The first, from 1940-2 saw a 'calamitous' undersupply of some machines and the underuse of

⁵¹ Postan, *British War Production*, pp.394-5. The football pools firm was almost certainly Littlewoods. Littler, 'The Bureaucratization of the Shop-Floor' records that Littlewoods were a Bedaux client from the 1930s to the 1960s. Unusually for a conservative firm, Littlewoods was run like many Quaker manufacturing firms, including in its devotion to precise timekeeping, even though its head, John Moores, was a Conservative and no Quaker. See Barbara Clegg, *The Man Who Made Littlewoods: The Story of John Moores* (London: Hodder and Stoughton, 1993).

⁵² These positions became more formalised throughout the war. The ILM was renamed the Institute of Personnel Management in 1941. The South African Institute of Personnel Management was formed as an IPM affiliate, followed by similar organisations in Australia and India. See Niven, *Personnel Management*, p.129. This was the same year that the Institute of Industrial Administration (IIA) foremanship course was formalised. See Brech, *Productivity in Perspective*, p.113.

⁵³ IIA membership grew from 478 in 1939 to 2,508 in 1945. See T.G. Rose, *A History of the Institute of Industrial Administration, 1919-1951* (London: IIA, 1954), p.140.

others. In response, the IPE formed a war committee consisting of many leading business managers, such as the maverick aeroplane designer E.C. Gordon England, and Deputy Chairman of Hoover, Sir Walter Puckey. This committee then unsuccessfully petitioned the Chairman of Churchill's Production Council, Arthur Greenwood, to introduce flow production into factories. They met with the response that training new workers was more important.⁵⁴

On 26 Sept 1941 Bevin addressed the IPE, emphasising the importance of production specialists such as production engineers, to increase the speed of production, without increasing working hours

For I was convinced that the long hours that were expected of the workers were having a bad effect on our total production. (*Applause*). It seems to me that in war this question of optimum hours is not so much one of bargaining between trade unions and employers as one demanding a scientific approach which takes account of all the factors involved at any given time and recognises the need for adjustment as those factors change ... The factors that will count are proper timing, flow of materials and components, and the sustaining of effort over a long period with continuously increasing rhythm ... A study of the curve of production over a period of months reveals that the final result achieved by spasmodic is not so good as that resulting from well organised and sustained effort, with a carefully-timed flow of production and components, for ever-increasing production. (*Applause*) The workers like to be kept going, and the whole direction of our productive effort, in what may well be a protracted struggle, must more and more be organised on such a basis that it can be sustained and progressive right to the very end.

Bevin also stressed the necessity of production engineers cooperating with the Ministry of Labour:

There is no greater service that you as production engineers can render to the country at the moment than to provide some kind of guide for my labour inspectors, so that they can say to a firm 'The experts in this industry have found that in a series of operations in your industry, this is what you should require.'

He concluded that manpower and factory capacity was coming under increasing stress, and that instead of asking for more manpower and factories, he appealed to the production engineers to utilise extant manpower and plant to the maximum extent possible.⁵⁵

By 1942, manpower shortage was the key issue facing British manufacturing. As the IPE argued in an open letter to Lyttleton in March 1942 that there was an even higher

⁵⁴ IPE War Emergency Committee, 'Memorandum on War Production Problems' *Journal of the Institution of Production Engineers*, Vol. 19, No. 19 (1940), pp.381-390.

⁵⁵ Ernest Bevin, *Britain's War Effort: The Production Front* (London: Institution of Production Engineers, 1942).

shortage of specialists than general manpower:

Attention tends to be focussed so narrowly upon the shortage of productive labour that the importance of the so-called non-productive staff, which is even scarcer, is not fully realised. Much of the non-productive work in each engineering factory is highly skilled work, and this effort is just as surely dissipated through over diversified production as the time of skilled tool makers or other skilled producers. Productive capacity is not to be measured in machine hours alone, but also in administrative capacity, production planning capacity, production engineering capacity, and even in skilled clerical capacity. Efficiency in big production shops cannot exist without the skill and adequacy of the corresponding production planning and administrative effort. If there is a national shortage of skilled management, let the same care be taken to avoid its wastage or dissipation as is emphasised for the skilled producer.⁵⁶

Also significant to the IPE was the election of Sir Ernest Lemon to its Presidency in 1943.

At his inaugural speech, where he was introduced by Lyttleton, Lemon extolled the virtues of scientific management and brandished a copy of Harrington Emerson's *Twelve Principles of Efficiency*. 'Read this,' he declared, '... it can be applied to anything'.⁵⁷

Bevin also intervened in labour management, not least because Churchill kept an eye on factory illness statistics too.⁵⁸ As examined in chapters 3 and 4, labour management specialists, professionalised foremen, and quality control inspectors had been present in private firms like Rowntree, Cadbury's, ICI, and Unilever for up to two decades.⁵⁹ However, the staple industries had engaged with these methods much less, and Bevin saw this as a direct hindrance to war production. As such, Bevin created training courses for labour managers in November 1940, and, by July 1941, there were 150 'new labour managers available for service in national or private factories'.⁶⁰ With the backing of Bevin and his Ministry's Factory and Welfare Department, as well as John Wardlaw-Milne's

⁵⁶ 'Increasing Production Without Increasing Facilities' *Journal of the Institution of Production Engineers* Vol. 21, No. 5 (May 1942), pp.205-221.

⁵⁷ Lemon was speaking to a much expanded IPE: its membership had expanded from 700 in 1939 to 3,000 in 1941, and its student body from 6 in 1939, to 692 in 1945. IProdE membership statistics, Institution of Production Engineers, Institute of Engineering and Technology, IMfgE 2/3/7-8.

⁵⁸ 'It is disquieting to find that the rising trend has continued during the winter. The addition, thus revealed, to the numbers normally kept away from work by sickness is quite an appreciable fraction of our total labour force; and the effect on the war effort is the same if a large proportion of them are war-weary rather than genuinely ill'. Churchill to Lord President of the Council, 5 July 1943. See Winston S. Churchill, *The Second World War, Volume 5: Closing the Ring* (Boston: Houghton Mifflin Company, 1951), p.650

⁵⁹ It was no coincidence that its wartime Presidents were Richard Lloyd-Roberts of ICI (1939-41 and 1945-7) and Dr Clarence Northcott of Rowntree's (1941-43). See Niven, *Personnel Management*, p.166. An A.F. Stewart was President of the IPM from 1943-5, although my research has uncovered nothing on this person.

⁶⁰ A Women Graduate, 'Labour Management in War-Time' *Industry Illustrated* (July 1941), pp.14-15.

Select Committee on National Expenditure, the number of labour managers surged from 1,800 in 1939 to 5,700 in 1943, with the majority of these new managers being employed in war production.⁶¹ The ROFs all established personnel departments, with around 600 labour officers between them, including senior managers who were coordinated on a regional basis. NFFs and explosive ROFs had manager-worker ratio of around 1:400, whereas the ratio at the engineering ROFs was more like 1:800.⁶²

What did these new labour managers do? They were certainly not there to simply provide welfare services. A semi-official history of wartime labour management was quite clear that

The patronizing and paternalistic conceptions of welfare of earlier years have been replaced by a more fundamental principle. The personnel function of management is wider in scope, more technical in application than the old welfare concept.⁶³

The new technical managers were useful for introducing programmes as well as training, coordinating with regional manpower and production boards, and contributing to Joint Production Committee (JPC) negotiations. They were seen to have been a success: 'The very high level of production in the munitions factories could never have been achieved without training and the discriminating use of "upgrading".' Specifically on the factory floor

The special circumstances of war have brought about a greater emphasis on training within industry than ever before in British history. The basis of all training in fundamental methods of work depends on an analysis of the job to be done. The best methods of doing a particular job are agreed upon, usually - in the larger concerns - between motion study representatives, supervisors and personnel officers. Instructors selected for their ability to teach are themselves instructed in the 'best' methods and pass on their experience in the training schools to new entrants, upgraded workers, and men and women transferred or promoted to new jobs.⁶⁴

This mass of new technical specialists were certainly required for war production, but this formalisation process came to be seen by Bevin and other senior postwar Labour figures as the model which should be applied to all successful manufacturing establishments. We next turn to the formulation, practice, and expansion of work measurement at the Ministry

⁶¹ Parker, *Manpower*, pp.420-1.

⁶² G.R.Moxon, *The Growth of Personnel Management in Great Britain during the War, 1939-1944* (London: IPM, 1948), pp.22-4.

⁶³ Moxon, *Personnel Management*, p.4.

⁶⁴ Moxon, *Personnel Management*, pp.17-18. See also Lyndall Urwick, *Personnel Management in Relation to Factory Organisation* (London: IPM, 1943).

of Supply.

5.4. Work measurement at the Ministry of Supply

Speedy and high quality arms production was of paramount importance to the British war effort.⁶⁵ As can be seen in this table, over the two years prior to the war, ROF capacity had expanded dramatically:

Table 5.8. Manpower deployed at the ROFs

Date	New ROFs approved	New ROFs in operation	Total labour force
March 1938	10	5	28,479
March 1939	16	9	32,794
December 1939	29	10	54,249
December 1940	38	31	112,268
December 1941	41	39	276,760
March 1942	41	40	311,932
1943		41 (+3 older ROFs)	c.350,000 ⁶⁶

Source: William Hornby, *Factories and Plant* (London: HMSO, 1958), p.91.

By contemporary standards, the biggest ROFs were enormous. Of the twelve factories in Britain employing more than 19,000 people during the war, seven were ROFs. Among the ROFs, the largest were the NFFs, which produced high-consumption items such as shells, grenades, and fuses. By June 1940, the largest NFF was established at Chorley, with 15,000 employees. From June-August 1940, more than 80,000 new workers taken on at the NFFs. At some, nearly 2,000 workers were taken on each month.⁶⁷

⁶⁵ This was even if the public did not rate them as highly as aeroplane and weapons production. See Postan, *British War Production*, pp.104-5.

⁶⁶ Ian Hay, *R.O.F. the Story of the Royal Ordnance Factories, 1939-48* (London: HMSO, 1949), p.22.

⁶⁷ William Ashworth, *Contracts and Finance* (London: HMSO, 1953), p.105

Output at the MOS increased considerably over the early war years. A 1942 report by the MOP stated that MOS production of Warlike Stores was more than 7.5 times higher than in 1939.⁶⁸ The official historian of war production described the actual methods and conditions of production at the ROFs thus:

In spite of the immense scale of the first ten R.O.F.s, the individual units within them had, for safety reasons, to be kept small in scale and much dispersed. Production was therefore seldom concentrated in single block large enough to allow the use of large scale machinery and, above all, conveyor belts. Factories were therefore planned largely as 'manufactories' in which the operations, done mostly by hand or by small tools, would be carried out by large masses of hand workers.⁶⁹

It was also noted that, in addition to the threat of aerial bombing, an objection to adopting American-style conveyor belt mass production was that it would affect the quality of weapons and would reduce flexibility in the event that enemy innovations necessitated new products.⁷⁰ Elsewhere it was also noted that mechanisation at the ROFs was discouraged to prevent explosions and because 'methods and machines were made obsolete by the frequent changes in type of ammunition required'.⁷¹

At their peak in 1943, there were 44 ROFs, 41 of which were new, and which employed over 300,000 workers, most of whom were labour conscripts, particularly women and girls.⁷² This was nearly 20% of the total number of workers employed by the Ministry of Supply. Even though MAP had been prioritised for manpower supplies, across 1943 'efficiency in the filling factories continued to grow and total output did not fall in proportion to labour strength'.⁷³ During the course of the war, the ROFs produced 76,000 major guns, 4 million infantry weapons, 400 million shells, bombs and mines, and 6,000 million rounds of small-arms ammunition. In addition, they produced millions of fuses and other ancillary equipment.⁷⁴

The NFFs were state-owned but often managed by the private sector: Unilever, the

⁶⁸ Ashworth, *Contracts and Finance*, pp.77-8

⁶⁹ Postan, *British War Production*, p.179.

⁷⁰ In retrospect, it turned out that American factories were not 'afflicted with rigidities of standardised production to the extent sometimes foretold in this country'. See Postan, *British War Production*, p.244.

⁷¹ Hornby, *Factories and Plant*, p.105.

⁷² 1943 really was their peak. Waltham Abbey was closed 1943. See Wayne D., Cocroft, *Dangerous Energy: The Archaeology of Gunpowder and Military Explosives Manufacture* (London: English Heritage, 2000), p.236.

⁷³ Postan, *British War Production*, p.352

⁷⁴ Hay, ROF, p.22.

Co-Operative Wholesale Society, Metal Closures, Lyons, Courtaulds, and Imperial Tobacco were all seconded to manage NFFs, some of which, particularly Lyons, had been extensively using the Bedaux *B* for years.⁷⁵ What were the new ROFs, particularly the NFFs, like? One account described the new NFFs as such:

In the planning of each factory scientific principles were brought to bear to estimate the quantities of each component required and how its production could be logically ordered; similarly in the conception of each building there was an economy of design and use of materials. The large process buildings were well designed according to functional modern ideals with no extraneous decorative detailing ... The new ROFs epitomised the advantages of modern factory design in improving the working environment and welfare provision.

In addition, to prevent explosions occurring in the first place, at the start of every shift workers changed into buttonless and pocketless clothing, with rubber safety shoes.⁷⁶

A debate had been taking place at the Ministry of Supply about the methods which could be used to incentivise rapid production at the NFFs, most of which were in the process of being built, and managing contracts established. The three options discussed were the Woolwich Arsenal 'fellowship scheme', the 'Premium Bonus System' in use at the ICI (Chemicals) plant at Ardeer, and the 'ex gratia allowance system' in use at the Vickers Armstrong Dartford Explosives Works. Only the Woolwich and Ardeer schemes were seriously debated.⁷⁷ As is clear from the description of the Ardeer PBS scheme, and other evidence, it was actually a more sophisticated type of work measurement under discussion.⁷⁸ It was used on a number of work processes at Ardeer:

This system is applied by Messrs ICI (Explosives) Ltd., at Ardeer, to the operations of cartridging, packing and sheathing of blasting explosives, to all Safety Fuze operations, and to cam press pelleting and small packing of Gunpowder.

The system is also applied at Denaby factory to the pressing, wrapping and packing of T.N.T. and tetryl pellets and at Kyle Factory to assembling and packing smoke floats, Very cartridges and parachute flares, also to the filling of aerial practice

⁷⁵ Cocroft, *Dangerous Energy*, p.216.

⁷⁶ Cocroft, *Dangerous Energy*, p.224

⁷⁷ The fact that the new Minister of Supply, Andrew Duncan, was a Director of ICI, may have influenced this. ODNB entry

⁷⁸ Faraday, *Story of Work Study*, p.6 notes that by 1935 the Bedaux department at ICI's Nobel Division was named the Premium Bonus Department. The Ardeer PBS was described as follows: 'This system is based on the result of a careful investigation of each process to determine the amount of work each normal worker should perform in a minute, due allowance being made for the effort required by the nature of the job. This amount of work is rated as a unit and is regarded theoretically as the equivalent to the effort expended in walking on the level at a rate of 3 miles per hour. A base rate is established equivalent to 60 units per hour and a bonus is paid in respect of all units worked in excess of this number.'

bombs.

In contrast to the Ardeer scheme, the Woolwich scheme was much older, having been designed to prevent accidents following the 1903 'Chase Parr' recommendations. It was feared that the Woolwich fellowship scheme, which pooled earnings based on output then paid workers from the pool according the price of each piece of work, reduced output 'to below what can be considered a safe and reasonable degree of effort'. In addition

There is relatively little work in the RFF at the Arsenal which can be called 'mass production'; in the new factories there will be more work of this nature. It will have to be remembered that the new factories will have no 'tradition' and they will not have grown up to their tasks.

The different problem with both the Ardeer PBS and Vickers Armstrong plan was their mathematical complexity, and a concern was that it might take too long to establish standards on which either system had to be based. The committee concluded by recommending that thirteen kinds of explosives production work should not be placed on a payment-by-results basis and stated that for other kinds of work, factory management should decide on what was best.⁷⁹

A hitherto unused and detailed MOS report held in the UK National Archives sheds much light on how work was organised, analysed, and measured at the NFFs. The report reveals that by late December 1940, work at the NFFs was divided into nine groups: Initiators, Pellet, Fuse, Fuse powder, Gunpowder, Cordite, Smoke, High Explosive Filling of Shells and Bombs, and Small Arms. Each group was then subdivided into the work operations required for each product. The majority of products required between ten and twenty operations, some of which were performed alongside other workers performing the same operation. There were of course exceptions to this rule: CE and TNT Pellets required a mere three operations (assemble mould, press pellet, and pack pellets for transport), whereas filling Fuze No. 109 M.K.'s III and IV required a total of forty-eight separate operations. Most operations were performed by workers incentivised by the MOS PBS. Operations not incentivised by the PBS system were those deemed too dangerous to

⁷⁹ NA, EF 4/62.

speed up. These operations were organised using the older 'occupation' method taken from the Woolwich Arsenal. Tasks which required equipment were listed as 'machine' production, whereas assembly of products was virtually all done by hand. Inspection was done by hand and eye.⁸⁰

Following the conclusion of the explosive committee's survey of factory incentive methods, the Minister of Supply instructed the NFFs to implement the 'Fellowship Piece Work System' from January 1941. Moreover, 'Consideration so far leads to the conclusion that we should reduce to a minimum the operations excluded from Piece-work'. It was believed that the parallel inspection system, which had been established 'eliminates the possibility of scamped work'. When the scheme was actually implemented in ROFs, it was renamed *National Bonus*.⁸¹ By December 1941, the efficiency of shell filling had increased by 40%. Moreover, the new system was better for war purposes than the old one:

In general, Royal Ordnance Factories had by the second or third year of the war become surprisingly efficient—surprisingly, because they were new enterprises employing mainly 'green' labour. In peacetime the older Royal Ordnance Factories, and more especially Woolwich, had the reputation of producing high quality goods at very high cost.

Nevertheless, the fact remains that the Filling Factories were among the relatively few industrial undertakings in the country to introduce three-shift working and the various modern devices of scientific management, such as statistical quality controls and 'time and motion' studies.⁸²

As examined in chapter 6, the wartime linking of the terms *scientific management* and *time and motion study* were not confined to the official histories. In a more precise exposition of the NFF work measurement system, the history of the ROFs explained that there were two ways in which faster NFF work was incentivised in a manner very similar to, if not based on the Bedaux *B*::

Several workers are timed with a stopwatch over the same operation or one of its elements, and the average time is noted, due consideration being given to skill and effort of the workers and to the heaviness of the work. The same process is applied to every operation in a single group, the times are all added together, and an estimate obtained of the total time likely to be occupied. If it is found that one operative is unable to keep pace with the others, thereby interrupting the even flow

⁸⁰ Appendix I: *Method of Payment on New Filling Factories*, 4 December 1940. NA, EF 4/62.

⁸¹ Inman, *Labour in the Munitions Industries*, p.354.

⁸² Postan, *British War Production*, pp.180, 430.

of articles along the production-line, a second operative is put in line to help him. Thus, by tightening up here or saving a second or two there, the operation is put through in the minimum of time.

It is now possible to arrive at a 'rating' for the whole team. The normal rating is the figure 60, indicating the amount of work that can be effectively performed by a production group, working in perfect accord, in 60 seconds, with reasonable application to the job in hand but without the added spur of extra financial reward.

There was also the system of 'piecework, or rather group-work':

This brings us to the second method of inducing speed. This is known as the profit incentive, of which we have also encountered in our round of factory visits. The method is quite simple: in any given shop a target of production is fixed for the week, and a production group exceeding that target receives a bonus accordingly.

This 'target' is obtained from the performance-level at a 60 rating, and includes the margin necessary for such delaying factors as fatigue, eye-strain, or temporary absence from bench.

In practice it has been found that a rating of 80, or even more, can be obtained by workers who give their best effort and attention to the job, without excessive fatigue. This means that the target is exceeded in the proportion of 80 to 60; that is, the actual production is 80 articles, as compared with a production of 60 - or 33 per cent more. The bonus earned is, in consequence, 33 per cent additional to the appropriate base rate.

At the end of the week this amount is added to the normal pay of each member of the group for such length of time as he was working in that group.

Such in brief outline is the 'time and motion' system as now applied to production incentive in one group of the Ordnance Factories. The idea is not new: Kipling thought of it long ago:

*If you can fill the unforgiving minute
With sixty seconds worth of distance run...*⁸³

Throughout the first half of 1942, ROF 16 at Elstow in Bedfordshire was built and run by the food manufacturer Joseph Lyons, a major user of the Bedaux system in peacetime.⁸⁴ Elstow therefore offers high-quality insights into how work measurement was transferred from a food producer into arms production. ROF 16 used the 'scientific division of labour' on a large scale, in which the plant's Planning Office were

involved in nearly 400 set-ups, and more than 1,500 time-studies were taken. The organisers were sometimes surprised at the interest and enthusiasm shown by the operators. Scores and other relevant information were posted daily in the shops. Each week analyses of time and work in the Production Groups were drawn up and

⁸³ Hay, *ROF*, pp.93-4. Five more NFFs, which employed the most workers of the ROFs, were finished in 1942 alone. See Cocroft, *Dangerous Energy*, p.211

⁸⁴ H.E. Bates, *The Tinkers of Elstow* (London: Bemrose, 1947), pp.8-9.

meetings were held to discuss the figures, everybody having an opportunity to express an opinion.⁸⁵

An account of ROF 16 praised the flexibility of production which Elstow managed to attain:

It is a commentary on the scientific inventiveness and speedy adaptation to the changing requirements of war that not one of the buildings in the High Explosives Group was used exactly as planned. So rapid and varied were the changes in design and filling that adaptations had continually to be made; and the fact that this Group was splendidly successful is a tribute to the Production and Engineer Staffs - and to the original plans which allowed for the possibility of making variations which could not be foreseen at the time.⁸⁶

The debate about work measurement continued in the British government. On 16 July 1942, the peak of the manpower crisis and during Wardlaw-Milne's attempt to force Churchill out of office, Wardlaw-Milne's Select Committee on National Expenditure reported on the ROFs.⁸⁷ It painted a picture of a sector which had been inadequately modernised under Churchill. The report explored how it was not possible to ascertain how much excess manpower and production capacity each ROF possessed, as the measurement and control of manpower was not standardised across the ROFs. The report recommended

closer and more standardised methods of measuring performance [between] the Royal Ordnance Factories engaged in engineering. There is the same need for systematic methods of efficiency control in private firms as in Royal Ordnance Factories. No instance was found in the course of the present inquiry records being kept regularly for comparative purposes by a Royal Ordnance Factory and a private factory, although, for many articles, such comparisons are both feasible and desirable.⁸⁸

It continued:

The usefulness of statistical control is obvious ... Your Committee therefore urges its application to all suitable items of production in the Royal Ordnance Factories as quickly as possible. They would also take this opportunity, though it is outside of the scope of this report, to invite the attention of other manufacturers of munitions to the potentialities of the method and to the arrangements which the Ministry of Supply has made to lend staff to assist in its introduction.

Moreover, foreshadowing Brech's later observations on standard data systems based on

⁸⁵ *Tinkers of Elstow*, pp.33-4. The Elstow ROF Planning Office was set up in March 1942 with one staff member. By July 1942 it had nine members with two in training: five were supplied by J. Lyons, and the other six had been selected from the ROF and trained at Lyon's London base at Cadby Hall.

⁸⁶ Bates, *Tinkers of Elstow*, p.17.

⁸⁷ For more on this, see Edgerton, *Britain's War Machine*, pp.126-8.

⁸⁸ House of Commons, *Fifty-First Report from the Select Committee on National Expenditure, Session 1941-1942: Royal Ordnance Factories* (London, HMSO, 1942), pp.7-8.

the *B*, examined in chapters 2 and 3, in considering how to standardise then boost production at the ROFs, the report noted that

Time studies and motion studies comprise two distinct but closely related functions. Motion study is directed to improving the technique of doing a job. It is therefore concerned partly with the reduction and simplification of the motions made by an operative in doing the job studied in a given set of conditions, and partly with the design of those conditions, that is, with possible improvements in the tools used and in the lay-out of the shop. Time study determines the time which an operation ought to take when performed by an operative working at normal speed under set conditions, and the standard so obtained can be applied as a measure of efficiency. During eighteen months a staff of some 120 time-study engineers has been built up at the filling factories and time standards have been fixed for 70 per cent of all operations and a substantial part of this must be attributed to the time and motion studies made. Superintendents were unanimously in favour of the methods, and no objections to them has been raised by the workers.

In addition, these methods increased safety as they allowed for precise monitoring and production planning. The committee reported that

It is a matter of regret that the principles of time and motion study have been introduced to Royal Ordnance Factories at so late a stage. These methods are well known and should have been introduced when the lay-outs of the factories were being planned; but this does not seem to have been considered. However, after eighteen months work some progress has been made.

The committee also reported positively that three NFFs had introduced incentive bonus schemes, where output had increased between 25 and 30 percent without decreasing the quality of production. It recommended that all ROFs undertake motion studies where they were not already being conducted, time studies on a sample of operatives to determine standard times, then bonus incentives rates to be introduced, with rates of pay to be negotiated on standard times. The final recommendation was that in the planning of new factories, 'time and motion studies should invariably be made in the early stages of planning so that shops may be laid out, equipment designed and work planned upon the most efficient basis'.⁸⁹

Under pressure from many tiers of government, and many labour representatives within the state and on the factory floor, the production of munitions under National Bonus continued to increase. Output per head at the ROFs increased by 60% between mid-1942 and mid-1943, though due to institutional opacity, it was impossible to calculate how

⁸⁹ House of Commons, *Fifty-First Report from the Select Committee on National Expenditure*, pp.11-13

much of the overall increase was due to National Bonus. Another problem with National Bonus was that it was inflexible and that it caused earnings to drop when a changeover in product was needed - the exact time when increased production was most essential.⁹⁰ Despite these apparent problems, 'the Ministry could plan with the knowledge that the efficiency of filling labour was fully forty percent above its level eighteen months previously'.⁹¹

More research could be conducted into the engineering ROFs, as some surviving evidence suggests that work measurement systems were used there too. The propaganda film *Night Shift*, which focused on the apparently super-productive and happy ROF No. 11, at Newport, at which 2,000 women were working, informed viewers that 'Job cards go back to the office. Written records of one night's work.' Moreover, the narration informed that 'Careful records must be kept. Earnings depend on output'.⁹² The next section examines parallel, but very different, interventions to increase industrial efficiency at MAP.

5.5. Work measurement at the Ministry of Aircraft Production

During rearmament from the mid-1930s onwards, the Air Ministry had made many investigations into the coordination and procurement of aircraft and other vital supplies. It rapidly became obvious that Britain would need considerably more specialist technical personnel, including those experienced in organising production.⁹³ Ernest Lemon was recruited to the Ministry from the London Midland and Scottish Railway, where he hired T.S. Smith of the Bedaux company as Director of the Air Ministry's new Statistic and Planning section.⁹⁴ Smith instigated a new statistical system of standard units of labour measurement to facilitate the calculation of labour costs as a percentage of total costs.⁹⁵ He also advocated lowering bonus rates as a means to boost output. This was to be

⁹⁰ Inman, *Labour in the Munitions Industries*, pp.340-54.

⁹¹ Postan, *British War Production*, p.180.

⁹² *Night Shift* [Film] Directed by J.D. Chambers. UK: Paul Rotha Productions; 1942.

⁹³ Ritchie, *Industry and Air Power*, chapter 5.

⁹⁴ Scott and Hughes, *Administration of War Production*, (London: HMSO, 1955), p.387.

⁹⁵ Scott and Hughes, *Administration of War Production*, p.387.

augmented by the 'Technical Cost Department' to collect basic time data, as they, possessing suitable experience, would 'be able to make a fairly approximate assessment of what the ultimate job-time should be under normal conditions with normal tooling'.⁹⁶

Beaverbrook's arrival at MAP in 1940 set the Ministry on another path, but he was not, as some have suggested, completely without a production plan.⁹⁷ Beaverbrook instead instructed Sir Patrick Hennessy, head of Ford Britain, to use his experience from Ford's to draw up an aircraft manufacturing plan, a plan which 'was of great interest in the history of aircraft planning'. It did not 'pretend to incorporate any of the more refined processes of statistics'.⁹⁸ Whereas the earlier Lemon-Smith plan had called for predictability in terms of manpower, supplies, and particularly statistics, Hennessy's experience at Ford had demonstrated to him that an 'optimistic' 'target programme' would work well, 'and if the results were optimistic, this was not undesirable; an optimistic programme seemed to the Minister to be good psychology'.⁹⁹

As seen earlier in this chapter, Beaverbrook and Hennessy were wrong, and the 1940 'Target' production drive was, in many respects, a failure.¹⁰⁰ There were also ongoing complaints that piecework rates and output bonuses were set too high in Midlands aircraft suppliers, and which was suppressing vital production.¹⁰¹ So what was to be done? In summer 1940, Smith, now Deputy Director General of material production, called in his former colleagues at AIC. He told them how MAP's 'Controller was nervous and he was wobbling. The battle of France was lost; the battle of Britain had begun'.¹⁰² AIC were given one month to formulate a new plan. By the end of August 1940, AIC consultants had convinced Smith and the Controller that MAP's production schedule base was 'rotten to

⁹⁶ T.S. Smith, *The Application of Wage-Incentives in the Aircraft Industry to Facilitate Cost Control* (c.24 November 1939), AVIA 10/246.

⁹⁷ Jenkins, *Sir Ernest Lemon*, p.207.

⁹⁸ Scott and Hughes, *Administration of War Production*, p.390.

⁹⁹ Scott and Hughes, *Administration of War Production*, p.390.

¹⁰⁰ Output at MOS increased by 7.5 times between 1939 and 1942, whereas the same Ministry of Production report indicated that the equivalent increase at MAP was only 3.8 times. See Ashworth, *Contracts and Finance*, pp.77-8. Conceptually speaking, 'Target' was not a complete failure. Churchill noted in his war memoirs that in December 1941 he and Beaverbrook visited the USA and successfully convinced the War Production Board to base their production plans for 1942 on Beaverbrook's 'Target' scheme. See Churchill, *The Grand Alliance*, p.689.

¹⁰¹ Ritchie, *Industry and Air Power*, p.169.

¹⁰² AIC, *Material Control Reference Book*, pp.68-9

the core'. In October 'four meetings were arranged covering the eighty-six main contractors'. It was explained that

On the floor of the aircraft industry there are literally thousands and thousands of tons of material which cannot be used because it is surplus or out of balance, and this has come about by PROCESS BATCH. There are places where they say that they are stopped and that they must put men off, but they will readily admit that they have got tons on the floor which they do not want at the moment.¹⁰³

After some arguments with resistant manufacturers, the replacement AIC *period* batch control scheme took several months to implement. AIC recorded that it considerably simplified the control of parts among MAP contractors.¹⁰⁴

By May 1941 Beaverbrook and Hennessy had left the Ministry. After a series of caretaker ministers, Sir Stafford Cripps was brought in to head MAP.¹⁰⁵ As with the creation of MOP, Churchill used his past manufacturing experience in the appointment:

In the first World War, while I was Minister of Munitions, Cripps had been assistant superintendent of the largest explosive factory in the British Empire, and had filled the post with remarkable efficiency. This practical administrative experience was combined with his outstanding intellectual gifts.¹⁰⁶

Given that MAP manufactured no aircraft itself, it relied on persuasion to induce its suppliers to produce efficiently, and there were complaints that the cost-plus procurement system in particular was an incentive to inefficiency.¹⁰⁷

Sometimes, however, coercion was deemed necessary.¹⁰⁸ The case of MAP intervention at Fairey in Manchester is a particularly iconic case of this.¹⁰⁹ However, extant historical accounts of MAP's involvement with Fairey have not, so far, included the important role that industrial consultants played in this intervention, and neither does this intervention feature in the literature on consultants. The study of UOP's investigations and

¹⁰³ AIC, *Material Control Reference Book*, pp.68-9

¹⁰⁴ AIC, *Material Control Reference Book*, pp.68-9. See also Brownlow, *History of Inbucon*, pp.56-7.

¹⁰⁵ Hornby, *Factories and Plant*, pp.394-40.

¹⁰⁶ Churchill, *Hinge of Fate*, p.64. Churchill noted that he initially offered Cripps the Ministry of Supply.

¹⁰⁷ See section 6.6. of this thesis.

¹⁰⁸ In one case, that of the English Electric company's takeover of D. Napier and Son, persuasion was adequate. See David Edgerton, 'Technical Innovation, Industrial Capacity and Efficiency: Public Ownership and the British Military Aircraft Industry, 1935-48' *Business History* Vol. 26, No. 3, (1984), p.259. Edgerton recorded that two firms, Short Brothers Ltd. and Power Jets. Ltd., were fully nationalised.

¹⁰⁹ Fairey is significant as contemporaries and historians of the ultra left have exulted it as an exemplar of the power of Fairey's JPC to convince MAP to overrule *in situ* management. See Jurgen Kuczynski and Margot Heinemann, *British Workers in the War* (New York: International Publishers, 1943), p.24 and Nina Fishman, *The British Communist Party and the Trade Unions, 1933-45* (Aldershot: Scolar, 1995), pp.293-4.

interventions at the two Fairey works in 1942 therefore offers a detailed case study of how UOP conducted these hitherto unexamined activities. Moreover, this example is all the more relevant as it demonstrates that it was perfectly possible for a firm to implement and strengthen work measurement, even when the plant contained a militant, communist-controlled JPC.¹¹⁰

By 3 July 1942, there were growing concerns within MAP that the output of the Barracuda Production Group, consisting of Fairey, Boulton and Paul, Blackburn, and Westland was too weak.¹¹¹ Later that month, the two Fairey plants at Stockport were singled out for intervention. Lemon, who knew from experience that product changeovers were the point at which workers were likely to rig piece-rates, recommended calling in UOP to investigate what was holding up production.¹¹² UOP were commissioned to investigate Fairey's Heaton Chapel works, which, with a payroll of 4,236 was larger than Fairey's other works at Errwood Park, which employed 3,980, though a smaller proportion of Heaton Chapel workers worked on production.¹¹³ At MAP, the 'key objective' in UOP industrial consultancy work 'lay in pursuit of manpower economy while at the same time improving operational productivity'. Moreover

On the manufacturing aspects for some clients [such as Fairey] the first requirement of consultant assistance lay within a change-over of product and components, as war-supply contracts were replacing their previous output of consumer goods, necessitating the complication of new specifications with materials, operations, methods and operational standards having to become newly determined through replicated Work Study. New schedules for production planning could be based on those standards to form the basis for control of both manufacturing progress and operating costs.¹¹⁴

By September 1942, UOP had completed a survey of Fairey's Heaton Chapel works, and, although the investigators were impressed with the layout and storage arrangements, and some production controls, UOP had two principal suggestions for improvements.¹¹⁵ Firstly,

¹¹⁰ For an examination of the Fairey interventions told from the factory floor and the JPC, see chapter 6.8.

¹¹¹ J.J. Llewellyn to Sir Ernest Lemon, 3 July 1942. NA, AVIA 9/38.

¹¹² Sir Ernest Lemon to the Minister of Production, 21 July 1942. NA, AVIA 9/38. For Lemon's experience of piece-rate setting, see Jenkins, *Sir Ernest Lemon*, p.209.

¹¹³ Heaton Chapel had 3,394 production workers (80% of the total workforce) compared to Errwood Park's 3,558 (89%).

¹¹⁴ E.F.L. Brech in Lyndall Urwick Society, *The Urwick Orr Partnership*, p.52.

¹¹⁵ There was little direct focus on the point of production, but this could well be because Fairey had already consulted Production-Engineering during rearmament. See P-E, *Fifty Years*, p.12. The UOP report noted that there was some focus on 'PRODUCTION CONTROL' but the costing information generated was too

that the Heaton Chapel and Errwood plants be separated into two distinct entities with one controlling department, and the corresponding creation of Production Managers, as the present Works Manager was acting more as a Chief Superintendent, with 40 people reporting directly to him. The second suggestion was that to improve production control and cut clerical costs, the three present production control streams had to be centralised into one master control sheet tied to time plans, which would help to improve costing methods, reduce administration costs, and enable the establishment of clerical and control procedures to allow the master time plan to be met. UOP recommended they be given six months to make these changes at Heaton Chapel, and then overhaul Errwood Park in the same way.¹¹⁶ Fairey also planned to promote men from within the firm to fulfil the new management posts which met with approval from MAP.¹¹⁷ MAP agreed to the suggestions from UOP's 'industrial efficiency experts' and Fairey's agreed to pay UOP's fees.¹¹⁸

When Stafford Cripps visited the Hayes works on 19 December 1942 and met with the JPC, the UOP consultants were 'in residence' at Fairey's. Also, Fairey's were already taking action on their suggestions related to supply and sub-contracting.¹¹⁹ Cripps brought with him G.E. Marden, MAP's nominated candidate, who, as Fairey's new vice-chairman and joint managing director, said he 'would meet the workers' representatives at any time to discuss the position, and consider their recommendations with a view to putting the establishment on a sound production basis'.¹²⁰ Marden was followed by MAP's insertion of Sir Clive Baillieu of the Federation of British Industry (FBI) and Dunlop's as temporary director of Fairey's for the remainder of the war.¹²¹

Cripps' deputy technocrats at MAP continued to increase in number. Later in 1942, and perhaps related to UOP's successful interventions on behalf of MAP, Cripps

complicated to be useful.

¹¹⁶ There is evidence that they were also commissioned to conduct similar reforms at the Fairey plant at Hayes in Middlesex. Urwick Orr & Partners Limited, undated report on Messrs. Fairey Aviation Co. Ltd. Held in AVIA 9/38.

¹¹⁷ Sir Ernest Lemon to J.J. Llewellyn, 8 September 1942, NA, AVIA 9/38.

¹¹⁸ J.J. Llewellyn to Sir Ernest Lemon, 10 September 1942, NA, AVIA 9/38.

¹¹⁹ Barlow to Sir Stafford Cripps, 16 December 1942, NA, AVIA 9/38.

¹²⁰ Undated press release on factory control, NA, AVIA 9/38.

¹²¹ ODNB entry for Baillieu.

established a Production Efficiency Board (PEB) which described itself as 'a small highly qualified staff for direct investigation "in the field" as distinct from the usual work of administration from the headquarters of the Ministry or through the Regional Controllers'.¹²² They were, in effect, a public sector industrial consultancy for the private sector, designed to scrutinise suppliers' costs and to train more work measurement specialists.

The PEB were gathered from a variety of sources: Major J.S. Buchanan had been Deputy Director of Technical Development at the Air Ministry for years.¹²³ Bevin had recommended Sir Charles Bruce-Gardner to Cripps due to his experience as chairman of the Society of British Aircraft Constructors (SBAC) and also due to his recent trip to the USA.¹²⁴ Cripps had visited the Metropolitan-Vickers (MV) plant at Trafford Park, and, impressed with Anne Shaw's motion study work, personally invited Shaw to join the board.¹²⁵ Finally, Frank Chappell, a veteran AEU organiser, was drawn from Labour Supply Inspectorate of the Ministry of Labour.¹²⁶

As had been indicated by the Lemon-Smith plan, the PEB seconded 50 men from the TCB. They began to time work processes more accurately and designed payment-by-results systems to stimulate increased production, although it remains unknown at which firms the TCB intervened.¹²⁷ Their industrial practices were akin to 'cost accountants, rate-fixers, planning engineers and time and motion study experts'.¹²⁸ They were certainly trained as such.¹²⁹ 'Utilisation of labour, for the purposes of the Board, is assumed to comprise first and foremost the problem of securing economy in manpower by

¹²² Note by the Minister, *Production Efficiency Board*, N, AVIA 9/38.

¹²³ Anne G. Shaw, *The Practice and Purpose of Motion Study* (Buxton, Columbine Press, 1952), p.8. Bruce-Gardner had previously supervised the establishment of the shadow factories.

¹²⁴ J.J. Llewellyn to Ernest Bevin, 20 November 1942. NA, AVIA 9/37.

¹²⁵ See A.G. Shaw to P. Inman, undated but c.1956. NA, CAB 140/27. For an examination of Shaw's motion study work at MV since 1930, see A.G. Shaw, 'Motion Study Applied to Engineering' *Journal of the Institution of Production Engineers* (1933), pp.376-383. Shaw was a former student of Lillian Gilbreth at Bryn Mawr College. In the postwar period Shaw influenced the establishment of motion study courses at Cranfield College of Aeronautics and also established a motion study consultancy. For Shaw's life and influence, see Harold Williams, 'Our Roots: The Pioneers - Anne Shaw, CBE, 1904-1982' *Management Services* No. 35, Vol. 8 (1991), pp.26-8.

¹²⁶ See P. Inman to M.M. Postan, 16 May 1956. NA, CAB 140/27, Material on the Tenth Report from the Select Committee on National Expenditure.

¹²⁷ Ashworth, *Contracts and Finance*, pp.77-8

¹²⁸ Inman, *Labour in the Munitions Industries*, p.431.

¹²⁹ The TCB, which had its origins in the Admiralty in World War One, was transferred to the Air Ministry in 1935. It was expanded during rearmament and had around 100 officers by the outbreak of war in 1939.

improvements in production processes, planning layout, etc.' As the TCB had gained experience of time studies and rate setting as part of costing, 'it will, therefore, be a natural extension of their existing functions that they should follow up an investigation by detailed efficiency investigations'.¹³⁰ However, this does not mean that the TCB's investigations were welcome, and it was not just workers who objected to the stop watch, still iconic of work measurement as it had been in the 1930s:

In most forms of price-fixing (whether 'maximum' prices, 'target' prices or 'cost-plus' prices) the firm's actual costs had to be ascertained. This sometimes meant that the agents of the State had to be given access to the firm's books and accounts. Frequently it meant that costing officers could, stop-watch in hand, inspect, analyse and estimate a firm's methods of production and its use of labour and resources. Needless to say, the firms, or at least some of them, tried to preserve the privacy of their records from the eyes of the official investigators. Above all, there was a great reluctance to allow the data about costs to be used as evidence of the firm's technical efficiency or inefficiency.¹³¹

'Project Realistic' was introduced in January 1943.¹³² For the remainder of the war, the TCB became greatly useful in costing production and was expanded further, reaching 277 staff in 1942-3, at which point the branch was commended by the Select Committee on National Expenditure, and a Training School was permanently established to train new costings officers. The TCB peaked in size in 1943 with a total of 389 officers of seven grades. But did it work? On MAP's terms, certainly: 'By the second half of 1944 MAP's managerial efficiency and the skills of its labour force were at their highest peak'.¹³³ The TCB had apparently been successful, but, as in so many other areas covered by the official accounts, the war revealed a shortage in production specialists:

The Technical Costs Officers had undoubtedly acquired a minute and intimate knowledge of the industrial processes in the factories they visited and could produce highly reliable and, from the engineering point of view, highly expert advice. But the service was under-staffed, and its main business lay elsewhere.¹³⁴

In regards to government technocrats, industrial consultants, and production specialists of various stripes, therefore, the war had apparently revealed a dangerous lack of capacity of many types of efficiency experts, but that, generally speaking, when the state was able to

¹³⁰ 'Technical Costs Branch', NA, AVIA 15/1945 and AVIA 46/525.

¹³¹ Postan, *British War Production*, p. 445

¹³² See Parker, *Manpower*, p.201 and Postan, *British War Production*, p.173.

¹³³ Postan, *British War Production*, p.316

¹³⁴ Postan, *British War Production*, p.465

intervene, it worked.

5.6. Postwar work study, work measurement, and Bedaux

The postwar discussion of work measurement was reminiscent of debates which had taken place in individual firms in the 1930s, albeit on a far larger scale. For example, should indirect workers be graded and incentivised by bonus schemes? Should direct workers be given individual bonuses or group bonuses? If so, how many grades should there be, to which sectors and jobs should these grades be applied, and which methods of grading and incentives worked best? Should they be applied equally to men and women, young and old? When and how should the state, the TUC, employers' federations, trade union branches, and individual shop stewards intervene in work measurement? Who was to pay for training specialists, and what exactly should they be taught? What should the parameters of success be? Who even defines *efficiency*?

Many combinations of these questions were debated, experimented with, and indeed used, in a wide array of British industrial contexts. The terminology varied from sector to sector, firm to firm, and plant to plant. No wonder all but the most experienced found the multiplicity of work measurement systems extremely confusing. Even specialists endlessly debated innumerable technical refinements such as which workers to exclude from measurement.¹³⁵ The one thing these debates had in common were that work measurement systems, including those based on Bedaux, were central to methods debated and used.

The official historian of British war production was clear about what should be remembered about the wartime management of manpower:

The momentum of the rising efficiency of management which underlay the soaring output of munitions in the later years of the war was bound to continue into the years of peace. The historian of postwar industry will not fail to notice the evidence of new managerial attitudes and techniques. He may or may not be inclined to contrast them with the managerial sloth of the early twentieth century, but he will

¹³⁵ For an early, and comprehensive, such study, see Harold Whitehead and Staff Ltd., 'Report on a Survey of Indirect Bonus Schemes for Indirect Working' *British Management Review* Vol. 5, No. 1 (1944), pp.81-114.

have to relate them and ascribe them to the experience of the war years.¹³⁶

In drawing up their 1945 general election manifesto, the Labour Party reached similar conclusions. Indeed, a section of the Labour Party's victorious 1945 general election manifesto specifically linked work efficiency and standard of life:

The essentials of prosperity for the world as for individual nations are high production and progressive efficiency, coupled with steady improvement in the standard of life, an increase in effective demand, and fair shares for all who by their effort contribute to the wealth of their community.

This statement could have been, and may well have been, lifted from any number of near-identical statements made by Seebohm Rowntree or another of Labour's 'progressive Liberals' over the prior two decades.¹³⁷ To transfer the 'rising efficiency' of war production into 'high production and progressive efficiency' and 'steady improvement in the standard of life' in peace, the postwar Labour government embarked upon a series of investigations as to how to permanently institute the gains made during wartime.¹³⁸

5.7. British Institute of Management

One such attempt was the creation of the British Institute of Management (BIM). Kipping later recalled that he had suggested to Cripps that he set up a BIM, and that Cripps' appointed wartime controller of Fairey and head of the FBRI, Sir Clive Baillieu, should be its head.¹³⁹ To do so, Cripps formulated a committee under Baillieu to investigate founding such an institute. Many investigations were undertaken and interviews conducted with a

¹³⁶ Postan, *British War Production*, p.386. As David Edgerton, *Warfare State: Britain, 1920-70* (Cambridge: Cambridge University Press, 2006), points out, the official histories of war production should not be taken at face value. Throughout *British War Production*, there is a tacit claim that the rising number of, and comparability of, statistical efficiency measurements in the later war years, particularly at MAP under Cripps, were an index of industrial success. This was, however, only one way to define success. This was a key point made by Lewis Ord, a protégé of Henry Gantt and former Air Ministry planner, in numerous postwar publications. The most thorough was Ord's *Secrets of Industry* (London: George Allen & Unwin, 1944). Moreover, although not discussed by Postan or Ord, as discussed chapter 6, the act of measuring industrial workers had already been a root cause of some serious industrial disputes in Britain and elsewhere.

¹³⁷ Online at <http://www.politicsresources.net/area/uk/man/lab45.htm>, accessed 14 June 2014. It could also have been modified from Liberal Party's *Britain's Industrial Future*, pp.185-6, of which Rowntree was a key signatory.

¹³⁸ The Anglo-American Council on Productivity (AACP) and Human Factors panel of the DSIR have received the most historiographical attention. For example, see H. Mercer, N. Rollings, and J.D. Tomlinson, (eds.), *Labour Governments and Private Industry: the Experience of 1945-1951* (Edinburgh: Edinburgh University Press, 1992).

¹³⁹ Norman Kipping, *Summing Up* (London: Hutchinson & Co, 1972), pp.13-14, 53. Kipping was the next head of the FBRI and also became a director of Lucas and Pilkingtons.

variety of professional bodies, civil servants, public and private firms, trade union officials, and 'prominent industrial consultants and "management technologists"'.¹⁴⁰

Established by the Board of Trade in 1947-8 with a subsidy of £50,000, the BIM subsequently passed into the private sector, as had been intended, and maintained close links with private and public sector manufacturing companies, such as ICI and the ROFs, with which there was frequent exchange of ideas, techniques and personnel.¹⁴¹ Three of *Britain's Industrial Future's* (examined in chapter 4) contributors were intimately involved with the establishment of the BIM: Charles Renold was the BIM's first Chairman, Urwick his vice-chair, and its first British honorary fellow was Seebom Rowntree.¹⁴²

At the BIM's launch, Renold declared that the committee had decided on a 'national drive for better management' as it had 'long been recognised that there is a wide gap between good and bad managements in this country'. Cripps responded that management 'is a skill and an art that has to be learned'. Renold described how the BIM aimed to aggregate and disseminate existing knowledge, publish new research, and 'devise indices of efficiency'. Cripps concluded the event by declaring that the BIM should 'bring a good dividend in increased efficiency and production and so help us solve our most difficult economic problems'.¹⁴³

The BIM aimed at training specialists in work measurement and efficiency methods on the factory floor, and in some advertisements placed 'Work Measurement' at the top of its list of practices.¹⁴⁴ It represented a form of technical management training which has largely been absent from historiographical discussion of postwar interventions in

¹⁴⁰ 'The Role of Management' *The Times*, 10 January 1947. 'A Management Institute' *The Times*, 16 September 1947. Literature on the BIM exists but its political origins and the industrial practices it propagated have received no historical attention at all. See E.F.L. Brech, *The Concept and Gestation of Britain's Central Management Institute, 1902-1976* (Bristol: Thoemmes Press, 2002), chapter 6. Niven, *Personnel Management*, pp.131-1 records that significant IPM individuals like Rowntree, Northcott, Shaw, and Renold, were also important in negotiating the relations between the IPM and the BIM.

¹⁴¹ The BIM received charter status in 2002 and is now the Chartered Institute of Management. I am grateful for their cooperation with my research and for providing me with source materials. See <http://www.managers.org.uk>; accessed 23 June 2014.

¹⁴² 'British Institute of Management' *The Times*, 10 January 1947. Brech, *Concept and Gestation*, p.248, informs that the other two BIM honorary fellows were Lillian Gilbreth and Elton Mayo.

¹⁴³ 'Better Management' *The Times*, 22 April 1948.

¹⁴⁴ See BIM, *Management for Production* (London: BIM, 1949) where work measurement was top of a list of ten BIM practices.

management education and increasing productivity.¹⁴⁵ The BIM also became a small management publishing house in its own right, producing magazines like *The Manager*, journals such as the *Journal of the British Institute of Management*, *Management Today*, and *Management Review & Digest*, and a series of books including Currie's *Work Study* which extolled the virtues of ICI's methods of work measurement based on the B-based ICI SM.¹⁴⁶

5.8. Work measurement at the postwar ROFs

On the eve of victory in Europe there were also still over forty ROFs in full operation in Britain.¹⁴⁷ Following the defeat of Germany in March, the Ministry of Production was dissolved and in October MAP and MOS were merged into the peacetime MOS.¹⁴⁸ The decision was 'arbitrarily' taken to discontinue 21 ROFs, leaving 23 ROFs in production to produce civilian goods and maintain war potential in the event of war with the Soviet Union. Employment at the ROFs was reduced from wartime high of 340,000 to a civilian nucleus of 40,000.¹⁴⁹ By 1948, the ROFs had settled down to civilian production, leaving intact 14 engineering factories, 5 explosive factories and 3 filling factories. The output of the ROFs was principally prosaic items such as tiny components, concrete railway sleepers, furniture, and Airey prefabricated houses. The ROFs sold to both private and

¹⁴⁵ This is true for even those historical studies which closely focus on Urwick's postwar importance in debate about management education. See David Rundle, *Henley and the Unfinished Management Education Revolution* (Henley-on-Thames: Henley Management College, 2006); Yvette Bryan, 'Management Education in England: The Urwick Report' (PhD thesis, Exeter University, 2009); Robbie Guerriero Wilson, 'The struggle for management education in Britain: The Urwick Committee and the Office Management Association' *Management and Organizational History* Vol. 6, No. 4 (2011), pp.367–389.

¹⁴⁶ See Currie, *Work Study*. Importantly, the BIM was successful to the extent that subsequent Conservative governments augmented its operations by establishing one hundred local British Productivity Centres (BPCs) to train technicians and specialists in the techniques of factory floor management and work measurement. On their own terms, the BPCs were also successful. The contemporary material on the BPC is voluminous, but for information on its activities, see British Productivity Council, *Cutting Costs for Productivity* (1958) and British Productivity Council, *Work Study in the West* (1958).

¹⁴⁷ Postan, *British War Production*, p.434

¹⁴⁸ David Edgerton, 'Whatever Happened to the British Warfare State? The Ministry of Supply, 1945-1951' in Mercer, Rollings, and Tomlinson, *Labour Governments and Private Industry*, pp.91-116.

¹⁴⁹ House of Commons, *Seventh Report from the Select Committee on Estimates, Session 1947-48: Use of Royal Ordnance Factories and Royal Naval Establishments in Connection with the Production and Export Drive* (London: HMSO, 1948), pp.v-vi. The ROFs were kept on as arms procurement from the private sector was wound down. See Postan, *British War Production*, p.383. Many of the time study men from the ROFs found employment at ICI after the war. See Faraday, *Work Study at ICI*, p.8.

public sector clients.¹⁵⁰

A Select Committee was commissioned to investigate the analysis and measurement of work at the peacetime ROFs in 1947-8. Research revealed that just as they had been in the war, methods varied depending on the type of work, complexity and volatility of product, and union willpower. As it had done so in the 1930s, and the war, the time study still featured prominently in discourse around work measurement:

The main method of control of labour costs is a system of incentive bonus. In the filling and ammunition factories the standard times for the jobs are based on a system of time and motion study; in the guns, carriages and tanks factories are based on estimates made in the planning departments of the factories. The rates paid are subject to agreement with the Trade Union representatives on the shop floor or through tariff committees. A high proportion of workers is paid by these methods (between 80 per cent. and 85 per cent. in the filling factories) ... No attempt has been made to introduce a system of time and motion study into the guns, carriages and tanks factories, where the Trade Unions have, by tradition, been opposed to such a system.¹⁵¹

In these splits in the way production work was analysed, incentivised and measured (or not), the ROFs represented a microcosm of postwar Britain's multitudinous industrial relations challenges. The work of maintenance staff, whose work could not be standardised to such a level, were usually paid on day work, though the measurement of maintenance work at the NFFs was seriously discussed.¹⁵² Unions kept work measurement out of some establishments altogether. Alternatively, some, like those at the Ministry of Works, examined the wartime experience and believed that it had shown them that work measurement would be good for them too.¹⁵³ It was for these reasons that there was plenty of business for the British industrial consultancies in postwar industry, which will be examined next.

¹⁵⁰ House of Commons, *Seventh Report from the Select Committee on Estimates, Session 1947-48*. The ROFs had no design or sales functions whatsoever, and sold on a cost basis. For example, the Ministry of Works was a major client, placing an order in November 1945 for 32,500 kitchen-bathroom units and 32,500 sets of cupboards.

¹⁵¹ House of Commons, *Twelfth Report from the Select Committee on Estimates, Session 1951-52: The Royal Ordnance Factories* (London: HMSO, 1952), pp.xvi-xvii.

¹⁵² For one of these attempts by former senior ROF officers, and a detailed set of responses from colleagues, see R. Talbot and G.F. Satow, 'Control and Planning of Maintenance with an Incentive Bonus' *Proceedings of the IMechE*, Vol. 156, No. 305 (1947), pp.305-317.

¹⁵³ By 1950, the National Federation of Building Trade Operatives positively endorsed work measurement, despite having successfully blocked it during World War Two. For the developing debate, see Ministry of Works, *Memorandum on Payment By Results* (London: HMSO, 1944); Ministry of Works, *Payment By Results in Building* (London: HMSO, 1947); and V.L. Allen, 'Incentives in the Building Industry' *The Economic Journal* Vol. 62, No. 247 (1952), pp.595-608.

5.9. Postwar British consultancies

The war boosted the public and private consultancy sectors considerably, in terms of both prestige and size, particularly in the eyes of the new Labour government and its Chancellor, Stafford Cripps.¹⁵⁴ Compared to 1939, by 1945 AIC's roster of consultants had doubled to 108, many of whom were employed in heavy engineering like shipbuilding.¹⁵⁵ *The Times* was confident that 'demand of industries for the company's services is expected to be as great in the future as it has been during the war in Europe'.¹⁵⁶ *The Times* understated its case: by the 1950s, AIC's consultant numbers more than tripled to 450.¹⁵⁷

Much research could be conducted into all four of the 'Big Four' management consultancies in the postwar period. Preliminary findings indicate that all four implemented work measurement systems in a variety of locations, and not just in manufacturing but clerical work and public services too.¹⁵⁸ They also expanded from Britain into Western Europe, North America, Africa, and Asia.

Some former Bedaux, and related, men, stayed in the public sector.¹⁵⁹ AIC's new director, Norman Fleming, was appointed to the AACP, where he contributed much to Graham Hutton's *We Too Can Prosper: The Promise of Productivity*, which stressed that 'Management Means Measurement'.¹⁶⁰ Richard Lloyd-Roberts, formerly of ICI, and brought

¹⁵⁴ For a detailed analysis of the development of managerialism within Labour, and Labour's emergent belief in the neutrality of consultants, see Nick Tiratsoo and Jim Tomlinson, *Industrial Efficiency and State Intervention: Labour, 1939-51* (London: Routledge, 1993).

¹⁵⁵ See Lyndall Urwick Society, *The Urwick Orr Partnership*, p.56. and Brownlow, *History of Inbucon*, p.53.

¹⁵⁶ 'Company Results', *The Times*, 16 June 1945.

¹⁵⁷ 'The McKinsey Report' *Topic*

¹⁵⁸ UOP's numbers had increased in a similar vein, with 150 consultants by 1951. See Tisdall, *Agents of Change*, p.58. In the postwar years, P-E consulted at British European Airways, the British Electricity Authority, the British Transport Commission, the Forestry Commission, and the National Coal Board (NCB). See P-E, *Fifty Years*, pp.16-7. Brech recalled that P-E also had 25 consultants in aviation components and aircraft building. See Lyndall Urwick Society, *The Urwick Orr Partnership*, p.56. He also recorded that PA had a 'specialisation in operational training methods'. PA consulted at Cambridge University Press in 1948, where they implemented a Standard Minute system. See Brooke Crutchley, *The Application of a System of Payment By Results at the Cambridge University Press* (Cambridge: Cambridge University Press, 1949).

¹⁵⁹ Clarence Northcott retired from Rowntree's and was sent by the Colonial Office to conduct detailed research into the efficiency of African workers. The results of the extensive survey were published as C.H. Northcott (ed), *African Labour Efficiency Survey* (London: HSMO, 1949).

¹⁶⁰ For Fleming, see Brech, *Productivity in Perspective*, p.138, Kipping, 'Consultancies, Institutions, and the Diffusion of Taylorism', p.75, and Brownlow, *History of Inbucon*, pp.63-5. See Graham Hutton, *We Too*

into the Ministry of Labour during the war by Bevin, stayed on, where he was knighted, and rose to become the Ministry's chief industrial advisor where he was important in framing joint consultation practices.¹⁶¹

AIC were also influential in the inquiry into wages and the measurement of work launched by the Cotton Manufacturing Commission.¹⁶² As part of its 1947-8 inquiry, which also involved P-E in ways which remain unclear, several methods of output incentive were examined.¹⁶³ The first, developed by the Shirley Institute and Cotton Spinners' and Manufacturers Association, was a piece rate system in which manufacturers and operators would agree on target wages, half of which was to be paid as a fixed sum and the other half on piece rate. The AIC scheme, supported by the Rayon Weaving Association, turned 'the attention both of the weaver and the employer away from the length of cloth produced, and focus it on the efficiency attained on her set of looms. This is the right emphasis'. These efficiency ratings were then correlated to a point grading system for different kinds of work, and an additional Weavability Factor to take into account the different kinds of cloth. The commission selected the AIC system and AIC trialled the system over the course of 1947-8.¹⁶⁴

The question remains whether Bedaux's former clients were still using his system. In many cases, they were.¹⁶⁵ Kodak, Bedaux's first British client, were using an enhanced version of the system in the late 1940s.¹⁶⁶ Lucas had modified their *Point* system again but

Can Prosper: The Promise of Productivity (London: BPC, 1953).

¹⁶¹ Niven, *Personnel Management*, p.117.

¹⁶² Brownlow, *History of Inbucon*, pp.59-62.

¹⁶³ P-E, *Fifty Years*, p.15.

¹⁶⁴ The system revealed that most looms in the sample were being run at 70-80% efficiency and that applying the AIC system, had led to an increase in PMH increase of 89.4%, and increase in earnings of 43.2%, a reduction in costs of 21.6%, and an increased throughput of 30.3%. AIC suggested that further increases could be made by better calibrated bonus rates, and the purchase of new machines. Cotton Manufacturing Commission, *Interim Report of an Inquiry into Wages Arrangements and Methods of Organisation of Work in the Cotton Manufacturing Industry* (London: HMSO, 1948); Cotton Manufacturing Commission, *Final Report of an Inquiry into Wages Arrangements and Methods of Organisation of Work in the Cotton Manufacturing Industry* (London: HMSO, 1949).

¹⁶⁵ For a complete list of Bedaux Britain's clients, which appears to have out-survived the Bedaux/AIC archives, see Littler, 'The Bureaucratization of the Shop-Floor', vol. 2.

¹⁶⁶ Here, like in many other locations, it was called the *Point* system. 292,991 *Points* were accrued by the Industrial Engineering Department in 3,474 hours in one week in February 1949, allowing the work study people to calculate that the department had an overall performance of 73 *Point Hour*. BL, Kodak archive, A1524

it was still in place.¹⁶⁷ ICI radically expanded the use of the *B*-based *SM* system at its huge plants after the war, and influenced many others in the British private and public sector to do so.¹⁶⁸

This chapter has considered the expansion of work measurement across a variety of very substantial sectors of British war manufacturing. In contrast to existing historiographical claims by Littler, Kreis, Carew, and Whitston it has sought to demonstrate that the war period, rather than the 1930s or 1950s, facilitated a huge shift in the way repetitive factory production work was analysed and measured at the point of production. The chapter has examined how this took place in both the public and private sectors, and that industrial consultants were important in this. In short: the war gave work measurement (including variations of the *B* such as the *SM* and *National Bonus*) the state legitimacy it had been lacking so far. Moreover, it has shown that there were many more routes whereby work measurement could be introduced, other than by Bedaux consultancy or its successors, and has revealed the role that ICI in particular, acting as a consultancy to the MOS, had in this shift. The chapter has also shown that the foundation of the BIM in 1948 marked the permanent endorsement of work measurement by the British state. The next chapter examines the reactions of British workers, trade unions and political left to work measurement, most of whom were generally accommodating from the outset. It also examines the role of the Communist Party, who believed that work measurement, including Bedaux, represented a significant, and very negative, change in the way work was measured and organised on the interwar British factory floor. It also examines how the war forced the CP to shift to permanently support work measurement from 1941 onwards.

¹⁶⁷ Ben Francis, 'Lucas Workers Out to End "Points" Pay' *Daily Worker* 23 December 1943 noted that a work stoppage at Lucas due to the 'hated points system which has controlled their wages and made many lives miserable for over ten years'.

¹⁶⁸ This was an inverse policy to ICI's rough US equivalents DuPont. Arthur Mendolia, then a Research Engineer at Dupont, later recalled that the Bedaux system at DuPont had become seriously dysfunctional and 'Early in the post-war period, DuPont bought itself out of the Bedaux System. It cost them about twenty-five million bucks, and in 1946 or 1947 that was a lot of money!' See interview with Arthur I. Mendolia, 12 November 1998, Chemical Heritage Foundation Oral History Program.

Chapter 6.

The labour movement's engagement with Bedaux and work measurement, 1920-48

6.1. Introduction

Some historical studies of how trade unions accommodated themselves to the Bedaux system, such as at Wolsey, Richard Johnson & Nephew, and Venesta exist.¹ Moreover, Whitston has argued that, by the postwar period, an expanding degree of 'mutuality' emerged between the TUC, some trade unions, and the 'time and motion study' central to 'Taylorism'.² This said, the general trade union engagement with work measurement, including Bedaux, has not yet received sustained attention from historians, or the biographers of senior trade union figures such as Walter Citrine, Ernest Bevin, or Margaret Bondfield.³

Building on these studies, this chapter explores the trade union engagement with Bedaux and other work measurement systems, and reveals that, in the early 1930s, the leaderships of the TUC and the TGWU believed Bedaux and work measurement to be extensions of the Premium Bonus System (PBS). As both had already endorsed the PBS, they accommodated themselves to work measurement, including Bedaux, relatively easily. However, both argued that the unscientific basis of work measurement meant that experienced trade union analysis and supervision was required to ensure that workloads and pay levels were set at reasonable levels.

The Communist Party of Great Britain, however, responded to work measurement systems such as Bedaux very differently. This chapter explores the CP's uniquely insightful stance on 'Bedaux and kindred systems' and the 'autocratic nature of the system' of *B*

¹ Jenkins, 'Time and Motion Strike', Littler, *Development of the Labour Process*, chapter 9, Downs, 'Industrial Decline, Rationalization and Equal Pay', Todd, *The People*, pp.101-5. For studies of unions' accommodation to work measurement units like the Bedaux *B* at private firms such as Rowntree, and Mander, see chapter 4. For the equivalent negotiations in war production, see chapter 5.

² Whitston, 'Worker Resistance and Taylorism'.

³ For Citrine and Bevin, see their ODNB entries. Margaret Bondfield's autobiography mentions the NUGMW conducting a test with the 'Taylor system which was entirely successful. The employers had handed the whole thing over to the Trade Union officers to see if they could work out a scheme more satisfactory than the piece-work basis on which they were then working'. See Margaret Bondfield, *A Life's Work* (London: Hutchinson & Co, 1948), p.333.

units; more accurate than senior trade union commentators such as Ernest Bevin or Walter Citrine. It explores the CP's critique of the Bedaux *B* and in the early 1930s, then the CP's inability to cope with synthetic data systems as they developed in the second half of the 1930s, although they realised that something important was happening in this process and attempted to stop it. They also realised the Bedaux and Bedaux-like activity was becoming increasingly widespread, particularly in the aircraft industry, where work measurement was being applied to facilitate rearmament, and where the CP and AEU were disproportionately represented. The chapter concludes with an exploration of the CP's activities during World War Two, its switch to support work measurement from 1941 onwards, and the uneasy postwar settlement around work measurement which emerged between the CP, trade unions, the TUC, the Labour Party, manufacturers and the British state.

6.2. The workers, Bedaux, and work measurement

Given that the Taylor system was barely used in British industry (examined in chapter 2), it is unsurprising that only a small number of accounts survive of it even being discussed by workers, except in World War One. Richard Whiteing, who heard Allingham's account of the Taylor system in 1913 wrote in *The Clarion* that Taylor 'has finally succeeded in getting the man to match the machine'. He explained that 'the process involved much algebra and that the work was divided into elements and sub-elements, each of which in turn were timed'. 'The system of course involves some complexity in other details such as "observation sheets", filled with hundreds of figures, "instruction cards", signed and checked, and what not.'

There seems no reason why the system should not be extended to all the callings and to all the arts. How much must a successful painter or novelist lose in mere time whenever he knocks off for lunch. If he could be fed with a suction tube, now, while still speeding along!⁴

How did workers and trade unions feel about the Rowntree *Mark*, instituted at the Cocoa Works in York in 1923? As seen in chapter 4, the *Mark* does not seem to have garnered

⁴ Richard Whiteing, 'SPEEDING THEM UP: Another Step Towards Industrial Slavery', *The Clarion*, 20 December 1913.

much attention but there was 'certain amount of suspicion and resistance on the part of the workers when time study was first introduced'. As the published Rowntree account *Incentives and Contentment* reported, generally positive industrial relations existed when the time study was used and even, 'a group of ambitious girl workers, to the surprise of management, asked to be allowed to act as time study observers'.⁵ However, a confidential internal Rowntree report remarked that even when the *Mark* system had been in place at the Cocoa Works for seven years, 'the girls understand vaguely the connection between their effort, the rates and the results but many of them feel that the rates, as they are at present, are simply arithmetical sums with a very small connection with their work and it has been impossible so far to find one girl who can calculate their earnings'.⁶ This worker response to the *Mark* was very similar to many factory floor responses to the *B*.

As work measurement grew in Britain throughout the late 1920s and 1930s, workers sometimes found the process frustrating, tiring and confusing. One industrial worker recalled that although the introduction of the Bedaux system at the 6,000-strong Hoffman Manufacturing plant in Chelmsford in the late 1920s did not cause a strike

The many women operators in the assembly rooms who had been accustomed to the steady, unhurried tempo of pre-Bedaux time found the drastically reduced cycle times hard to achieve. In the case of the more highly strung emotional women there were tears and outbursts of angry frustration.⁷

In a minority of early 1930s cases, the Bedaux name and practices brought groups of workers, sometimes unorganised women and girls, out on strike. The scale and length of such a strike at Wolsey in Leicester winter 1931-2 drew the attention of the newspapers, the Ministry of Labour, and the ILO in Geneva.⁸ Later oral testimony reveals much about what caused the strike. A Wolsey manager, Malcolm Skillington, remembered that

We had a very good name in those days, in Leicester, and we were chosen to sort of introduce it [the Bedaux system]. Mr Charles Bedaux persuaded our board of directors that it ought to be an innovation for Wolsey because it was a modern thing,

⁵ *Incentives and Contentment*, p.116.

⁶ *Report on Preliminary Work Done in the Enrober Room in Preparation for the Labour Research Enquiry* (1930), p.3, BI, Rowntree archives, R/DL/LS/1.

⁷ Hardwick, *Time Study*, p.105-7.

⁸ It was much discussed in the MRGs. See LSE, MRG/8/5. The strike prompted much discussion, including in Italy. See NA, LAB 2/2060/IR530/1935 and ILO, N400/0/4/1/25. The strike also received national extensive coverage in the *Daily Herald*, the *Daily Worker*, and *The Times*.

that would improve production, and the idea was that the operator had a man standing there with a pad and a stopwatch and timing all the movements she did in a day.⁹

Operators did not like the Bedaux system and found it confusing and upsetting, although objected to the results of the system rather than the system itself. One recalled that

Before they introduced Bedaux, I could earn my money on it, and did do. But when they brought this system, of course it floored everybody. They [the workers] just didn't know what to do to try and better themselves. They [the Bedaux company] hadn't done enough research. They didn't realise the implications of what it could do to a human being. One girl could adapt, another girl can't. I saw them go hysterical. I saw them cry. I saw one girl faint. And I don't think that any system should be allowed to do that to a person. I think it should have been gone into a lot more before it was introduced. I would go so far as to say it [the Bedaux system] gave Wolsey a bad name ... It got to a breaking point and we had a meeting and then we decided it was 'no go' and we came out on strike.¹⁰

One wage clerk at Wolsey, Doris Fish, recalled of the strike that

There were several, I think they were college, university students joined. About half a dozen of them to put it in, you see. And then they went on strike. All the factory did. Six weeks they were on strike. When these Bedaux ... I don't know what you call them ... engineers put it in they had a job to get in the factories, you see, because they'd [the workers] picketed them. They got in one day. They put them in some skips that they used to put the hosiery in and brought them in in a van. They smuggled them in.¹¹

Negotiations involving the unions, the Ministry of Labour and Wolsey's management bought the strike to an end in early 1932. One operator recalled that

After the trauma of the seven week strike, it was agreed that we was re-timed and this is what it was: re-timing of the job. Then they was more moderate. They reasoned things out more from that day on.¹²

There were other strikes over Bedaux, some of which attracted particular attention from the Communist Party (CP). CP-led pickets were deployed when a strike broke out over the Bedaux system at Richard Johnson and Nephew in Manchester in 1934. The strike lasted for months and five wire workers brought a legal case against their employer for loss of earnings. When the case came to court, *The Times* reported how the workers' barrister, D.N. Pritt, described how

The Bedaux experts had beset the workmen by standing over them with note-books and stop-watches, as it were, breathing down their necks while they were doing

⁹ Women in industry oral history project, ROLLR, LO/029/C29.

¹⁰ Women in industry oral history project, ROLLR, LO/029/C29.

¹¹ Interview with Doris Fish, ROLLR, LO/477/427.

¹² Women in industry oral history project, ROLLR, LO/029/C29.

their difficult and responsible work - timing, watching, checking and following every movement so that they could not do their work.

Pritt described how one wire-drawer was 'haunted in dreams at night by the observer' and another felt a 'state of nervousness' which precipitated a 'cold sweat accompanied by loss of appetite'. A third had a "wiggly-woggly" feeling so intense that his hands trembled and he was quite unable to carry out his duties satisfactorily'. Delivering his verdict, Justice Luxmore was 'satisfied that the effect of the observation was in each case grossly exaggerated in the witness-box' and ruled in favour of Richard Johnson and Nephew and the Bedaux Company.¹³ The strike crumbled and the Bedaux system was introduced to the firm's works. As in both the Wolsey and Richard Johnson and Nephew cases, very few strikes caused by the introduction of the Bedaux system were successful at blocking its introduction altogether. Instead, most such strikes secured more beneficial pay rates, modifications to the timing of jobs, or the reduction or removal of the foreman's bonus.¹⁴

As in the case of the Rowntree *Mark*, most of the factory floor problems created by the Bedaux system were banal, administrative, and easily forgettable. Some did leave a historical trace, and it the time study seems to have been the principal cause for concern. One employee from Hoffman's recalled an incident in which the Bedaux system descended into a farce:

There were incidents and minor conflicts. On one particular controversy Butchard [a technical director] took a stopwatch and checked a suspect claim for himself and came out in support of the operator's claim that the production figure set by the Bedaux engineer could not be met.¹⁵

The *B* was confusing too, particularly as the presence of the stopwatch appeared to indicate that the *B* was a unit of time:

That's not right, Tim. Yer don't get a premium fer doin' 60 knots an hour. This windin' machine isn't the Aquitania. Yer have to do a 60 B hour. Here, let me help yer, how

¹³ "'Human Power Measurement": Workman's Complaint Fails', *The Times*, 30 November 1934. For detailed materials on the strike, see MRC, TUC archive, MSS.292/112/5.

¹⁴ The same was true for the February 1932 strike at Amalgamated Carbuettors. See Stephen Wood (ed), *The Degradation of Work: Skill, Deskillling and the Labour Process* (London: Hutchinson & Co., 1982), p.142. An EL survey of January 1934 reported that twelve strikes had broken out over Bedaux. Of the strikes the EL possessed suitable information on, none of these strikes had resulted in ejecting the Bedaux system. The report is in MRC, EEF archive, MSS.237/3/1/235. Other strikes which occurred against Bedaux at this time included those at Henry Hope's window frames, Mullard's radio valves, Withers safe-makers, and Venesta. See Fishman, *British Communist Party*, pp.58-60, 67.

¹⁵ Hardwick, *Time Study*, pp.105-7.

did yer get it around yer wrist? I've tied me fingers in a couple of times but blimee, I never get it half way up to me elbow. It's a good thing it's only yarn or you'd be hangin' yerself.¹⁶

Even operators working in the same factory were divided as to whether work measurement was a good thing. The bewildering forms and calculations that the measurement of work required brought with them grumbling and grouching from both managers and workers. Bedaux engineers sometimes reported 'certain opposition' to their presence.¹⁷ Some operatives felt alienated and bored, while some, given the repetitive nature of their work, enjoyed having something to focus on.¹⁸ In some, perhaps most, situations, operatives working on Bedaux were able to earn extra money. Sometimes, however, the bonus payment was so comically tiny that it was worth less than the envelope in which it was contained.¹⁹

As seen in chapters 2 and 3, the time study was only one component of work measurement systems like Bedaux, but it was the feature which workers noticed the most. Bedaux men knew this, and sought to ameliorate workers' concerns. As one former Bedaux engineer, Leslie Orr put it in 1936:

on the subject of study work and the use of a stop watch, which, to Labour, was undoubtedly symbolical of something that should be attacked, it was most necessary, he [Orr] was convinced, that a very understanding approach be made to the individual employee. Study work was certainly not the beginning and end of reorganisation, but it did bring us to the point when our work directly impinged upon Labour. That was a point when great care must be exercised and much understanding displayed. No assumptions could safely be made here. It was of vital importance that pains should always be taken to explain to operators what as being done. Also, he was now satisfied that a special effort should be made to keep the *intensity* of study work at as low a level as possible consistent with obtaining the information required.²⁰

Orr's comments go some way to explain why historians have assumed that Bedaux was a singular feature of the early 1930s and used the more general terms like *Taylorism* for later periods. By the mid-1930s, the use of synthetic times and the removal of the *B* by name,

¹⁶ Chester Froude, 'Jantzen Goes Jolly Well British' *Jantzen Yarns* Vol. 11, No. 6 (December, 1930), p.9.

¹⁷ Coopey, O'Connell, and Porter, *Mail Order Retailing in Britain*, p.152.

¹⁸ For a detailed study of operatives' opinions as to whether work measurement at Rowntree's made their work more interesting, see Hall and Locke, *Incentives and Contentment*. For comments on workers' mixed reactions to Bedaux, see R.T. Mattinson, 'The Advantages to the Worker of a Common Denominator to all Plant Activities' *Welfare Work* (June, 1931), pp.338-40.

¹⁹ Women in industry oral history project, ROLLR, LO/029/C29.

²⁰ Urwick Orr, *Urwick Orr*, p.27

examined in chapter 3, made interventions on the factory floor less intrusive. Moreover, as Bedaux engineers became more tactful with workers and unions, time studies became less frequent, less noticeable, and also less likely to generate sources for future historians.

The Duke of Windsor's American fiasco in November 1937 temporarily brought media and public attention back to the Bedaux system's daily operations. The *Daily Express* conducted a survey of an East-End barrel assembly room in which Bedaux was in daily use. Interviews with production workers revealed that while the Bedaux system had made production more efficient, and noticeably increased worker pay, not all the workers liked the system:

Girls with blank, unsmiling faces handed strips of wood to other girls with blank, unsmiling faces, exchanging no words. Two girls dipped strips of wood into liquid and passed them through a roller so that they came out hoops, and were collected by another girl who chewed gum and silently passed the hoops to barrel-makers.

Silent, fixed-faced girls held barrels into machines that riveted them. Girls hammered hoops that were fed to them into barrels that were fed to them. The Bedaux system was wiping out waste, cutting out chit-chat, competing with the clock.

A buzzer sounded above the din of hammers and the clattering machines. In a second, silence. Hammers were dropped and the moving belts stopped. The girls with the unsmiling faces sat down in little groups. Some talked. Some produced magazines and began to read. Some just sat still.

Asked about the system, one nineteen year old woman, who had received a bonus of 13s 3d on top of her fixed pay of 30s 8d the prior week, remarked that

'I don't like it. I would sooner work as we did before. It seems to make the time go quickly, but we are not all friends any more. We were always laughing and singing and happy go-lucky. Now we have time for nothing - but cross words.'

'But I would sooner go back to the thirty shillings a week if we could all be friends again', she said.

'So would I, said her neighbour', twenty-one year-old May Challingsworth. 'There never used to be these squabbles.'

Not all the workers at the factory felt this way. Some, particularly young girls and men, liked the system as it allowed them to earn a bonus and, moreover, 'None of the workers with whom I talked appeared to have any difficulty in maintaining sixty B's an hour'.²¹

²¹ Lindon Laing, 'Bedaux Girls Say: "We'd Give Up Money To Be Friends Again"', *Daily Express*, 6 November 1937.

Due to war secrecy, the uneven archiving of wartime manufacturing institutions, and the likelihood that many war workers were simply not interested in finding out about how their labour was being measured, very few sources exist from the wartime factory floor. However, some insights survive. A joint IHRB/MRC survey of women in war work in four factories, in which one hundred female factory workers were interviewed, revealed that the majority of women on group bonus, individual piece and day rate were satisfied with their wages, although 'The chief cause of dissatisfaction was inequality in the rates of payment for similar types of work, the effects of which were more apparent on individual than on group piece-work'.²² Similarly, official accounts of the ROFs indicate that National Bonus functioned satisfactorily, although some ROF workers thought that National Bonus was too complicated and confusing, 'because they could not appreciate how their own efforts affected their earnings'.²³

There were issues at MAP contractors too. In addition to the JPC issues discussed later in this chapter, at EKCo's plant at Malmesbury, the Mass Observation investigator for *War Factory* reported that among permanent Assembly workers, there was

a certain amount of thought-out criticism of mismanagement, with reference to other factors than mere personal likes and dislikes. A complaint of this sort heard several times was about the time-sheets; the time-sheets are small printed forms, about three inches by two inches, on which each girl has to fill in each day what job she has been working on, and what time she started and finished. No one can make out quite what the point of this is, as *all* information is already on the clock-cards, but whereas in the machine-shop no one worried about it one way or the other, in the Assembly one heard remarks like this:

'It's wicked the way they waste paper here. The way they make you start a new clocking card, if there's only two days used on your last one. And the time-sheets, that's a waste of paper. They never look at them, I know they don't. They don't use them at all, those office girls. They just collect them up and never look at them. It's a wicked waste.' (F35C)

or this

'What's it for, all these time-sheet things?'

²² IHRB/MRC, *Study of Women on War Work in Four Factories* (London: HMSO, 1945), pp.10-11. The writer continued: 'The general policy of the management in these factories was to pay each worker according to the amount of output produced. When output was not measurable, or when a high degree of accuracy was essential, the workers were paid a day rate. Payment-by-results was, whenever possible, based on individual output, but in some cases only the collective output of a group could be measured, and the equivalent earnings were then divided among the members of the group.'

²³ Inman, *Labour*, pp.340-54.

'For the salvage, of course' (*general laugh*).²⁴

The M-O investigator then consulted with the Labour Manager, who explained that 'actually the slip in question was the means whereby the Costing Department would know on which particular job the employee in question had been engaged for the day'.²⁵

6.3. Labour, the unions, the TUC, and Bedaux

As the Taylor system was used minimally in Britain, only a sparse number of union engagements with it survive.²⁶ The Bedaux *B* and many derivatives, on the other hand, were implemented permanently in hundreds of British factories. As such, Bedaux could not escape attention from the trade unions. Moderate unionists like Bevin believed, as some manufacturers did, that the *B* was simply a more precise way of measuring work, which could be used, with sober trade union supervision, to increase pay, and to reduce fatigue and working hours. It was certainly better than the Ford approach, which Bevin described as 'the nearest thing to sheer slavery that I have ever witnessed, with the machine as the compelling force, a kind of modern whip'.²⁷

As head of the massive TGWU, Bevin in particular became skilled at negotiating issues surrounding Bedaux's introduction: following the winter 1931-2 strike at Wolsey, Bevin personally negotiated the introduction of the Bedaux *B* to ICI and Mander's, examined in chapters 3 and 4 respectively. The TGWU continued this conciliatory stance and conducted negotiations at a series of Bedaux strikes throughout the 1930s.²⁸

²⁴ The factory manager Michael Lipman did not record the precise method used at E.K. Cole during the war in his memoirs. Nevertheless, he recalled that 'as the war entered its third year - to a great drive, particularly by the Ministry of Aircraft Production, for greater efficiency in the utilization of labour.' He claims that as E.K. Cole's product lines were quite specialist, they did not really need 'time study' or the 'detailed study of the movements and motions needed to perform a task', but 'knowing that we were very receptive to new ideas, we were always roped in on these new developments'. See M.L. Lipman, *Memoirs of a Socialist Business Man* (London: Lipman Trust, 1980), p.163.

²⁵ Mass-Observation, *War Factory: A Report by Mass-Observation* (London: Victor Gollancz, 1943), pp.61-2.

²⁶ When Lever Brothers brought in a man to investigate the 'Taylor plan', described by the AEU as 'one of the last stages of lunacy', a stoppage of work took place and the 'American organiser' forced out. The AEU reported that its members were 'very jubilant' at this result. See 'Report of Division 2', *AEU Monthly Journal and Report* (January 1913), p.59.

²⁷ Ernest Bevin, 'American Efficiency from the Standpoint of British Labour' *Twenty-Fifth Lecture Conference For Works Directors, Managers, Foremen and Forewomen, 29 September to 3 October 1927*, pp.15-21.

²⁸ Fishman, *British Communist Party*, pp.58-60, 67. The highly pro-Bedaux *Shelf Appeal* noticed the TGWU's importance, plus the possibility of bargaining with them. See 'Bedaux', *Shelf Appeal* (April, 1938).

The TUC also came into contact with Bedaux. By 1932, the TUC had received a number of negative reports about the Bedaux system, and commissioned a survey into it.²⁹ Viewing Bedaux as an American payment-by-results system, akin to the Rowan, Taylor and Emerson systems, the TUC stressed that the most important feature of the Bedaux system was the *B*. But, the report also stressed, the Bedaux Engineer did not determine the rate of pay per *B*, which remained a matter for negotiation between management, worker and trade union. 'Fundamentally, of course, the same criticism is levelled against the Bedaux System that applies to every premium-bonus method of wage payment'.³⁰ Its final report was produced in 1933, the same year that the National Union of General and Municipal Workers (NUGMW) also endorsed the Bedaux system with modifications.³¹

The most serious criticism that the TUC report levelled against the Bedaux system was in its claims to be *scientific*. TUC officials interviewed Leslie Orr, Chief Consulting Engineer of the Bedaux Company, about the system and challenged him on this point. He responded that

In the strict sense of the term the basis of the Bedaux Company could not claim to be scientific. He said that the term scientific could be used in many senses, and they had only used it in the sense that the System provided uniform method of measurement which could be applied throughout an entire plant. In the sense that this method embodied systematic knowledge it was scientific, but it did not claim to be based on research into industrial psychology or physiology. Actually the rating was based on experience and observation, and not on theoretical work. Mr Orr claimed that the object in view could not be attained by theoretical research.³²

The TUC report concluded that as the Bedaux system was dependent on the 'experience, prejudice and personal peculiarities of the Bedaux Engineer himself', 'it is absolutely essential, however, that if such a system is introduced at all there should be the fullest consultation with the Trade Unions concerned'.³³

The former mechanic and AEU member W.F. Watson produced several analyses of

²⁹ The voluminous materials gathered during the survey can be found at MRC, TUC archive, MSS.292/112/2-5.

³⁰ Walter Citrine, *Bedaux: The TUC examines the Bedaux system of payment by results* (London: TUC, 1933), p.9.

³¹ See 'Bedaux System of Work Measurement' *Ministry of Labour Gazette* No. 41 (June, 1933), p.204. See also NUGMW, *Bedaux System Explained* (June 1932). The NUGMW were unable to find any examples to study in Britain so relied on a case study of the USA. They noted that the *B* had been renamed the *M*.

³² Orr also stressed that the division of bonus was a matter of choice for the company.

³³ Citrine, *TUC examines the Bedaux system*, p.16. As seen in chapters 3, 4 and 5, the TUC often got their wish.

the Bedaux system in which he argued that union and academic examinations of Bedaux 'do not seem to get at the root of the system'.³⁴ To Watson, 'Mr Bedaux made the same mistake in 1916 as Mr Taylor made in 1898, in regarding the workman as a mere machine'. He argued that the *B* was not scientific as, despite the Bedaux company's claim that its engineers were highly experienced in industry, 'Bedaux engineers are frequently inexperienced in the work of the factory in which they are installing their plan and, on entering the plant, they at once begin to pass pseudo-scientific judgement on the times taken on the jobs'. Moreover, there 'is eloquent evidence that "B" values are arbitrarily fixed, and that the workers reward for extra "B's" is in no way commensurate with the extra efforts expended, nor the value of the increased output!'³⁵

It was not until the war that the Bedaux system entered the House of Commons in any substantive way. June 1941 saw the Bedaux question surface in the House of Commons related to unions. The Labour MP Ellis Smith questioned Bevin, then Minister of Labour, as to

what extent the Bedaux system of production has been introduced in the countries involved in the war; who are the directors of the company; is he aware that in this country agreements have been arrived at between the trade unions and organised employers providing for prices to be fixed by mutual agreement, and there is machinery to deal with cases of dispute; and is it intended to maintain these agreements and the machinery they provide?

Bevin responded that

No recent information is available with regard to the operation of the Bedaux system in the countries involved in the war. It is understood that it was applied to a varying extent in pre-war years in individual firms in this country and in Belgium, Czecho-Slovakia, Denmark, France and Italy. In accordance with the Companies Act, lists of directors of companies are available for inspection at the offices of the Registrar of Companies. The answers to the last two parts of the Question are in the affirmative.

Smith retorted by asking:

Have the Government any information about this Bedaux system being imposed upon the workers in France since they lost their trade unions, and, if so, can that

³⁴ W.F. Watson, *The Worker and Wage Incentives: The Bedaux and Other Systems* (London: Hogarth Press, 1934). A mechanic turned journalist, Watson wrote an extensive autobiography which says much about developments on the factory floor in early twentieth century Britain. See W.F. Watson, *Machines and Men: An Autobiography of an Itinerant Mechanic* (London: George Allen & Unwin, 1935). In 1920 he had fallen under accusations of being a police spy and responded with W.F. Watson, *Watson's Reply* (London: privately published, 1920).

³⁵ Watson, *Bedaux and Other Bonus Systems*, p.32.

information be given to the House; if the Government do not possess the information, will they make an investigation in order that they can inform the House with regard to the introduction of this system?

Bevin responded that he would 'make enquiries', although the matter does not appear to have gone any further.³⁶ Smith's fear that the Bedaux system could be used to undermine the negotiation machinery already established were unfounded. In fact, as examined in chapter 5, 1941 saw the Bedaux system, and other work measurement systems like it, more closely integrated into vital areas of British war production, and related industrial relations methods expand with it. And, also as examined in chapter 5, moving into 1942, as manpower was squeezed even more, the Bedaux and similar systems were permanently expanded to further areas of British industrial production.

One particular postwar debate in the House of Commons revealed a great deal about how, and how rapidly, Bedaux's name became decoupled from work measurement, while the iconic time study stayed in focus. Whereas the wartime debate on Bedaux, examined earlier in this chapter, expressed anxiety that the Bedaux system was being used by Britain's enemies to boost war production, Bedaux's highly publicised suicide in February 1944 and reputation as a Nazi collaborator had compromised Bedaux's name in the political sense. Bedaux's name therefore re-entered the House of Commons in November 1946 on different terms. Replying to comments made by Peter Bennett of Joseph Lucas about Britain's new export drive, Woodrow Wyatt, Labour MP for Birmingham Aston, responded that politicians had to convince workers to work harder than before the war, as, due to the unlikelihood of manpower increasing by 75%, workers would have to produce 75% more. In addition to praising the recent 'Britain Can Make It' exhibition, Wyatt noted that new production methods could be considered:

The obvious ones are the application of time study and motion study. Around both these methods of increasing production the most acute controversy is raging in industry at the moment. Very little is said about it in the open but amongst workpeople there is a great deal of violent feeling, both pro and anti, about time study and motion study. But whatever the workpeople may think about the situation, managements are getting ready to extend the application of those systems.

³⁶ HC Deb 19 June 1941 vol. 372, cc.790-1.

Wyatt warned against the 'unscrupulous methods' used in timing before the war: 'In fact, the origin of time study, the Bedaux system, was regarded in most industrial centres as one of the most inhuman systems of work ever perpetrated by employers anywhere.' Oliver Lyttleton, now Conservative MP for Aldershot, responded that 'I hope he is not confusing the Bedaux system with time and motion study. These are distinct things and I do not think that some of the objections which he is raising to the former apply to the latter'. Wyatt hit back with the accusation that Lyttleton had confused time study with motion study and then reasserted that 'All forms of time study are based on some form of the Bedaux system'. He then suggested that suspicions about the misuse of time study could be allayed by the issuance of common standards for timing in industry which could be regulated by rate-fixers holding Board of Trade certificates.³⁷

Work measurement, including Bedaux, may have been supported by mainstream trade unions, and absorbed into the postwar Labour government's industrial productivity policies, but work measurement did meet with resistance and outright hostility on the factory floor, and is that which we turn to next.

6.4. The Communist Party, Taylor and Bedaux

Prior to the formation of the CP in 1920, a minority of British marxists spoke out against scientific management. The founder of the unsuccessful Scottish Communist Party, John Maclean, argued that scientific management formed part of a new phase of industrial capitalism in which employers such as Cadbury, Rowntree and Leverhulme were propagating "enlightened capitalism" to save capitalism from the establishment of a socialist republic'. As part of this,

'Scientific management' is the resort to any and every scientific expedient to increase output, or, to put it another way, to reduce the time taken to do a piece of work or turn out the completed commodity. Scientific management was undoubtedly more thoroughly applied in the United States than in the British empire prior to the war, the hindrance in the empire being largely due to the conservatism of the capitalists and the "ca' canny" policy of the powerful trade unions.

³⁷ HC Deb 5 November 1946 vol. 428, cc1263-4.

Maclean argued that all these features of the new capitalism would intensify in the future, as capitalists realised they could massively increase industrial output and keep virtually all of the additional profit. This increased output would also lead to the expansion of capitalism into new imperial territories to supply new markets, and 'an economic war, this war after the war'.³⁸

The CP was formed in 1920 principally by militant manufacturing workers and trade unionists. They saw themselves as the vanguardist intellectual leaders of the British working class, and they certainly possessed the Leninist zeal for organisational discipline. As former CP member Raphael Samuel recalled, British communism

shared with 'scientific management' - that 'American efficiency' - which the Bolsheviks wanted to introduce into Russia - faith in 'precision', a belief in 'labour-saving' devices and a commitment to 'getting things done'. The Communist obsession with punctuality had obvious affinities with the 'speed-up' and those time-and-motion routines which were being introduced in the 1930s into the more advanced sectors of British industry (e.g. the Bedaux system).³⁹

As Lenin and Trotsky had spoken in favour of the Taylor system, approval of Taylor quickly became official CPSU policy.⁴⁰ The CP therefore toed the Moscow line on Taylor and scientific management, and suppressed any misgivings they had about them.⁴¹ But they were happy to attack manufacturers for welfare capitalism, and to overlook the fact that these manufacturers' opinions of scientific management dangerously overlapped with those of Lenin. So the CP claimed that scientific management was intrinsically Soviet, and avoided discussing it in relation to Britain entirely. For example, Maurice Dobb commented

³⁸ John Maclean, *The War After the War* (Glasgow: Scottish Labour College, 1918).

³⁹ Raphael Samuel, *The Lost World of British Communism* (London: Verso, 2006), 116-7. Samuel did not realise how accurate his comparison was. See sections 6.7-6.9 of this thesis.

⁴⁰ In Lenin, 'A "Scientific" System of Sweating' *Pravda*, 13 March 1913, Lenin declared that Taylor's 'scientific system' was designed to 'squeeze out of the worker three times more labour during a working day of the same length as before'. He reported that the system received support from both capitalists and the bourgeoisie. By 1918, Lenin had changed his tune. Vladimir Lenin, 'The Urgent Problems of Soviet Rule' *Pravda*, 28 April 1918 called for the new government 'to try out every scientific and progressive suggestion of the Taylor System'. Trotsky's opinions of Taylor also changed over this period. While decrying 'Taylorism, in which the elements of the scientific organization of the process of production are combined with the most concentrated methods of the system of sweating', Trotsky declared in *The Defence of Terrorism (Defence of Terrorism and Communism)* (London: Labour Publishing Company, 1921), pp.135-8 that 'Under Socialist production, piece-work, bonuses, etc., have as their problem to increase the volume of social product, and consequently to raise the general well-being'. Lenin's remarks were republished along with Webb's in *Bulletin of the Taylor Society* Vol. 4, No. 3 (1919), pp.35-8.

⁴¹ The only CP reference to F.W. Taylor or the Taylor system located during research was in *The Worker* from 1930 referring to 'between 15,000 and 18,000 workers being sweated under the Taylor System in the Michelin Rubber Works' in France. See 'Rationalisation in France' *The Worker*, 6 June 1930.

that 'in the tenth year of the Soviet Government "rationalisation" and "scientific management" were probably more talked about and written of in the land of Chekhov and Dostoievsky than in New York or Berlin'.⁴²

The CP also campaigned against the prevalent trend on the left and right which posited high wages as a solution to British industrial problems. The CP's theoretical chief Rajani Palme Dutt argued that the Independent Labour Party (ILP), manufacturer, and Fordist campaigns to increase wages, including to a Living Wage, in order to boost consumption amounted to reformism within the capitalist system. 'The living wage is thus an immediate aim in the daily fight with capitalism. It is not a final aim ... The only final aim is socialism, which implies the destruction of capitalist wage-relations and the overthrow of capitalist class power'.⁴³ He also remarked of Ford that 'Fordism, for all its large-scale scientific character, is not large-scale or scientific enough'.⁴⁴

As indicated by Palme Dutt's comments, throughout the 1920s, the majority of the CP focus was on critiquing Ford. Indeed in the early 1930s, the CP published several accounts of the anticipated hellish conditions at Ford's new plant at Dagenham.⁴⁵ Not dissimilar to Bevin's remarks on Ford, the CP's critique was that Ford was actually a step far backwards in industrial production methods. As one CP article put it, Ford's methods led to factory workers being 'bound to the conveyor the way the galley slaves were bound to the vessel'.⁴⁶

The appearance of the the Bedaux system on the British industrial scene in 1930, and the simultaneous CP demonisation of Trotsky, who, like Lenin, had made positive comments about Taylor, presented the CP with a new target, and one which their rivals on

⁴² Maurice Dobb, *Russian Economic Development Since the Revolution* (London: G. Routledge & Sons, 1928), p.332. For Dobb's career, see Timothy Shenk, *Maurice Dobb: Political Economist* (Basingstoke: Palgrave Macmillan, 2013).

⁴³ See R. Palme Dutt, *Socialism and the Living Wage* (London: Communist Party of Great Britain, 1927), pp.69-70.

⁴⁴ Palme Dutt, *Socialism*, pp.171-187.

⁴⁵ See 'Turning Men into Robots at Fords' *Daily Worker*, 31 January 1930; 'Henry Ford's Factory is no Paradise' *Daily Worker*, 2 January 1932; "'Work Like Fiends" On Ford Conveyors: "High-Wages" Ford wants cuts and bigger speed-up' *Daily Worker*, 31 March 1932; 'Paradise a la Ford: dumb and dead-beat at Dagenham' *The Worker*, 30 April 1932; "'Ideal Conditions" at Ford's Motor Works: Robs Workers of all Vitality' *Daily Worker*, 21 October 1932; '8,000 Ford Workers Strike Against Cuts' *Daily Worker*, 28 March 1933; 'Ford Workers Win Concessions' *Daily Worker*, 30 March 1933.

⁴⁶ 'This Rationalisation' *The Worker*, 3 January 1930.

the left had minimal interest.⁴⁷ The CP and the CP-influenced AEU, therefore went on the offensive. The first AEU mention of the 'new rate fixing system' in which a man 'with stop-watch in hand, standing over men, timing each actual operation of the job', came in April 1930.⁴⁸ The CP also noted the introduction of work measurement to ICI's 'slave shops':

The introduction of labour-saving devices, both in plant and process, speeding-up with a time-card method of checking the amount of work done each day by every worker, have resulted not merely in wage-reducing costs, but has thrown numerous chemical workers on to the streets. While the employers, through a vicious form of tyranny, have pushed more and more work on to each worker.⁴⁹

CP mention of Bedaux came in September 1930, commenting on the strike at Rover's over Bedaux's introduction there.⁵⁰ Coverage followed of several strikes over Bedaux, particularly of the strikes at Lucas, Hope's, and Richard Johnson and Nephew, specifically because the CP had managed to infiltrate the otherwise unofficial strike at Wolsey, and because they were already relatively strong in the skilled AEU engineers at the latter.⁵¹ The *Daily Worker* reported that in two of these three strikes, while actually unsuccessful in throwing out Bedaux, the CP had a leading role in resistance to the Bedaux system.⁵² Moreover, the CP were unique in spotting that while the Bedaux system had been expelled by the workers at Lucas, it was simply introduced by anonymised consultants under the name of the Lucas *Point* system.⁵³

In responding to Bedaux with such dynamism, the CP were not, as the Economic

⁴⁷ Social democrats treated the Bedaux system in a blasé fashion. Believing Bedaux to be simply an extension of the PBS, none of the major Labour intellectuals produced any substantive analysis of Bedaux. The ILP also expressed minimal interest. The ILP *New Leader* featured only the Bedaux strike at Wolsey. See '4,000 Girls Resist Factory Slavery' *The New Leader*, 22 January 1932. The other groups that picked up on the Bedaux system were even smaller than the CP. See 'The Bedaux Sweating System at Work' *The Chemical Worker*, 20 February 1932 and 'Speed-Up Systems CAN be SMASHED' *The Militant Trade Unionist*, 1 June 1933.

⁴⁸ 'Callender's Cable Company' *AEU Monthly Journal* (April 1930), p.35.

⁴⁹ "'Imperial' Chemicals: Organising for the Coming Struggle: PRÉPARE NOW' *The Worker*, 7 November 1930.

⁵⁰ "'Bedaux" System Rejected: Girls Firm at Motor-Car Works' *Daily Worker*, 10 September 1930. The *Daily Worker's* coverage of the 'speed-up' in April and May that year did not note that the 'speed-up' in question was Bedaux.

⁵¹ Moreover, the strike at Wolsey was examined at quite a high level of the CP for the negotiations which had been used to settle it. See CPGB CC papers LHASC, 16 January 1932.

⁵² For the triumphant account of beating Bedaux at Lucas, see 'VICTORY! BEDAUX SYSTEM SMASHED!' *Daily Worker*, 29 January 1932. The article reported how 'Ten Thousand Lucas Workers Cheer Communist: Inspiration to Smash Bedaux Everywhere'.

⁵³ See *Light on Lucas*; 'Bedaux system in new clothes at Lucas' *Daily Worker*, 22 April 1932. See Harold Nockolds, *Lucas: The First 100 Years. Volume 1: The King of the Road* (Newton Abbott and London: David & Charles, 1976), p.288.

League (EL) believed, 'always looking for some new grievance to exploit'.⁵⁴ In fact, the CP developed a cogent critique of Bedaux. The CP's critique of Bedaux, which came most clearly from CP founder and AEU militant Percy Glading, was that Bedaux signalled a new phase of industrial capitalism in which the value of multiple kinds of factory work had been abstracted from any local context or conditions, and converted into 'common units', the monetary value of which was completely controlled by the factory's managers.⁵⁵ Glading quoted Bedaux's 1926 *India Rubber World* article:

The Bedaux system is characterised by the fact that it is concerned only with the measurement of human labour power, and does not concern itself with individual processes or machines. It finds expression in a unit, which represents the labour which must be put out by the workers.

Not mentioning that Bedaux openly admitted in his article that his system was 'based on time study, the same as Taylor's system', Glading argued that the 'Bedaux Hell' was 'one of the many similar systems used for speeding-up production', but that Bedaux 'can be described as one of the most devilish systems ever invented'.⁵⁶ The 'Bedaux rate-fixer' would time workers then multiply the work done by a 'velocity factor, which is always less than one!' Glading argued that this type of analysis had been made possible by the continual division of labour to the extent to which each worker was performing one, or only a few, highly repetitive tasks.⁵⁷ In doing so, Bedaux would extract 'the last ounce of energy from the workers, irrespective of the surroundings, equipment or machine'. He continued: 'This robbery is supposed to have a scientific basis (similar to the American foreman's bonus system)' and it resulted in 'whole factories full of raging, tearing, human beings being driven to a premature death by such inhuman systems'. Glading also noted that the

⁵⁴ See 'The Bedaux System of Time Measurement' MRC, EEF archive MSS.237/3/1/235.

⁵⁵ Viewed from the perspective of eight decades later, after the 'Bedaux and kindred systems' were extensively applied across many British manufacturing processes in both the public and private sectors, it is now possible to identify that despite his distortions, Glading, who still remains a murky figure, was correct. It appears that Glading understood Bedaux better than prominent marxists such as Antonio Gramsci, who contemporaneously wrote about FIAT, a showpiece Bedaux installation mentioned in chapter 3, in more general terms of *Taylorism* and F.W. Taylor's *Principles of Scientific Management*. See Antonio Gramsci, Quintin Hoare, and Geoffrey Nowell-Smith, *Selections from the Prison Notebooks of Antonio Gramsci* (London: Lawrence and Wishart, 1971).

⁵⁶ Glading quoted his source for his articles as 'The Bedaux System in Rubber Factories' *The India Rubber World*, 1 August 1926. That article is the source of the Bedaux quote on Taylor.

⁵⁷ Glading's point about the division of labour was the same made by a 'Bedaux expert' in a speech to the NFRB in May 1936. See LSE, Fabian Society archives, Fabian Society/J/15/8. See also chapter 4 for statements from an UOP consultant on reducing the number of tasks performed by individual workers.

TUC, which 'agrees with all forms of rationalisation' and Labour, both supported Bedaux. 'The Minority Movement stands alone against speed-up, against Bedaux systems'.⁵⁸

The Bedaux company were suitably disturbed by the *Daily Worker's* claims about the Bedaux system, and directly confronted Glading. The Bedaux Co. claimed that they timed only average workers, and that 95% of the time, times allowed under Bedaux were actually greater than previously. They also stated that Glading's claim about the 'velocity factor' was simply wrong, and that a proportion of the direct workers' bonus went to indirect workers, and not the firm. Glading was unconvinced and re-stated Bedaux's claim that the Bedaux system transformed work into abstract data and did not concern itself with actual work processes or machines.⁵⁹

The CP also continued to critique the *Point* system at Lucas, publishing *Light on Lucas* in 1934. Noting that the 15,000 workers employed by Lucas largely consisted of women and youths, and was almost totally unorganised, *Light on Lucas* argued that the *Point* system 'is one of trickery against the girls and the setting of men and women against each other by the management'. Factory and office machines had been brought into use, and workers bribed with bonuses and tea money to work the new, larger, batteries of machines.⁶⁰ The CP remained derisory about the *Point* system's alleged neutrality. All work processes had been given *Point* values, about which 'management always state that it is impossible to change the "value" of a given operation once it has been fixed'. Although, the CP observed, when *Point* values had been set too low from the management's perspective, *Point* values could be dropped, 'thus showing that the management can, and

⁵⁸ Percy Glading, 'The "Bedaux" System or "Bedaux Hell": A Description' *Daily Worker*, 18 September 1930. Glading was an AEU member, and from 1929 was on the Political Bureau of the CP, and also on the Executive Council of the LRD. National Archives, Kew, London. Percy Glading file, NA, KV 2/1020, confidential biography of Percy Glading, p.2. Glading prepared a more elaborate critique of Bedaux two years later: P. Glading, *How Bedaux Works* (London: Labour Research Department, 1932). He argued that Bedaux was particularly suitable to a capitalist country like Britain where capitalists were not prepared to find the necessary amount of constant capital required in the so 'new and more effective methods of exploitation of human beings are sought and adopted. And it is under this heading that the Bedaux system appears.'

⁵⁹ 'The Bedaux System - is it a Curse or a Blessing?' *Daily Worker*, 13 January 1932.

⁶⁰ Although the article does not stipulate the firm under discussion, see 'All the Typists' "Taps" are Registered', *Daily Worker* 24 March 1938, p.7. 'There would probably be 100 or more typewriters working in each room or section to really appreciate the full horror of such working conditions. This [unnamed] firm flaunts to the world its "model" factories and ideal working conditions'.

must, change “values”⁶¹.

The CP's continued and vocal focus on Bedaux attracted the unwelcome attention of the EL.⁶² Noting the CP's argument that Bedaux was necessary as capitalists were not reinvesting profits, though not focusing on the *B* unit, the EL considered the Bedaux system to be perfectly fair for both workers and employers. They believed that ‘It does not suit the man or woman who is not a particularly efficient or quick worker. It gives the revolutionary-minded worker something to agitate about’. Furthermore, ‘British labour is conservative at heart in so far as systems of work are concerned. It is also notoriously easily led by Trade Union leaders, and even by Communists.’ Finally, the Luddites were highlighted as a comparison, and the strike at Henry Hope taken as an exemplar of this vulnerability of British labour to radicalism.⁶³

CP attitudes to Bedaux changed in five main ways from the mid-1930s onwards: firstly, the CP noted that in some cases, such as at Lucas, the Bedaux system was being deliberately masked by changing the language of the system. Secondly, the fact that the Bedaux company went public in May 1936 was not lost on the CP, and, according to its journal *Labour Research*, signalled that the company's business was continuing to grow.⁶⁴ Thirdly and related, the CP frequently observed the expansion of Bedaux work measurement into the aeronautical engineering sector and explicitly linked it with the rearmament drive, for which they criticised the National Government. Fourthly, due to its partial shift to the right under its popular front tactic, the CP stopped criticising the TUC and TGWU for endorsing some features of the Bedaux system, and indeed sometimes

⁶¹ *Light on Lucas* (1934), p.7.

⁶² The League was formed in 1919, explicitly as an anti-Bolshevik organisation. It was highly clandestine, and consisted of a number of high-ranking military and industrial figures, including those connected with ICI such as Harry McGowan. Probably due to lack of suitable source materials, only a slender amount of historical research has been conducted on the EL. Some exists. See Mark Hollingsworth and Charles Tremayne, *The Economic League: The Silent McCarthyism* (London: National Council for Civil Liberties, 1989).

⁶³ ‘The Bedaux System of Time Management’, 5 July 1933, MRC, EEF archive, MSS 237/3/1/235.

⁶⁴ ‘Bedaux Menace’, *Labour Research* Vol. 25 (May, 1936), p.110. The article, which noted that Bedaux's profits had averaged £48,668 *per annum* since 1931, quoting from the recent Bedaux company prospectus: ‘The amount of businesses in hand is greater than at the same time last year. Additional staff has been and is to be engaged for training in our methods in view of the general increase in industrial activity throughout the country. In view of the wide field in this country available for the application of our system, the directors anticipate that the profits of the business will increase’.

praised these bodies for securing beneficial deals on behalf of workers. Finally, from 1936 onwards, the CP met with the challenge of promoting Soviet Stakhanovism and officially challenging Bedaux, while also attempting to cope with the emergent, and frequently-made, conceptual connection between Bedaux and Taylor.

By the mid-1930s, on the factory floor, the CP argued, while the country's economy as a whole had recovered from the depression, it was not the workers who were benefiting from the recovery. In fact, employers' increasing reliance on Bedaux was making things worse. One report in *Labour Research* stated that this 'notorious system' had led to the increase of the working week from 5 days to 5½ days due to the drop in output caused on Thursday and Friday afternoons. Moreover, *Labour Research* argued, Bedaux increased accidents and worsened conditions, which was 'the price which the workers have to pay for the recovery which their employers are enjoying'.⁶⁵ In short, the Bedaux system may have been working but only for the bosses. For everyone else, the CP argued, it was industrial chaos and more work for little more money.

This noting of the fact that the Bedaux consultants had grown more conciliatory towards workers, examined in chapter 3, was accompanied by the CP's realisation that the Bedaux consultants had learned how to conceal the system's most visible features, particularly the time study.⁶⁶ Throughout the second half of the 1930s, the CP noticed the expansion of the Bedaux system and related derivatives of the *B* into the engineering sector. From its foundation in 1935 up to the outbreak of war in 1939, almost every edition of the CP-controlled *New Propellor*, which had a monthly circulation of 13,000, noted the emergence of 'efficiency experts' in aeronautical engineering plants. These experts, in reality P-E, were brought into install systems 'akin to Bedaux' at such engineering firms as De Havilland, A.V. Roe, Vickers, High Duty Alloys, Rover's and Rolls-Royce.⁶⁷ When news that the 'services of experts' were being brought in to Rolls-Royce, and

allusion was also made to an alleged attempt to adopt the Bedaux system, an

⁶⁵ 'Bedaux', *Labour Research* Vol. 24 (October, 1935), p.223.

⁶⁶ The absorption of *B*-based *Point* systems and time studies into synthetic data matrices by Bedaux, Rowntree, and UOP are examined in chapters 3 and 4 respectively.

⁶⁷ See 'De Havilland: Against "Efficiency Experts"' *New Propellor* Vol. 1, No.4 (1935).

official of the AEU, Mr C.R. Bates was loudly cheered when he declared his readiness to lead a strike against any further such attempts.⁶⁸

At A.V. Roe, workers believed they faced something quite formidable:

In the old days, the man with the bowler hat used to parade up and down the shop putting the fear of Christ into each and every worker. The more brutal was he, the more successful boss he became.

In these days the bosses are more 'refined' but much more brutal. The helmet of authority has passed away and into his shoes has dropped the 'Motion and Time Study' expert, whose job it is to study the individual output of the machine, to study the speed and to eliminate all waste movements of the operator, which will ultimately lead to a general speeding up, increased production, a less cost per unit to the employer.

In some instances, under this phrase of 'scientific management' the employer will endeavour to tell the workers not to be old fashioned but to be up-to-date, nice and modern ... don't believe a word of it.⁶⁹

These frequent articles, and the *New Propellor's* editor, Peter Zinkin, also noted that the intervention of the efficiency experts often led to many workers joining trades unions, particularly the AEU.⁷⁰ The two new management methods which the engineers cited in the *New Propellor* and related publications were the Bedaux system, which sometimes featured prominently in the *New Propellor's* satirical cartoons, and the books of L.M. Gilbreth.⁷¹ So while the P-E engineers had often been able to avoid the Bedaux label, events would soon render the Bedaux name far more politically toxic.

6.5. The CP, the Duke, Bedaux, and Stakhanov

Stalin's promotion of Stakhanovism in the USSR from the second half of 1935 onwards was celebrated by the Soviet authorities but met with great suspicion in many circles

⁶⁸ 'Rolls-Royce Employees' *The Times*, 15 February 1938. Dave Birch, 'Rebels with a Cause?' (undated but c.1931), p.27 noted that the CP-published *Rolls-Royce Rebel* called for 'No Speed Up'.

⁶⁹ For some examples, see 'Motion and Time Study' *New Propellor* Vol. 1, No. 4 (1935); "'Efficiency" at Vickers, Weybridge. Rising Trade Union Membership' *New Propellor* Vol. 2, No. 5 (1936); 'Bedaux at High Duty Alloys?' *New Propellor* Vol. 2, No. 12 (1937); 'Efficiency Expert Must Go!' *New Propellor* (1938); 'Rover Shadow Factory Strike' *New Propellor* Vol. 3, No. 4 (1938). P-E, *Fifty Years of Professional Enterprise*, p.12, notes that during re-armament P-E conducted work measurement studies at Armstrong-Siddely, Fairey, Hawker, Rolls-Royce, Saunders-Roe, and Short Brothers.

⁷⁰ Some strikes by particularly militant male workers were successful in preventing the introduction of the Bedaux system, or similar systems. The AEU had vigorously opposed the introduction of Bedaux at ICI's Blackley Works in 1936, and launched a successful strike in the Blackley main engineering workshop in February 1937.

⁷¹ See also the scathing examination of Gilbreth and Bedaux in Peter Zinkin, *A Man to be Watched Carefully* (Newcastle and London: People's Publications, 1985), pp.160-2. Zinkin was a CP member, an AEU shop steward at De Havilland, and the editor of the *New Propellor*. Zinkin also wrote the Aircraft Shop Stewards' National Council pamphlet *Aircraft Workers' Case* (1936).

around the world, including in the USSR, the USA, Britain and even among many CP members. Trotsky, forced by his earlier favour for Taylor to fall back to an earlier Marxist position from *Das Kapital*, argued in *The Revolution Betrayed* that Stakhanovism marked the dawning of true state capitalism in the USSR.⁷²

Given the public disagreement among Soviet figures as senior as Stalin and Trotsky, and the bewilderment in Soviet factories, it is not surprising that Stakhanovism was even more confusing to Soviet supporters and opponents hundreds, if not thousands, of miles away. The CP were reluctant to print too many stories on the popularisation of Stakhanovism in the USSR for fear that it would be confused with the rationalisation methods which they had been fighting for the last decade. This CP wavering prompted a barrage of criticism from Moscow, which criticised the CP for publishing Stalin's autumn 1935 speech on the Stakhanovites on the 'defensive instead of using this Movement as a weapon for struggle against BOURGEOISIE.' The Comintern also harangued the CP for not explaining that Stakhanovism was a movement from below, and only possible under Socialist conditions.⁷³ In late December 1935, the CP discovered that Charles E. Bedaux, inventor of the

BEDEAUX (sic) system of speed-up is applying through VOX and his connections with American Ambassador in PARIS for visa to Soviet Union for personal enquiry into STAKHANOV Movement. Hopes to use experience for [a] speed-up drive [of] Capitalist factories.⁷⁴

The CP's General Secretary, Harry Pollitt, warned that this would make the promotion of Stakhanovism in Britain even more difficult, and may allow Bedaux to break down British resistance to the Bedaux system.⁷⁵ The Comintern responded that 'We understand that important discussions are taking place on the work of the Soviet Trade unions. We propose before any public announcement is made leading comrades of ECCI be called to

⁷² Available online at <http://www.marxists.org/archive/trotsky/1936/revbet/ch04.htm#ch04-4>; accessed 17 June 2014.

⁷³ ECCI-CPGB, 19 December 1935, NA, HW/17/19.

⁷⁴ CPGB-ECCI, 30 December 1935, NA, HW/17/19.

⁷⁵ Pollitt to Dimitrov and Manuisky, 1 January 1936, RGASPI, 495/74/35. For the internal politics between the CP and the ECCI, see Andrew Thorpe, *The British Communist Party and Moscow, 1920-43* (Manchester: Manchester University Press, 2000).

MOSCOW'.⁷⁶

As seen in chapter 3, Bedaux did visit Moscow in January 1936 but was ejected from the USSR before seeing any Soviet factories. While Bedaux's version of events, explored in chapter 3, was that he had seen Stakhanovites working at an impossibly high 240Bs, the official CP line was that 'These factors had a "very different role" in a "socialist system of production" and 'it is of interest to notice that the Soviet Government has investigated and rejected the Bedaux system'.⁷⁷ Concluding that Britain lacked the correct context to instigate Stakhanovism, the CP Central Committee decided to promote the successes of the movement in the USSR but refrain from promoting Stakhanovism in Britain for fear it could be discredited by 'capitalists and Citrine types'.⁷⁸

The CP had good reason to fear this, as this is precisely what happened. Signalling the later anti-fascist position which the CP and leading British manufacturers would adopt during the war, one such capitalist willing to take advantage of the apparent links between Stakhanov and Taylor was Lyndall Urwick. In January 1937, Urwick delivered a speech in which he emphasised that Taylor's goals were even relevant under Soviet communism:

If we study what they are doing in Russian factories we shall find that, though national feeling and revolutionary ideology impels them to describe their new techniques as 'Stakhanovism', what Stakhanoff is securing is the application of Taylor's methods.⁷⁹

As head of the TUC, Citrine was more critical of the Stakhanov movement than Urwick was. Writing of his investigations in the USSR in 1936-7, Citrine noted of the Stakhanovites, whom he had seen at work in real life, that

I am very sceptical as to the authenticity of some of the Stakhanov claims ... In so far as the Stakhanov Movement makes for greater efficiency, it is to be applauded. There is, however, a very real danger of setting a pace which is far beyond the average worker, with consequent deleterious effects upon health, not to mention such incidentals as irritation and the creation of enmity between worker and

⁷⁶ Pollitt to ECCI secretariat 1 January 1936, NA, HW17/20.

⁷⁷ 'Bedaux Sweats Workers', *Labour Research* Vol. 24 (June, 1936), pp.129-131.

⁷⁸ CPGB Central Committee meeting, 4 January 1936, LHASC.

⁷⁹ Lyndall Urwick, *Contribution of Scientific Management to the Solution of Present Economic Difficulties* (19 January 1937), p.8. Held in HBS, Urwick papers, Box 1, volume 7. Z. Clark Dickinson, *Compensating Industrial Effort: A Scientific Study of Work and Wages* (London: Macdonald & Evans, 1937), p.134 made the same connection between Taylor and Stakhanov but meant it negatively, also arguing in 1937 that as part of the Stakhanov movement, 'a recent fad in Soviet Russian labor management is "progressive piece rates" which out-Herod the Herod of Taylor-Gantt differential rates'.

worker.⁸⁰

Similar denunciations also came from Bedaux and his engineers, who did not appreciate being compared to Stakhanov or Stalin's soviet dictatorship.⁸¹ Addressing the New Fabian Research Bureau in 1936, a 'Bedaux expert' cited the widespread use of piece work in the USSR as evidence that piece-work was 'a natural form of payment. The most natural system of all is to work for yourself, and then it is quite obvious that the harder and more skilfully you work the more you will get'. His argument concluded by meeting the challenge that Bedaux created unemployment:

Objection on these grounds appears to be exactly on all fours with the attitude of the Luddites in objecting to machinery being introduced. For weal or woe we have introduced machinery and for weal or woe time study methods are proving equally inevitable. We should, I imagine, be welcomed in Soviet Russia, where the Stakhanov movement is trying to increase the badly-needed output, probably by shock methods and by tremendous efforts of labour, instead of by patient study and improvements of process.

He concluded that Bedaux could be used to reduce working hours while ensuring higher pay, but that this was a matter for politicians to deal with. He finished: 'I fling it at you as a parting shot that Labour's intelligentsia ought to realise this, and realise that their Luddite objections are out of date'.⁸²

The confusing ambiguity of apparent similarities and differences between the Bedaux, Stakhanov, and, sometimes, Taylor work incentive methods became particularly foggy when, as also examined in chapter 3, due to the November 1937 controversy over the Duke of Windsor's trip to the USA, some right-wing commentators formed conceptual links between Bedaux and Stakhanov which the CP tried to discourage.⁸³ Some anti-communists such as the poet Ezra Pound explicitly compared the 'Bedaux and Stakhanov sweating and speeding up systems'.⁸⁴ The *Daily Express* remarked that

⁸⁰ Walter Citrine, *I Search for Truth in Russia* (London: George Routledge, 1938), p.402.

⁸¹ For an examination of Bedaux responses to such comparisons, see chapter 3.

⁸² NFRB, 9-10 May 1936, LSE, Fabian Society/J/15/8.

⁸³ The publication in 1937 of a new edition of the Webbs' *Soviet Communism: a New Civilisation* (London: Longmans, Green & Co., 1937), pp.936-938, contained an explicit comparison of Stakhanovism and *Taylorism*, with the Webbs concluding that 'The Stakhanov Movement' ... 'is the obverse of the American system of "scientific management" as devised by Taylor'.

⁸⁴ Ezra Pound, *Guide to Kulchur* (London: Faber & Faber, 1938), p.282. The Bedaux-Stakhanov connection was also made in 'The Foreign Horizon' *The Argus*, 27 December 1937 in which it was noted the 'speed-up system, first made famous or infamous in the United States by Mr. Bedaux' had recently caused a strike in France. 'In the Soviet Union a similar hostility is felt towards Stakhanov'.

Mr Bedaux, who seems not to have the approval of trade unionists, is the inventor of the 'Bedaux system'. Mr Bedaux calculates the output of a factory worker in one hour. It's true that he divides it up into minute-units which he calls B-units. Then he offers bonuses to workers who do more, together with a rake-off for the foreman. In Soviet Russia the miner Stakhanov is the parent of the same system of speeding up and 'work-norms' and paying extra. Over there they call it 'Socialist competition'. But never mind the word. The thing is what counts.⁸⁵

While it is not clear exactly to which stimulus the CP were responding, they were quick to refute the notion that Bedaux and Stakhanov were similar at all, let alone the same thing. The *Daily Worker* published a question and answer article which asked the rhetorical questions, 'Why is "scientific management" and speeding up a good thing when associated with Stakhanov and a bad thing when associated with Bedaux? What is the difference (if any)?' The *Daily Worker's* industrial correspondent, J.R. Campbell responded that 'Speeding-up is bad, whatever it is associated with, but the Stakhanov movement has nothing to do with speeding-up.' To Campbell, the Stakhanov movement, like Stakhanov himself, consisted of skilled workers who studied 'how the machinery at his disposal could be better used.' In contrast, 'The Bedaux experts study how the worker can slave more intensively in the interest of his employer.' Stakhanov's increased earnings were guaranteed by the Soviet unions, whereas 'Some extra earnings will doubtless be made in the introduction of the Bedaux system but these will be gradually reduced, so that after a while the worker is giving a vastly greater output for the same earnings.' Campbell concluded that

Stakhanovism means the mastery of technique by the workers, and strives for an all-round technically educated working class. The Bedaux system means the speed-up of the individual worker and his reduction to a robot. There is no similarity between the systems. Their aims and methods are entirely different.⁸⁶

In retaliation to these accusations, the magazine *Shelf Appeal* examined Campbell's points. Stating that the original questions must have come from a 'Right Wing Deviationist', the magazine retorted that 'What Marx is to the *Daily Mail*, Bedaux is to the *Daily Worker*'.

⁸⁵ 'Bedaux-Stakhanov' *Daily Express*, 5 November 1937. The CP's approval of the BFL-led resistance to the Duke's trip was reported in 'U.S. Labour Tells Windsor to Keep Out' *Daily Worker*, 5 November 1937.

⁸⁶ 'Bedaux and Stakhanov' *Daily Worker*, 12 November 1937. For more on the Campbell's explication of Stakhanov, this time in relation to Marx's theories of the division of labour, see J.R. Campbell, 'Once More Stakhanov' *Daily Worker* 19 November 1937, which approvingly cited the Webbs' *Soviet Communism*. For the continued CP take on Bedaux, see Rose Smith, 'There's Profit in Speed-Up' *Daily Worker* 20 November 1937.

The article concluded that 'if the words 'Bedaux' and 'Stakhanov are transposed' in Campbell's article, 'it would perfectly express the Bedaux point of view'.⁸⁷

Two important things related to the CP and Bedaux happened in 1938. Firstly, having quietly left the CP and been caught as an NKVD agent at the Woolwich Arsenal, Percy Glading was given six years' penal servitude. Coming at an awkward time for the party, this led to the CP suppressing Glading within their own history, including, it seems, his exposés of the Bedaux B.⁸⁸ Secondly, in its continuing bid to appeal to the centre-left and to make Stakhanovism seem distinctive, the CP's critique of Bedaux softened.⁸⁹ Revising his 1927 volume *Wages*, Maurice Dobb described the Bedaux system in a way which foreshadowed why it became so widely used in the war and afterwards. To the Dobb of 1938, Bedaux had been foreshadowed by the Taylor Differential Piece Rate and PBS but offered a new, and potentially dangerous, way of standardising the outputs of workers. As opposed to most piece-rate and bonus systems, which had great troubles in 'adjustment of rates between different jobs in the same factory'

The advantage which the Bedaux System claims for itself over other bonus systems is that it provides a method of assessing both the bonus-rate and the standard output between various jobs so as to prevent dissatisfaction from arising as to the different rates of earnings of workers on different jobs.

Dobb also noted that the system was more complicated than its equivalents, and that

Since the calculation of the B-units is done by technical experts sent down by the Bedaux company, the fixing of the standard, and hence the amount of bonus, is less susceptible of any form of collective bargaining than under ordinary bonus systems.

Dobb was not opposed to payment-by-results on principle. He argued that the Ford system of fixed wage work in which the pace of work was controlled by a machine conveyor, demonstrated that the worker was simply there to 'merely attach certain screws and bolts as a continuous travelling carriage passes them'. In contrast, payment-by-results could

⁸⁷ 'Bedaux', *Shelf Appeal* (April 1938), p.8.

⁸⁸ Despite being a founding member of the CP, and Harry Pollitt's best man at his wedding in 1925, Glading does not feature in its first history. See Tom Bell, *The British Communist Party: A Short History* (London: Lawrence and Wishart, 1937). Glading briefly featured as a name on a committee in the CP's later official account: Noreen Branson, *History of the Communist Party of Great Britain, 1927-1941* (London: Lawrence and Wishart, 1985).

⁸⁹ See also the discussion of Stakhanovism in Soviet science in J.D. Bernal, *The Social Function of Science* (London: George Routledge & Co., 1939), pp.224, 443-8.

mean that the worker had retained some control over the pace of work.

Where trade unions are strong enough to impose safe-guards against abuses such as rate-cutting or excessive 'speed-up' opposition to it often disappears; and it is a familiar fact that in the socialised industry of the USSR systems of payment by results are widely in use.⁹⁰

All of these features of later 1930s CP policy changed considerably with the somersault in the CP's attitudes to war production in summer 1941. This is examined next.

6.6. The CP and the war

The CP were in a quandary when war was declared on Germany on 3 September 1939. They were aware that many of their members were monitored by MI5 and the police, and were at risk of being jailed as potential factory saboteurs and Soviet spies.⁹¹ CP critiques of British industrial production shifted in three ways. Firstly, its critiques of the British armaments speed-up intensified. Resurrecting an argument from the prior war, J.B.S. Haldane argued that Morrison and Bevin's recent amendments of the 1937 Factory Acts (examined in chapter 5), aimed at increasing working hours in the name of increasing industrial production, would actually slow down munitions output.⁹² Secondly, the CP contended that war procurement methods, particularly cost-plus (also examined in chapter 5), actively produced managerial inefficiency and that war was therefore leading to war profiteering instead of increased war production.⁹³ Thirdly, after Labour entered the wartime coalition in May 1940, the CP's critiques were coupled with a refreshed attack on the TUC, Ernest Bevin, and the Labour Party for promoting 'Fascist', unscientific work

⁹⁰ Maurice Dobb, *Wages* (Cambridge: CUP, 1938), pp.60-77. Unsurprisingly, the 1927 edition of the book does not feature Bedaux. The 1946 edition's interpretation of Bedaux is identical to that of the 1938 edition.

⁹¹ MI5 and the police were keeping lists of active CP engineers in many factories. See NA, MEPO, 38/54. Fishman, *British Communist Party*, p.285 quotes Orwell to note that the CP did not sabotage British production, despite their logic compelling them to do so.

⁹² J.B.S. Haldane, 'Fatigue and the War Worker' *Daily Worker*, 18 June 1943. For more robust responses from the scientific left on working hours and conditions, see Anonymous, *Science in War* (London: Penguin, 1940) and J.B.S. Haldane, *Science in Peace and War* (London: Scientific Book Club, 1941).

⁹³ Mick Jenkins, *Prelude to Better Days* (unpublished typescript, undated), p.228 remarked that 'individual capitalists were on a good thing when the Government introduced the "cost plus" system. This gave manufacturers a percentage profit on the total cost of their product. This system was wide open to abuse, for the greater the costs of production, the greater the profits.'

organisation methods which could never be effective in a decisively non-fascist Britain.⁹⁴

Moreover, the CP used the issue of alleged industrial inefficiency to criticise British capitalism more generally. They praised high outputs per worker in the industries of other countries, especially in the Soviet Union, the United States and, ironically, Nazi Germany.⁹⁵ Stalin's chief economist, Eugene Varga, argued that British capitalists had not kept pace in inventing machines, had an unproductive workforce, and that state capitalism would have emerged even if not for the war: 'the economic difference between peacetime capitalism and wartime capitalism steadily disappear'.⁹⁶

This stance changed radically after the German invasion of the USSR in June 1941. Historians have examined the CP's contribution to the subsequent British production drive, particularly through the *New Propellor*, the Joint Production Committees (JPCs) and Engineering and Allied Trades Shop Stewards' National Council (E&ATSSNC).⁹⁷ They have noted that both Stakhanovism and scientific management emerged in CP discourse in the months after the German invasion of the USSR, and some have argued that this was the same hypocritical embrace of Taylor's scientific management which had already taken place in the Soviet Union.⁹⁸ It was not: in reality, the CP's adoption of the language of the original scientific management movement reflected a new continuity-based explanation of events stemming from, and increasingly propagated by, British manufacturers embarrassed by the publicised connection formed between Bedaux, Taylor, and Nazism four years prior.⁹⁹

⁹⁴ Harry Pollitt, *The War and the Workshop* (London: Communist Party of Great Britain, 1940).

⁹⁵ Moscow correspondent, 'Soviet Unions Increase Production' *Daily Worker*, 27 June 1940.

⁹⁶ Eugene Varga, 'Changes to Capitalism During the War' *Labour Monthly* Vol. 23, No. 7 (July, 1941), pp.312-7.

⁹⁷ Geoff Brown, *Sabotage: A Study in Industrial Conflict* (Bristol: Spokesman Books, 1977), chapter 13; Croucher, *Engineers at War*, chapters 2-5; Branson, *History of the Communist Party of Great Britain*, chapter 24; James Hinton, *Shop Floor Citizens: Engineering Democracy in 1940s Britain* (Aldershot: Edward Elgar, 1994), chapters 2-7; Noreen Branson, *History of the Communist Party in Britain, 1941-1951* (London: Lawrence and Wishart, 1997), chapters 1-9.

⁹⁸ 'Two Hundred per cent. Movement', *World News and Views* Vol. 2, No. 42 (18 October 1941), p.661; Edward Hyde recalled in *I Believed: The Autobiography of a Former British Communist* (London: Reprint Society, 1950), p.162 that after 1941, the CP 'had our heroes of labour, our Stakhanovites whom we built up in every way possible'.

⁹⁹ While, in retrospect, the CP's adoption of this argument connected the CP to a later, mechanistic version of Taylor, it made wartime sense. After all, in 1941 Taylor was a relatively obscure and almost politically neutral historical figure, whereas the Bedaux name was contemporaneously linked to Nazi Germany. It was only in the postwar years, that historians would pick up on the CP promotion of both Taylor and Stakhanov, and, noting the apparent irony, not question whether it was a matter of more deliberate tactics

The CP came out in favour of production, welfare, and collective bargaining practices they had opposed for years. Attempting to decouple themselves from the taint of the Molotov-Ribbentrop pact but promote a British production surge, the CP were, in reality, promoting work measurement. But they had to root it in a pre-Bedaux Leninist heritage and language, which also served to disentangle the CP from the criminal conviction of the CP's most prescient Bedaux critic, and convicted NKVD spy, Percy Glading. Thus in a literally Stalinist re-writing of both history and current events, Glading, Bedaux and the Bedaux system evaporated from the CP's discourse and were replaced with the transnational proletarian hero Stakhanov, a relatively neutral Frederick Taylor and an equally neutral scientific management.¹⁰⁰

21 to 28 September was designated by Beaverbrook and the MOS as 'Tanks for Russia' week, a move which received great support from the CP and the JPCs. Their new patriotic stance won them much support, except perhaps from the TUC, and the CP's membership tripled to around 56,000; its largest ever.¹⁰¹ However, the CP's new Bedaux-Stakhanovism was noticed by the CP's opponents on the ultra-left.¹⁰² The response from Britain's anarchists was that

The stakhanovists method is not something new. Ford and Taylor had long before defined means by which the workers would produce the maximum work in the minimum time. Their methods were of course despised and hated by the working people all over the world. When a few years ago the Duke of Windsor wanted to visit an American factory in company with Bedaux, the workers threatened to go on strike if he came with a man who had refined the methods of exploitation of the workers.¹⁰³

Another anarchist commentator argued that the CP had become the 'recognised

than they gave it credit for.

¹⁰⁰ A superb example of this is Jack Owen, *War in the Workshops* (London: Lawrence and Wishart, 1942), chapter 6, which is brazenly entitled 'The Principles of Scientific Management', and promotes the work of F.W. Taylor and Frank Gilbreth. See Brown, *Sabotage*, pp.282-6 for additional examples.

¹⁰¹ Andrew Thorpe, 'The Membership of the Communist Party of Great Britain' *The Historical Journal* Vol. 43, No. 3 (2000), p.781. For comments on the unlikely alliance between the JPCs and Beaverbrook, see Hinton, *Shop Floor Citizens*, pp.76-7.

¹⁰² As they were later by British Trotskyists. See Robert Black, *Stalinism in Britain* (London: New Park Publications, 1970), pp.168-175.

¹⁰³ M.L.B., 'Stakhanovism and the British Workers' *War Commentary* (March, 1942), p.59. It is important to note that Taylor and Ford were referred to in the past tense, whereas Bedaux was considered recent history. It is also intriguing to note that the anarchists seemed reluctant to appear anti-monarchist. See also T.B., 'Stakhanovitis: A New Industrial Disease' *War Commentary* (October, 1942), pp.62-6.

consultants of engineering management'.¹⁰⁴ The Revolutionary Communist Party called for workers to 'BE ON YOUR GUARD: Clear Out the Bosses' Agents!'.¹⁰⁵ The CP's response was that these were the words of defeatism, Trotskyism, Nazi collusion, and sabotage.¹⁰⁶

The CP critique of British industrial capitalism also changed in this period, in two main ways. Firstly, in a bid to make its own pro-production efforts seem particularly insightful and successful, CP members exaggerated how inefficient British industrial production had been in the 1930s and earlier 1940s, and indeed still was. As the EL noted of the CP's shift in argument:

In the Left publications the workers are warned that some employers and managements will try to sabotage production because they dislike our alliance with the Soviet Union. Most of the press reports of workers in aircraft factories protesting against lack of work and inefficiency of the managements come from shop stewards and other Left elements in the factories concerned. Some of these criticism may or may not be justified. There are, no doubt, works in which there is slackness on the part of the management, and better organisation necessary. But in examining the statements published in the press and in Communist journals - such as the "New Propellor" - we must not overlook the fact that these complaints come from sources more or less hostile to the employing class, and that, therefore, defects in organisation will be exaggerated.¹⁰⁷

Secondly, the CP critique of 'cost plus' became intense, arguing that contractors and managers were actively incentivised to boost costs by making production inefficient and by extending working hours. Moreover, all three consuming Ministries placed their own orders, sometimes from the same contractors, which could be solved by a directing Ministry of Production. This needed, the CP argued, superior planning from the top down and consultation with the workers on the factory floor. Therefore, the CP asserted

In order to prevent not only profiteering, but gross waste of labour and materials, much closer inspection, supervision and careful costing is needed. One check on costs should be the existence of at any rate some Government factories, which can serve as a yardstick in measuring the cost of each new type of equipment, and also to encourage technical costing by engineers, which is practiced to some extent by the Admiralty.¹⁰⁸

¹⁰⁴ Quoted in Brown, *Sabotage*, p.282.

¹⁰⁵ Workers' International League, *Factory Workers!* (undated)

¹⁰⁶ See W. Wainwright, *Clear Out Hitler's Agents!* (London: Communist Party of Great Britain, 1942) and J.R. Campbell, 'Trotskyist Saboteurs' *Daily Worker*, 10 April 1944.

¹⁰⁷ Economic League, *An Investigation into Subversive Movements* (August 1941), p.1, NA, HO 45/25476.

¹⁰⁸ 'What's Holding Up Production?', *Labour Research* Vol. 30, No. 8 (August 1941), p.115-6. For a more theoretical explication as to the problems of the 'cost plus' system, see Maurice Dobb, *Production Front!* (London: Labour Monthly, c.1942), pp.12-13. See also Maurice Edelman, *Production for Victory, not Profit!* (London: Victor Gollancz, 1941), who, although not a CP member, had a very similar critique of 'cost plus' procurement to the CP and Varga.

The reference to the Admiralty was presumably a reference to the TCB, examined in chapter 5. However, the CP did not just call on the government to improve production, and to cut out waste, but also sought to directly contribute by means of the JPCs.

6.7. The CP, manufacturers and the ROF JPCs

Churchill's establishment of the JPCs, which had been mooted by Bevin and McGowan of ICI against the advice of both employers' federations and the unions was important in the wartime control and direction of manpower.¹⁰⁹ Kipping was set to work out the relationship between the JPCs and the Regional Boards of Production.¹¹⁰ Bevin brought Lloyd Roberts of ICI into the Ministry of Labour to establish and run joint negotiations machinery. Agreements were reached between national unions in engineering, shipbuilding and the ROFs in February 1942.¹¹¹ Soon, there were forty ROF JPCs, covering 260,000 employees of a total of 3.5 million workers working in JPCs.¹¹²

Jack Tanner, President of the AEU, and a CP fellow-traveller, was particularly important in pushing for JPCs to be formed at the ROFs. Eddie Frow later recalled that Tanner had petitioned the MOS to form JPCs, and although rejected, was contacted by the Director General of Ordnance Factories (Sir Charles McLaren) three days later.¹¹³ After negotiations, ROF Whitley committees were established, the purpose of which was 'to consult and advise on matters relating to production and increased efficiency'. 'For the first time, the Engineering Employers conceded the principle to the trade unions, of consultative rights on matters relating to the planning and organisation of production'.¹¹⁴ The AEU also commissioned a report which revealed that one in five JPCs went beyond

¹⁰⁹ Hinton, *Shop Floor Citizens*, p.75.

¹¹⁰ Hinton, *Shop Floor Citizens*, p.90.

¹¹¹ As Fishman, *British Communist Party*, p.301 notes that some JPCs predated these legal agreements.

¹¹² ILO, *British Joint Production Machinery* (Montreal: ILO, 1944), pp.88-9. There were also yard committees which covered 95% of private shipyards, covering 200,000 workers, production committees in the five Royal Dockyards, the Admiralty and Air Ministry. There were also 1,100 pit production committees. Many site committees had been set up at the Ministry of Works.

¹¹³ McLaren can be seen in a *Warwork News* story with Ruby Loftus and Dame Laura Knight inspecting Knight's famous painting *Ruby Loftus Screwing a Breech Ring* at the Royal Academy here: <http://www.youtube.com/watch?v=0PTtzGS0gmg>; accessed 18 June 2014.

¹¹⁴ Frow and Frow, *Engineering Struggles*, pp.178-180

the remit of increased efficiency and into piece rates and output bonuses.¹¹⁵

Clear overlap developed between the CP and manufacturers on JPCs. Both manufacturers and the CP demanded increased production, payment-by-results, and focused on Rowntree's new *Poverty and Progress* (1941) to argue for them.¹¹⁶ And both wanted to look as patriotic and anti-fascist as possible. Manufacturers spoke in favour of the ROF JPCs, arguing, perhaps truthfully, that they represented the natural extension of the Whitley committees they had been using at the own factories since the last war. Quoting the ROF JPC constitution, Clarence Northcott of Rowntree's, examined in chapter 4, stressed that the JPCs 'become the leaders in the new situation' of 'industrial democracy', whereby the 'dominant if not autocratic' manager would be replaced by 'one who is sympathetic, but firm and unprejudiced'. 'Only one man can give an order, though others may advise him before he gives it, may lend much help in enforcing it, or even in punishing infringements of it'. Moreover, 'The Measurement of Success' was important:

The committees must in reality improve production and increase efficiency. Greater output per hour must be obtained, machines must yield more, costs must go down. These are the ordinary business yard-sticks of success, for which there is no adequate substitute. But the growth of a better spirit is quite as important a result, but the absence of the co-operative attitude is an effective detriment to increased efficiency.¹¹⁷

Questions were also raised in the House of Commons by Geoffrey Mander (whose works and *work units* were examined in chapter 4). Stressing that the JPCs were similar to works councils at some enlightened factories, Mander stated that Britain had much to learn from the Soviet Union, as

They have certainly developed a type of democracy in industry, whereas too often here democracy stops at the factory wall. In my view it ought to be brought inside. I believe that these joint production committees can be, and should be, a valuable permanent part of our industrial life, worked out in our own thoroughly British way.

Garro-Jones, Lyttleton's Parliamentary Secretary, responded that since the Ministry of Supply had signed a JPC agreement with the ROFs and six large trade unions, and a

¹¹⁵ Angus Calder, *The People's War: Britain, 1939-45* (2nd edition, London: Panther Books, 1971), pp.459-461

¹¹⁶ Kuczynski and Heinemann, *British Workers in the War*, p.31 quoted Rowntree on the wages 'necessary for physical efficiency'.

¹¹⁷ C.H. Northcott, 'Joint Production Committees: Their Place in Modern Industrial Management' *Labour Management* (June 1942), pp.83-84.

similar arrangement with the engineering trade unions. He then quoted Seebohm Rowntree's argument that 'greatest single cause of waste in industry is lack of co-operation between management and workers'.¹¹⁸

In strikingly similar language to some manufacturers, *World News and Views* spoke out in favour of the ROF JPCs:

The [ROF JPC] constitution provides for cooperation between management and workers to improve production and efficiency. The workers' side must be trade unionists and are elected by a ballot of the workers. This will obviously mean that the shop stewards, already the democratically elected representatives and leaders in the workshops, will be the natural choice.¹¹⁹

The history of the JPCs in the ROFs, including how they engaged with the extensive work measurement scheme in place there needs further research, particularly as by the end of the war, all ROFs had a JPC, and unlike the engineering JPCs, they all lasted into peacetime.¹²⁰

6.8. The CP, work measurement, and the engineering JPCs

Simultaneous to the establishment of the ROF JPCs, similar deals were struck between the trade unions and the private engineering sector. By December 1943 there were 4,169 JPCs in private engineering firms, covering 2,724,000 workpeople, and the CP and AEU were particularly important in pushing for the introduction of wage incentive programmes via the JPCs. Maurice Dobb argued that while peacetime pay incentives often led to rate-cutting, the JPCs offered protection against this and encouraged higher production. He cited

An example of a Glasgow firm of the effect on production of a guarantee of piece-work prices ... an urgent order, required for the Soviet Union, was discussed by the men, and after the shop stewards had received a guarantee of no rate-cutting from the management, the production of ten units, usually a week's work, was carried through in ten days.¹²¹

The 9,000-strong strike at Vickers Armstrong in Barrow in autumn 1943 was telling. As a

¹¹⁸ Hansard HC Debate, 3 August 1944, cc.1720-1721.

¹¹⁹ A Shop Steward, 'Production Committees' *World News and Views*, 28 February 1942.

¹²⁰ Inman, *Labour*, pp.376-392 recorded that the NFFs were so large that JPCs could not function without a tier of Whitley committees beneath them.

¹²¹ Maurice Dobb, *Production Front: What Can Be Done?* (London: Labour Monthly, c.1942), p.17

response to the Barrow AEU District Committee's refusal to call off the strike, the CP controlled AEU executive dismissed the entire District Committee and reinstated only those who were willing to call off the strike.¹²² This, however, was only part of the picture. Important also was AEU National Organiser and CP Political Bureau and Central Committee member George Crane. Crane had previously boasted in CP meetings about how he had successfully led a strike against the 'the speed up system' in the Armstrong factory at Coventry. He was the key figure in negotiating the replacement of its antiquated PBS with the new 326 Award bonus plan during the war.¹²³

Oxford communist Arthur Exell later recalled that while his CP branch had opposed bonus systems throughout the 1930s, when it came to his JPC discussing how to increase war production, 'payment by result caused quite a controversy, but it was found that P.B.R. had come to stay, and was an incentive to production, and [it was] pointed out how the Stakhanov ideas were in it'.¹²⁴ Moreover, the AEU successfully pushed, in August 1942, for the introduction of the Bedaux system at ICI's Billingham plant.¹²⁵

Both at the time and since, the CP held up the JPC at Fairey as an exemplar as the CP's role in the JPC there.¹²⁶ The production committee movement

has been recognised in particular by Sir Stafford Cripps, who has consulted with a number of production committees and shop stewards since becoming Minister of Aircraft Production. Recently, following complaints by shop stewards, the Ministry removed the managements of two big London aircraft companies, and at one of them (Fairey's) is keeping in regular touch with the workers' representatives to see that the situation improves.¹²⁷

As seen in chapter 5, the wartime CP and Cripps narratives missed out an important

¹²² Croucher, *Engineers at War*, pp.218-228; Fishman, *British Communist Party*, p.316.

¹²³ Frows, *Engineering Struggles*, pp.189-193. See Fishman, *British Communist Party*, p.316 for some of the politics here. See also Branson, *History of the Communist Party of Great Britain* for comments on Crane's importance in the CP. The information on Crane's CP position is from Roger Hollis to A. Canning, 'Composition of the Communist Party', 7 July 1940, NA, MEPO 38/54. As examined in chapter 2, the Vickers PBS had of course trumped Taylor's efforts at the US Navy Shipyards many years prior.

¹²⁴ Arthur Exell, 'Memoirs of the Shop Stewards Committee' (undated), OHC, MSS 12/2. Exell recalled that 'management were preparing the way for piecework' and 'the Bonus system went [into use] and we were timed on each job, which meant men were working faster than ever, and greed crept in'. Moreover, as women became more essential to war production work throughout 1942, the CP started reporting specifically on high-producing female factory workers.

¹²⁵ Faraday, *Work Study*, pp.16-17. For a study of the very similar shift in standpoint by the CPUSA and the United Electrical, Radio and Machine Workers of America, see Ronald W. Schatz, *The Electrical Workers: A History of Labor at General Electric and Westinghouse, 1923-60* (Urbana and Chicago: University of Illinois Press), chapter 6.

¹²⁶ Fishman, *British Communist Party*, pp.293-4.

¹²⁷ Kuczynski and Heinemann, *British Workers and the War*, p.53.

component of MAP's interventions at Fairey: UOP consultants. But what happened on the factory floor at Fairey, and how did the CP and JPC stimulate workers to engage with the goal of higher production? A CP memoir and other sources reveal much. Prior to 1942, there had been complaints at Fairey about poor production levels from managers and workers, particularly after the CP put its weight behind the production drive. A communist shop steward at Fairey's, Mick Jenkins, recalled that in the early war years at Fairey's there had been great inefficiencies. Fluctuating MAP orders had caused Fairey to switch back and forth between producing a variety of machines, which resulted in low output. 'Whilst nobody was against increased production, it was hard to find anybody for increased production'.¹²⁸

Unsurprisingly, 'This situation changed with Hitler's attack on the Soviet Union'. However, he remembered, much of workers' time at Fairey's was spent avoiding doing work due a faulty work incentive system. It was the JPC's job to fix it:

Many [skilled craftsmen] were the workers who spent most of the day avoiding the chargehands and not doing a stroke of work. The rate-fixing system was responsible for this. The worker had to save as much time as he possibly could in doing the job and from the amount of time saved, he got half as bonus at the basic rate and the time he took doing the job was paid for at the bonus rate, with all the plussages. Many workers were able to complete their jobs in a fraction of the time they had booked, and still have 100 or 150 percent bonus. To have clocked off the job when they had finished would have meant 200 or 300 per cent bonus. That would have resulted in the re-timing of the job and having to work continuously to earn average bonus.

(In April 1942 a worker was caught by the rate-fixer working on one job while he was actually clocked on another.) The rate fixer seized upon the incident to slash the time of the job. There were rows, heated scenes, threats to strike by the men in the department and the original time was finally restored!

The management did not like such earnings, neither did the workers. But many of the workers who 'looked after No. 1' would spend time doing nothing rather than give up the very privileged position they had made for themselves.

Small strikes took place continuously. Of course such a situation and atmosphere could not be changed overnight. As a matter of fact, one of our problems in the new period, was to stop these strikes from taking place or to bring them to an end as quickly as possible, when they did take place. Considering that previously we had been ardent supporters of all actions defending the standards of the workers, our position was not at all easy.¹²⁹

¹²⁸ Jenkins, *Prelude*, pp.214-6.

¹²⁹ Jenkins, *Prelude*, pp.214-5. Jenkins noted on p.202 that he sent to Fairey's Heaton Chapel works for

The JPC called for, and succeeded in achieving, increased work and time discipline, ending waste and absenteeism, equal pay for women, and 'settling all timing disputes so that 100 percent effort would be made, for the training of labour, especially of the girls and women'.¹³⁰

Jenkins recalled that 1942 was a particularly bad year for production at Fairey's. After calling various public meetings, coordinating with other shop stewards in Manchester, and setting up a production committee, the Fairey shop stewards sent a deputation to the House of Commons on 25 February 1942 to meet with Ellis Smith, the Labour MP for Stoke who, as examined earlier in this chapter, had questioned Bevin in the Commons about Bedaux the prior year. They also held additional meetings with other MPs, the E&ATSSNC, and officials at MAP. Responding to their appeals, Colonel Llewellyn visited Fairey on 6 March 1942 and, after consulting with the JPCs and workers, 'made a firm promise that an investigation would take place'. Jenkins noted that production rose noticeably from then on, as 'the effect of the campaigns, the deputations, also the visit of Colonel Llewellyn [sic] was salutary [sic]'.¹³¹ An investigation did take place: as seen in chapter 5, a key result of the JPC's engagement with MAP was for MAP to hire UOP to overhaul production at both Fairey plants. As also seen in chapter 5, the hitherto unidentified Fairey experience during the war signalled the dynamics of the many of the postwar Labour government's industrial interventions in miniature. The next section examines those negotiations and policies.

6.9. Postwar convergence of the CP, manufacturers, and Labour

Soon after Bedaux's death in February 1944, the CP were quick to denounce the 'slaver Bedaux' who had 'made millions from speed-up'. The CP continued their pre-war line that Bedaux was 'pro-Fascist' but completely reversed their argument as to how Bedaux had

training, then moved to the Errwood Park Works to begin work.

¹³⁰ Jenkins, *Prelude*, p.216. Jenkins also complained about the 'grasping' employers and MAP's cost plus procurement practices, both of which he said reduced production efficiency and encouraged war profiteering.

¹³¹ Jenkins, *Prelude*, p.219.

been received and applied in Britain. Whereas the prior CP narrative was that, due to distinctive features of Britain's capitalists and trade unions, Britain in the 1930s was particularly vulnerable to Bedaux, by 1944, the CP line was that these organisations had actually protected British workers from Bedaux throughout the 1930s:

resistance by the unions in Britain prevented the system from expanding, but it had great vogue in American and European factories in which trade unionism was weak. From treating the worker as a cog in the machine to becoming an agent for Fascism was evidently, for Bedaux, only a short step.¹³²

The *Daily Worker* also pointed out that Bedaux had advised the 'Nazi authorities' about 'oil refineries in the Persian Gulf, with which his company had association'. However, the *B* itself had been absorbed into more general claims about the *speed up*. Moreover, the notion that the Bedaux system was intrinsically fascist, and thus had always been alien to a union-rich democracy like Britain, was convenient. Between 1937 and 1944 the Bedaux and other systems of work measurement had expanded very considerably in Britain but, as examined in chapter 3, Charles E. Bedaux was demonised at the same time. If the Bedaux system was mentioned, it was in reference to the early 1930s, specifically the strikes at Wolsey and Richard Johnson and Nephew.¹³³

The CP's approach to the array of industrial efficiency and work measurement specialists had changed considerably since their adversarial stance in the 1930s and early 1940s, and linked well with Labour's, even if the latter refused formal affiliation. As Frow, a CP activist put it

When VE Day came on May 8, 1945, Engineering workers could justly take part in celebrating the defeat of Fascism. They were determined to secure improvements in wages and working conditions and the active shop stewards were prepared to achieve that objective.¹³⁴

The fact that the CP had converged on near-identical policies as Labour about increasing industrial productivity and wages was not lost on the CP's opponents on the left.¹³⁵

¹³² J.R. Campbell, "'Slaver' Bedaux Made Millions from Speed-Up' *Daily Worker*, 21 February 1944. *Labour Research* stressed that 'this system has gone into the background of late'. See 'Bedaux', *Labour Research* (July, 1944), p.100.

¹³³ For the former, see Northcott, *Personnel Management*, pp.137-8. For the latter, see Mick Jenkins, 'Time and Motion Strike: Manchester 1934-7' *Our History* Vol. 60 (Autumn 1974).

¹³⁴ Frow and Frow, *Engineering Struggles*, p.198.

¹³⁵ Black, *Stalinism in Britain*, pp.209-211

Moreover, as examined in chapter 5, the CP's arguments, and Labour's had, also converged with those long held by British manufacturers, particularly Seebohm Rowntree.

The CP developed a new historical narrative which fitted this shift to the right.¹³⁶ Margot Heinemann's arguments in 1947's *Wages* bore no resemblance to Glading's critique of Bedaux fifteen years prior. Instead, Heinemann cemented the interwar position on high wages with the CP's wartime stance, also explicitly praised collective bargaining¹³⁷ What did she say about wages, work measurement, and worker efficiency? Heinemann abandoned the CP's wartime discourse of Lenin and Taylor. But she still needed a way of addressing these issues and could not discuss Bedaux either. To achieve this, Heinemann performed an about-turn: she adopted the same standpoint as Trotsky in *The Revolution Betrayed* (1936), and reached through Lenin into Marx's *Das Kapital* (1867).

Heinemann agreed with Marx that the main problem with piecework was that it was designed not to increase output but to reduce labour costs through rate-cutting. As such, a careful check had to be in place between workers and managers to ensure rates would not be cut. She attacked the 'so-called "scientific" wage scheme' which results in

people 'selling' wage systems based on time study [who claimed] that they provide a 'scientific' method of rate-fixing in place of the chance to-and-fro of collective bargaining.

Heinemann continued that 'the determination of wages, involving the division of the product between the worker and the capitalist, whether it is done with or without a stop watch, is not a scientific process at all'. 'Clearly time-and-motion study is not the simple panacea for all the evils of industrial relations, in general, and wage relations in particular, that is sometimes claimed.' Heinemann then evoked the British wartime experience and indicated that it had, in fact, created very similar conditions to those in the USSR:

Genuine group-bonus systems, based on the output of a department or factory, can

¹³⁶ M. Heinemann and N.J. Klugmann, 'Britain's Economic Strategy' *The Modern Quarterly* Vol. 2, No. 2 (Spring 1947), pp.137-154 argued that prior to the war, British industry had only been self-sustaining due to capitalist connections and goodwill, and that 'production per man-hour in British industry just before the war is estimated at little over one-third of that in U.S.A.'

¹³⁷ She praised Northcott of Rowntree's recent publications on the importance of collective bargaining to the payment process. As seen in chapters 4 and 5, Northcott had recently retired as Labour Manager at the Rowntree Cocoa Works at York, and was President of the Institute of Personnel Management from 1941-3.

be combined with individual bonus systems. Their development is, perhaps, the best way to strengthen the work of joint production committees and create a better basis of support for it among the workers. As we shall see, they are widely used in the USSR.¹³⁸

Others in the CP quietly redirected their prior arguments to Marx in a similar fashion.

Eschewing his 1920s argument that the USSR had been a hotbed of scientific management, by 1948 Maurice Dobb argued that the USSR's extensive embrace of bonuses and wage incentive systems was inspired by Lenin's interpretation of Marx's

Critique of the Gotha Programme. It also predated Stakhanov:

Following Stalin's Six Point speech of 1931, the sphere of payment by results was further extended, until by the later '30s something approaching three quarters of all workers were being paid according to some variation of this system.

While repudiating the notion that Stakhanovism had its roots in Taylor and scientific management, he at least implied that the Taylor-Stakhanov comparison was the most appropriate:

When the Stakhanov movement began to develop, it was commonly discounted abroad as a propaganda-facade; while some dismissed it as being simply Taylorism in Russian clothes ... The methods used in the main introduced no new principle, and it is true that few of them will surprise students of American Scientific Management ... What was novel about it was that it represented a movement to rationalise working methods that arose from the initiative of the individual workers themselves; and as such its achievements came as a definite surprise to the management of industry. What in other countries has generally been devised by functional foremen and efficiency engineers, often in the teeth of relentless hostility from ordinary workers, was now being initiated by workers themselves.¹³⁹

Again, the CP and influential manufacturers converged on the alleged Taylorist roots of the postwar Stakhanovites, although for different reasons. Urwick and Brech's *The Making of*

¹³⁸ Margot Heinemann, *Wages Front* (London: Lawrence and Wishart, 1947), pp.117-124. A thorough study of this phenomenon across Western Europe, the USA and the USSR could be examined. For Hungary, see Miklós Haraszti, 'I Have Heard the Iron Cry' *New Left Review* I, Vol. 91 (May-June 1975), which noted 'an old Communist who now holds a prominent position recalled in glowing terms a comrade who, before the War, had organized workers' demonstrations against the Bedeaux (sic) system, the "scientific" method of payment by results of those days. I looked up statistics and learned that the majority of [Hungarian] industrial workers are on piece-work. I also found out—though this is common knowledge—that only workers are allowed to enjoy this chemically pure form of socialist wage-labour; their superiors have to be content with more backward forms.' Georg Schlesinger, who had fled the Third Reich in the 1930s, remarked in *The Factory*, p.67 that 'even in Communist Russia' where 'Stakhanoff' 'is called the "Russian Taylor"' individual and group efficiency systems like Bedaux were used 'as in all the capitalist countries of the world'.

¹³⁹ Maurice Dobb, *Soviet Economic Development Since 1917* (London: Routledge & Kegan Paul, 1948), pp.424-9. He also became a keen supporter of Seeböhm Rowntree's poverty studies, and argued that payment by results systems based on 'what are called "time and motion" studies' required careful monitoring by trade unions to prevent rate cutting. See Maurice Dobb, *Wages* (London: Nisbet & Co., 1946), chapters 2-3.

Scientific Management series (examined in chapter 7) focused the debate on scientific management specifically, and remarked that "Stakhanovism", of which so much has been heard in the U.S.S.R. is in fact no more than a variation of F.W. Taylor's philosophy'.¹⁴⁰

As explored in this chapter, in the two decades since the founding of the first Bedaux company in Britain, examined in chapters 2 and 3, the debate had moved from whether to use work measurement at all, to the finer details of its operation, training requirements, promotion, and regulation by the British state. Moreover, as seen in chapter 4, work measurement based on the *B* was implemented on a substantial scale, in firms like Rowntree's where historians have claimed other, more general, interventions were made. As examined in chapter 5, historians of these issues related to the Bedaux system and Taylorism on the British factory floor, have also not taken into account the importance of World War Two in facilitating the substantial and permanent expansion of work measurement on the British factory floor. This chapter has provided symmetry to these analyses by exploring how workers, trade unionists and industrial activists responded to the substantial spread of work measurement, including the Bedaux *B*, in British manufacturing from 1920-48.

¹⁴⁰ Urwick and Brech, *The Making of Scientific Management II*, p.104 repeated Urwick's 1937 argument that Stakhanovism was just an extension of F.W. Taylor.

Chapter 7.

Conclusion

7.1. Thesis summary

Using source materials from public and private archives, private collections, and a varied body of published contemporary materials such as books, newspapers and pamphlets, this thesis has examined the growth of work measurement in British industry from 1914-48. As outlined in chapter 1 the thesis explored the history of an largely unknown unit of work measurement and its formulation, implementation and use in British industry. The remainder of chapter 1 conducted a review of the relevant historiography, and presented the methods used in the research leading up to the presentation of this thesis.

Following an examination of the often-used term *Taylorism*, chapter 2 showed that a previously unexamined aspect of the work of F.W. Taylor, the use of *unit-times* for labour measurement, was actually the most influential part of his work, although my study shows that few practitioners noticed Taylor's emphasis, including in Britain. It examined the formalisation of Taylor's *unit-times* into the Bedaux *B*, a standard unit of work output at the core of work measurement. It then examined the business of the early US Bedaux consultancies in the 1920s.

Chapter 3 provided a biographical account of the tumultuous life of Charles E. Bedaux, and the growing consultancy sector in Britain in the 1920s and 30s, in terms of Bedaux Britain Ltd. and its offshoots. It also demonstrated that Bedaux's apparently pro-fascist allegiances in November 1937 and February 1944 led to management practitioners and consultants distance themselves from Bedaux and the Bedaux name.

The next chapter examined Seebohm Rowntree and the circle around him, including Lyndall Urwick, Clarence Northcott and Oliver Sheldon at the interwar Rowntree Cocoa Works at York. It explored how, in contrast to several claims in the historiography on the Cocoa Works and the Rowntree circle, Rowntree and York was a key nexus in the growth of *B*-based work measurement in interwar Britain. The chapter therefore explored the implementation and expansion of the Rowntree *Mark* work measurement unit, derived

from the Bedaux *B* in 1921 and implemented at the Cocoa Works in 1923. It showed that the Rowntree *Mark* system actually predated the Bedaux company's arrival in Britain, and that, like the Bedaux system, its operations required extensive negotiations, elaborate bureaucracy, and positive industrial relations structures to operate smoothly. The chapter examined the extension of the *Mark* system, without the need for time study, to repetitive tasks such as typing and calculating in Rowntree's clerical operations. It then examined the employment of the Bedaux company by Mander's Paints and the internalisation and anonymisation of the *B*-derived *work-units* system at Mander's, which involved detailed negotiations with senior TGWU officials. Like at Rowntree's, work measurement was then extended to Mander's offices, although using the time study in this case. In addition, in order to evaluate UOP's industrial practices and to differentiate them from the broader term *Taylorism*, a case study of UOP's implementation of the UOP *Point* system at MSF from 1936 to 1938, an revealed that the *Point* operated in a near identical fashion to the *B*.

In order to challenge claims by Kreis and Littler on the distinctive importance of the Bedaux system specifically in the interwar period, and Whitston and Carew more generally on Taylorism in the 1950s and 1960s, chapter 5 examined the massive expansion of work measurement, particularly the *B* system and others derived from it, during World War Two. Using the examples of the Ministry of Supply, it examined how private manufacturing firms such as ICI and Joseph Lyons acted as consultancies which conducted work measurement and also trained additional practitioners in these techniques. It then explored how at MAP, the TCB was evolved to provide, in effect, a state work measurement consultancy which intervened in private contractors to ensure prices for procurement were fair. MAP's employment of AIC and UOP consultants to provide superior inventory control in firms where work measurement was already being used was considered, particularly with a case study of Fairey Aviation. The chapter then examined how work measurement was absorbed into the postwar Labour government's industrial policy in order to increase industrial productivity and wages. Finally, work measurement was permanently endorsed by the British state with the foundation of the British Institute of Management in 1948.

Chapter 6 examined the labour movement's response to work measurement,

particularly the Bedaux system and its *B*. As explored, mainstream trade unions and senior trade unionists, including the Ernest Bevin, Walter Citrine, the TGWU and the TUC, accommodated themselves to work measurement systems, particularly Bedaux, at a variety of firms in the early 1930s. In contrast, the CP were singular in both their insightful critique of the Bedaux *B* and 'kindred systems', and their strident, albeit largely unsuccessful, attack on them. The chapter explored how, when, and why the CP abandoned this critique, partly due to the imprisonment of this critique's author, Percy Glading, but more so because of the CP switched to support work measurement from summer 1941 onwards. It argued that by 1948, there was a convergence of British support for work measurement by the CP, the Labour Party, the trade unions, the TUC, private manufacturers, and some nationalised industries.

7.2. Unit-times, the *B*, BS 3138, and work measurement in postwar Britain

In 1959, the Department of Scientific and Industrial Research (DSIR) and Medical Research Council (MRC) co-published an extensive report on work incentives in a number of British factories. The report noted the ubiquity of time studies in British manufacturing, and how they were an integral part of work measurement. It stressed that compared to the older method of rate-fixing, which made operators work faster with no agreed comparative standard, these more sophisticated methods of 'Work Measurement' claimed 'to avoid such arbitrary values by its more "objective" measurement'. The report noted of work measurement that the 'results were expressed in terms of a standard unit, formerly termed the "B" but now variously called the Normal Minute (N.M.), Allowed Minute (A.T.), or Work Unit (W.U.).' In line with similar contemporary research, the report observed that around one-third of British industrial operators were paid by results in some form.¹

These extensive surveys revealed three types of payment-by-result wage incentive methods in contemporary British industry: straight piecework, 'wage incentive schemes based on the Bedaux system of work measurement' and, in one exceptional case, a novel

¹ Sylvia Shimmin, *Payment By Results: A Psychological Investigation* (London: Staples Press, 1959), pp.1-21. International Labour Organization, *Payment By Results* (Geneva: ILO, 1951), p.55 reported a figure of 38% for Britain in 1949. S. Wyatt and R. Marriott, *A Study of Attitudes to Factory Work* (London: HMSO, 1956), a report for the Medical Research Council, recorded similar figures.

group payment system based on the Bedaux method.² Despite work measurement's prevalence in postwar Britain, specific knowledge about the importance of the Bedaux system's B was confined to a small number of specialists.³ Even then, work measurement specialists were sometimes unfamiliar with the Bedaux name: Ray Scott, then a time study apprentice at Crosse and Blackwell, later recalled that older workers would complain about the 'bloody Bedaux system!', although he did not know what this meant.⁴ As the Scott's recollections indicate, many such specialists did not know work measurement's true origins, or the significance of the work measurement units on which it was based. Most simply mentioned time study, work study, or F.W. Taylor.⁵

1959 was also significant to the work study profession, and the engineering community more broadly. Writing a few years later, the former Bedaux consultant W.A. Smyth, argued that British Standard (BS) 100 Performance, defined by the British Standards Institution as BS 3138 in 1959, was based on the Bedaux 80 *B*-hour, the *B unit* was 'what we now call the "Standard Minute"', and the 'Points system' was 'in fact, pure Bedaux'.⁶ Despite this prevalence, Smyth observed that 'modern text books have little to say of him [Bedaux], indeed many do not mention him at all'. But he emphasised, as several former work measurement consultants have also recently done, that Bedaux had actually been more influential in shaping 'the field of work measurement, and particularly, of time study' than Taylor had.⁷ He also pointed out that

A great number of men trained in Bedaux methods in the thirties and forties are today occupying senior executive positions in British industry. These men no longer use Bedaux's name but they are unlikely to forget the principles of industrial measurement and control which they learned and applied when they worked for him

2 The report also noted that 'the amount of research on incentive payment schemes is scant in comparison with the volume of beliefs, opinions and unsubstantiated claims regarding their strength and weakness.' See Shimmin, *Payment by Results*, p.1. Many similar technical publications could be cited. For example, Michael Avery, *Time Study Incentives and Budgetary Control* (London: Business Publications, 1964), p.7 noted that 'Since Bedaux, various groups of people have formed themselves into consulting organizations and have adapted the B unit in one way or another without interfering with its basic concept until today we have the Standard Hour, containing the sixty Standard Minutes - the work unit commonly employed in this country and America.'

3 For example, see Russell M. Currie, *Work Study* (London: Pitman, 1960), which was reprinted multiple times in the 1960s and 70s.

4 Interview with Ray Scott, 31 July 2013.

5 International Labour Organization, *Introduction to Work Study* (Geneva: ILO, 1962) was a ringing endorsement of ICI's work measurement system.

6 Cyril Hardwick, *Time Study in Treason: Charles E. Bedaux, Patriot or Collaborator* (Chelmsford: Peter Horsnell, c1992), p.92 also noted that the British Standard 100 rating was based on Bedaux.

7 Brech, *Productivity in Perspective*, p.598. Kenneth Hopper and William Hopper, *The Puritan Gift: Triumph, Collapse and Revival of an American Dream* (London and New York: IB Tauris, 2009), p.79. Kenneth Hopper was an AIC consultant in the postwar period.

and his successors.⁸

Smyth was correct that some Bedaux men had climbed high in British business echelons. One long-standing Bedaux consultant, Alan Wilson, headed the Management Consultants Association (MCA). Described by *Topic* in 1962 as 'Britain's top management man', Wilson also headed AIC, the successor to British Bedaux Ltd. With 450 consultants, AIC was the largest management consultancy in Europe.⁹ Manufacturing firms were important here too. Another former Bedaux man, Percy Standring, had recently retired as a Managing Director of British chemicals titan ICI.¹⁰ Standring was just the tip of the iceberg: ICI contained hundreds of staff who had been using Bedaux for decades, some of whom were also key consultants to the government.

Not all who built substantial portions of their careers on the Bedaux system had worked directly for the Bedaux company. As examined in chapter 4, some were competitors. The so-called 'Father of British Management', Seebohm Rowntree, had used a system derived from the Bedaux system at his Cocoa Works at York for many years.¹¹ Rowntree's protégé, Lyndall Urwick, nicknamed 'Mr Efficiency' by the *Daily Express*, was one of Europe's best-known management writers, and had founded the second largest management consultancy in Europe.¹² Like AIC, Urwick's consultancy, Urwick, Orr & Partners (UOP), owed its fortunes to implementing a variant of Bedaux system, the *Point* system, in factories and offices. In this a sense, therefore, Braverman's assertion that the 'successors to Taylor are to be found in engineering and work design, and in top management' was partially accurate, although Braverman paid minimal attention to consultants; a key focus of this thesis. In addition, Taylor's successors were knowingly using practices derived from the *B* but most did not make the earlier connection to Taylor's *unit-times*.

Despite the large-scale use of work measurement in postwar Britain, its origins, terminology, and historical trajectory had become confused. For example, 1959 also saw a

8 W.A. Smyth 'Bedaux - the Man and his Work' *Work Study* (October, 1966), p.7. As he noted in his article, Smyth had spent a week with Mr and Mrs Bedaux in Baghdad in 1938.

9 'The McKinsey Report' *Topic*, 1 September 1962, p.36.

10 Reader, *Imperial Chemicals Industries*, p.504, lists P.K. Standring as a full-time Director of ICI from September 1952 to March 1957.

11 The term belongs to Lyndall Urwick, 'The Father of British Management' *The Manager* Vol. 30, No. 2 (February, 1962), pp.42-3.

12 For the quote, see Brech, Thomson, and Wilson, *Lyndall Urwick*, p.2.

particularly powerful critique of the 'time and motion study'; one which resonated with many members of the public. That year marked the release of *I'm All Right Jack*, a hugely popular comedy film in which a national strike was caused by a single time study of box-loading by a consultant at a private factory. Historians of British film who discuss *I'm All Right Jack* usually note the film's mocking depiction of the communist shop steward, Fred Kite.¹³ However, it should be noted that it was not actually the time study but the book of 'science fiction' data derived from the new time study which, in the film, led to British industrial deadlock.

7.3. The memory of Charles E. Bedaux in postwar Britain and the United States

Following his demonisation between 1937 and 1944, examined in chapter 3, Charles E. Bedaux was largely forgotten from the historical record, except in relation to the Duke of Windsor, where he was a convenient scapegoat for the Duke's meeting with Hitler. This was in contrast to the 1930s, when Bedaux's name was well-known to many audiences as a figure of current business importance, while Taylor was a historical figure. It was of course Bedaux, not Taylor or Ford, that Charlie Chaplin had satirised in *Modern Times* (1936), and, also that year, the Taylor Society was renamed as the more general Society for the Advancement of Management.

Even details of the Bedaux system like the *B* were sometimes better known than specifics about Taylor's career. For example, in 1940, *Fortune* referred to Taylor as the originator of the 'motion and time studies' at the root of the 'large spawn of incentive formulas', 'the most famous [of which] is the Bedaux system', based on its 'basic task measuring unit, the "B"'.¹⁴ The 'Bedaux belt' also featured, without further explication, in George Orwell's 1940 essay *Inside the Whale*, alongside a list of other items and people, such as Hitler and Stalin, which Orwell saw as indicative of the dark side of the 1930s.¹⁵

Bedaux's wartime notoriety and well-publicised suicide meant that he would appear in the postwar history books very differently to Taylor, if at all. As seen in chapter 3, in 1945

¹³ For example, see C.J. Wrigley (ed.), *A History of British Industrial Relations, 1939-1979: Industrial Relations in a Declining Economy* (Elgar: Cheltenham, 1996).

¹⁴ 'Scientific Management' *Fortune*, February 1940.

¹⁵ George Orwell, *Inside the Whale and Other Essays* (London: Gollancz, 1940), p.142.

the *New Yorker* was dismissive of 'the Bedaux System [which] did not differ much from the old Frederick Winslow Taylor shop-management system of the nineties'.¹⁶ And by 1948, Bedaux's reputation had declined relative to the revival of the memory of Taylor and others from the original scientific management movement.¹⁷ That year, the technology analyst Siegfried Gideon suggested that the Bedaux system was even a retrograde step from Taylor's:

Is the success of Charles Bedaux, mainly in the 1930s, to be regarded as a further development of scientific management? Doubtless his 'close analysis and systematic observation of industrial operations were taken over from Taylor and especially from Gilbreth, but the main purpose was to establish more perfect wage systems ... with Bedaux, attention centers upon 'labour measurement', on the wage scale. It stands for a much earlier conception of business enterprise. The suspicion of espionage under which he came, and his inglorious end during the Second World War, show Bedaux's methods in an even more crudely materialistic light.¹⁸

In contrast, as Kreis has shown, in Britain Bedaux did not feature in the emergent literature on the recast *Scientific Management*, including the most influential, written by Lyndall Urwick and his young assistant E.F.L. Brech.¹⁹ This said, perhaps these authors had Bedaux and the *B* in mind when they referred to a 'gold-digger' mentality which 'thought that "Scientific Management" was something that a man called Taylor had "invented", analogous to a new piece of office machinery or an original method of calculating income tax'.²⁰ As examined in chapter 4, these remarks resembled similar comments from Urwick in the prior decade, although they would not quite classify Urwick as the 'rhapsodic historian of the scientific management movement' as Braverman later characterised him.²¹ What is clear, however, is that Tiratsoo and Tomlinson were correct when they observed that the reified *Scientific Management* of the 1940s was not the scientific management or Taylorism of the 1910s, nor the Taylorism of later social science.²² It may, however, have related in some way to the newer term 'management consultant'.²³

When Bedaux appeared in Daniel Bell's *Work and its Discontents* (1956), it was an

¹⁶ Janet Flanner, 'Annals of Collaboration: Equivalism I' *New Yorker*, 22 September 1945, pp.28-30.

¹⁷ For example, Liberty Ships named after Frederick W. Taylor, Frank Gilbreth, Harrington Emerson, and Henry Gantt were launched in 1943.

¹⁸ Siegfried Gideon, *Mechanization Takes Command* (New York: Oxford University Press, 1948), pp.114-5.

¹⁹ Kreis, 'Diffusion of an Idea', pp.292-3. See Lyndall Urwick and E.F.L. Brech, *The Making of Scientific Management* (3 volumes, London: Management Publications Trust, 1945-1949).

²⁰ Urwick & Brech, *Making* Vol. 1, p.20

²¹ Braverman, *Labor and Monopoly Capital*, p.68.

²² Tiratsoo and Tomlinson, *Industrial Efficiency and State Intervention*, pp.114, 143. *Scientific Management* was the title used for the substantive republication of Taylor's key works in 1947.

²³ For more on this discussion, see Ferguson, *Rise of Management Consulting*.

an extension of Taylor and Gilbreth, though Bell argued that 'during World War II, charges against Bedeaux [sic] of collaboration with Vichy, plus the bitter hostility of the unions to this method of mechanical wage calculations, brought the system into disuse' in the USA.²⁴ As examined in chapter 3, Bell was mistaken about the true nature of the Bedaux system, although it remains to be seen whether work measurement based on the *B* and similar *Unit Times* systems, as originally propounded by F.W. Taylor in *Shop Management* (1903) and *Concrete Costs* (1912), were still in use in postwar America. As explored throughout this thesis, particularly in chapters 5, 6, and this chapter, they certainly were being used in postwar Britain.

Much has since been written about Bedaux's involvement with the Third Reich in the 1930s and 1940s, as well as his 1934 Canadian adventure, although almost all of this material remains reliant on Flanner's 1945 account. As examined in chapter 3, over time, this has, in turn, amplified the demonised version of Bedaux's career even more than Flanner had.²⁵ For example, these problems were further compounded by a trilogy published by Martin Allen between 2000 and 2005.²⁶ Building on prior unsustainable conspiracy theories, Allen's version of events described how Bedaux's career as an 'efficiency expert' made him singularly placed to conduct industrial espionage on behalf of the Germans from 1917 onwards. By the time Hitler came to power in 1933

Bedaux was a devoted Nazi follower ... Bedaux and his efficiency system became very important in the 1930s for he was a key component in Hitler's economic miracle, and a major influence and designer of Germany's re-armament programme.²⁷

Allen's curious narrative and loose interpretation of primary and secondary material was

²⁴ Daniel Bell, *Work and Its Discontents* (Boston: Beacon Press, 1956), pp.8-9

²⁵ See Peter Allen, *The Crown and the Swastika: Hitler, Hess and the Duke of Windsor* (London: Robert Hale, 1983); Charles Higham, *Trading with the Enemy: An Exposé of the Nazi-American Money Plot, 1933-1949* (London: Robert Hale, 1983), Gwynne Thomas, *King Pawn or Black Knight?* (Edinburgh: Mainstream Publishing Company, 1995). Bedaux's only full biography, Jim Christy's *The Price of Power: A Biography of Charles Eugène Bedaux* (Toronto and New York: Doubleday, 1984), also suffered this problem.

²⁶ Martin Allen, *Hidden Agenda: How the Duke of Windsor Betrayed the Allies* (London: Macmillan, 2000); Martin Allen, *The Hitler/Hess Deception: British Intelligence's best-kept secret of the Second World War* (London: HarperCollins, 2003); Martin Allen, *Himmler's Secret War: the covert peace negotiations of Heinrich Himmler* (London: Robson, 2005). Allen's narrative generally followed that laid out by his father Peter Allen in *The Crown and the Swastika*.

²⁷ Allen, *Hidden Agenda*, pp.50, 63. The poet Tom Paulin praised Allen's book, as it 'paints a devastating picture of this truly evil royal who was a close friend of Charles Bedaux, a Nazi spy so dangerous that the FBI would appear to have bumped him off in 1944 (officially he committed suicide)'. See 'Pump up the volumes' *The Observer*, 26 November 2000. Allen's version of Bedaux featured in the *Daily Mail* as recently as April 2014. See <http://www.dailymail.co.uk/news/article-2597791/How-French-begged-Churchill-stop-Edward-Mrs-Simpson-collaborating-Nazis.html>; accessed 11 June 2014.

questioned soon after the publication of his volumes, but it was not until 2008 that it surfaced that Allen had cited 29 hitherto unused documents held in the NA, all of which were revealed to be recent forgeries.²⁸ Nevertheless, it is interesting to note that all three historical examinations of Bedaux's life published subsequent to the 2008 revelations have drawn on Allen's *Hidden Agenda* without noting this incident.²⁹

7.4. Further research

As argued throughout this thesis, Bedaux's influences, and by extension Taylor's *Unit Times* had a longer and broader influence than historians have realised. This said, in line with several studies of Taylor's life and work, with further research it may transpire that Taylor was not actually the true author of *Unit Times*. After all, as historians have shown, Taylor relied on much input from assistants and colleagues such as Morris L. Cooke, Carl Barth and Sanford E. Thompson for most of his projects. *Unit Times* may have been one such project, particularly as Thompson was Taylor's co-author on *Concrete Costs* and referred to *unit-times* at British management conferences well into the 1930s.³⁰ Related, while some biographical knowledge is known about Taylor's associate Henry L. Gantt, it appears that the history of the diffusion of his 'Gantt chart', still widely used in project management to this day, is still to be written.³¹ In addition, studies of the emergence and diffusion of other types of work organisation and incentive systems such as the Priestman

28 For a clear refutation of Allen's use of primary source material, see Ernst Haiger, 'Fiction, Facts, and Forgeries: the "Revelations" of Peter and Martin Allen about the History of the Second World War' *Journal of Intelligence History* Vol. 6 (2006), pp.105-117. For the 2008 forgeries story, see Ben Fenton, 'Lies And Secrets' *Financial Times*, 3 May 2008; 'The 29 Fakes Behind a Rewriting of History' *The Guardian*, 5 May 2008.

29 Charles Glass, *Americans In Paris: Life and Death under Nazi Occupation, 1940-44* (London: HarperPress, 2009), pp.439, 441, 445; Sol Bloomenkrantz, *Charles Bedaux - Deciphering an Enigma* (Bloomington: iUniverse, 2012); Adrian O'Sullivan, 'German Covert Initiatives and British Intelligence in Persia (Iran), 1939-1945' (PhD thesis, University of South Africa, 2012), pp.125, n.33, 129, n.44; See also Adrian O'Sullivan, *Nazi Secret Warfare in Occupied Persia (Iran): The Failure of the German Intelligence Services* (Basingstoke: Palgrave Macmillan, 2014).

30 See Sanford Thompson, 'Optimum Productivity in the Workshop' *British Management Review* (1938), pp.132-157. For Taylor's reliance on assistants such as Cooke, Barth, and Thompson, see Charles D. Wrege and Amedeo G. Perroni, 'Taylor's Pig-Tale: a Historical Analysis of Frederick W. Taylor's Pig-Iron Experiments.' *Academy of Management Journal* Vol. 17, No. 1 (1974), pp.6-27 and Charles D. Wrege and Anne Marie Stotka, 'Cooke Creates a Classic: The Story Behind F.W. Taylor's Principles of Scientific Management' *Academy of Management Review* Vol. 3, No. 4 (1978), pp.736-749. I thank John Hassard for pointing out the relevance of Barth, a mathematician and mechanical engineer, to this potential research. It is worth noting that the 1902 handwritten draft of *Shop Management*, held in the Taylor collection at the Stevens Institute and nearly identical in content to the 1903 ASME edition, is in Taylor's handwriting.

31 See Leon Pratt Alford, *Henry Laurence Gantt, Leader in Industry* (New York: Harper & Bros, 1934).

system could be conducted.³²

The fate of Bedaux's consultancies could be researched further. As France was Bedaux's second-largest market in Europe, a full study of Société Française Bedaux would probably be most fruitful. Also, as noted in Albert Ramond's memoirs, some of Bedaux's US consultancies appear to have survived the war intact, albeit with different names. Indeed, as examined in chapter 3, Ramond recalled that he had bought Fern Bedaux's shares in Bedaux International at a cost of \$50,000 in cash plus royalties, and that the consultancy, renamed Albert Ramond Associates, was very successful in the postwar period. It would be interesting to examine whether its consultancy's operations were similar to the 'Big Four' Bedaux offshoots in Britain. Similarly, Bedaux Holland survived the war, although I only managed to recover scattered information about this consultancy such as the fact that a key client was Phillips and that it lasted until the 1960s.³³ The operations of similar consultancies could also be productive. Although some historical knowledge about Charles E. Knoepfel, Suffern & Son, and Emerson Consulting has been accumulated over the past three decades, full studies of these consultancies and their engagement with Taylor's *unit-times*, particularly in Europe, could be researched and written.

Now that chapter 2 of this thesis has elucidated on the importance of Taylor's *unit-times*, and Bedaux's *B*, I hope that this will allow future researchers to explore the history of twentieth-century industry in Britain and elsewhere with a greater degree of accuracy than hitherto available. For example, the methods by which working hours were reduced and work simultaneously intensified at Boots of Nottingham during the great depression period remains unexplored.³⁴ Full studies of work organisation and measurement methods introduced at Unilever and Dunlop could be interesting, particularly as the latter was a corporate member of the Taylor Society, along with Rowntree and Cadbury, and both had

³² See Henry Atkinson, *Co-Operative Production: The Priestman-Atkinson System* (London: Ernest Benn, 1927).

³³ There are substantive holdings on Phillips and Bedaux in the IISG. In my interview with Jurrian te Gussinklo Ohmann on 7 September 2011, Ohmann recalled that Bedaux Holland closed quite soon after he joined in 1965.

³⁴ According to the appendix in Littler 'Bureaucratization of the Shop-Floor', Boots employed the Bedaux consultancy from May-July 1931. The results of the extensive experiments at Boots were published as Sir Richard Redmayne, *A Review of the Experimental Working of the Five Days Week by Boots Pure Drug Company at Nottingham* (Nottingham: Boots Pure Drug Co., 1934). For a study of Taylor, his allies and working hours in the USA, see Chris Nyland, 'Taylorism and Hours of Work' *Journal of Management History* Vol.1, No.2 (1995), pp.8-25.

subsidiaries overseas.³⁵ Related, the stance of other leading industrialists such as William Lever of Unilever and Eric Geddes of Dunlop, and additional trade unionists, towards work measurement could be examined. It also remains to be discovered whether manufacturers took the ILO's productivity advice and implemented ICI's *Standard Minute* work measurement system, derived from the Bedaux *B*, when establishing new factories in the third world throughout the 1950s and 1960s.³⁶

As examined in chapter 4, at some firms the application of work measurement on the factory floor was followed by implementation of similar processes on repetitive office tasks in the same plants, with or without the time study. The case studies of this dynamic examined in this thesis - Rowntree, Mander, Lucas - are brief, and more research could be conducted into additional examples. Due to its influence in work measurement elsewhere, ICI's offices could be particularly productive a topic. Additionally, in the Cambridge University Press case, examined briefly in chapter 5, it seems that a work measurement system was even installed on office tasks without the factory production work measurement phase being necessary. This topic is rendered more interesting by the prominent position which Braverman gave to Taylor's principal office management follower, W.H. Leffingwell, Managing Director of the Taylor Society and well-known to specialists in inter-war Britain, who, unlike Taylor, attracted little attention during the labour process debate.³⁷

7.5 Relevance to the present day

My thesis examiners requested that I include a section on the relevance of this thesis to the present day, and I am happy to oblige. Indeed, this study remains relevant in several ways. In 2014, work measurement, formally codified by BS 3138, is still in daily use in Britain, rarely remarked upon, and its rich and controversial history unrealised. Despite the

³⁵See Sir Ronald Stores, *Dunlop in War and Peace* (London: Hutchinson & Co., c.1947).

³⁶ ILO, *Introduction to Work Study*, pp.196, 280-1, 345-6. The volume was written as part of the ILO's productivity missions to Asia, Africa and the Middle East, and was reprinted and distributed many times throughout the 1950s and 1960s.

³⁷ Braverman, *Labor and Monopoly Capital*, chapter 15. Given that Braverman was head of the *Monthly Review Press*, it would be interesting to examine his own firm's clerical operations. For Braverman's career, see Bryan Palmer, 'Before Braverman: Harry Frankel and the American Workers' Movement' *Monthly Review* (January 1999), pp.33-46.

decline of manual work to be measured in many workplaces, work measurement is still used in settling equal pay for equal work disputes by determining, via job evaluations, the ratio of two given different tasks that constitute equal work. This, as the Bedaux and other systems did, involves the arbitrary *rating* of work, the core function of BS 3138. For example, at the time of writing, 400 female operatives at the Walmart subsidiary Asda were launching an equal-pay-for-work-of-equal-value case against their employer on the basis that lower-paid female shelf-stackers seemingly perform the same work as male warehousing operatives. At present, job evaluations will be used to settle the case.³⁸

Related, the measurement and monitoring of operatives at work has received much recent attention due to the increased use of digital wearables, GPS and other facilities and logistical management technologies to streamline workplace layouts, enhance inventory control, and optimise workflows. The most discussed European example in recent years has been the digital analysis of operatives at Amazon fulfilment centres in Britain, the USA, Germany and elsewhere. The company, and the organisation of work there, were the topic of a controversial BBC *Panorama* investigation in November 2013, which a particularly focused on the digital tracking devices used to monitor and direct the 'pickers' who gather orders within Amazon's massive warehousing facilities. However, it should be stated that Amazon is just one example and similar equipment is used by many other firms in relation to scheduling, deliveries, inventory, and similar logistical matters.

In addition, the use of relatively new digital project management systems in offices such as PRINCE2®, SixSigma, Agile, Lean, and Kanban, each of which involves the detailed division of work tasks into standardised digital data, and their automatic reassembly into larger project structures, often explicitly named 'Gantt charts', frequently attract the term of *Taylorism*. One can find many comments on *Taylorism*, *digital Taylorism*, *neo-Taylorism*, and *New Taylorism* in reference to such present-day project management systems.³⁹ I do not wish to suggest that this work is being measured or costed using Taylor's *unit-times* or their derivatives (although it may be), but the

38 <http://www.bbc.co.uk/news/business-29753702>; accessed 24 October 2014.

39 'Digital Taylorism' is prominent in Phillip Brown, Hugh Lauder, and David Ashton, *The Global Auction: The Broken Promises of Education, Jobs, and Incomes* (New York, Oxford: OUP, 2011). During research for this doctorate I met outsourcing and project management professionals who, unbeknownst of my interest in the topic, stated that their job involves much 'Digital Taylorism'. One remarked, 'I do not care about the history of the system. I'm only interested in the system'.

mobilisation of language from older manufacturing practices is nonetheless interesting. Moreover, these discussions have emerged alongside much debate about 'Big Data' (the European Commission and the data industry jointly pledged €2.5 billion for big data projects in October 2014 alone), to which the terms *Taylorism* and a 'new era of Taylorization' have recently been attached.⁴⁰

⁴⁰ M.J. Mortenson et al., 'Operational research from Taylorism to Terabytes: A Research Agenda for the Analytics Age', *European Journal of Operational Research* Vol. 241, No. 3, (2014), 583-595.

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Ray Scott, 31 July 2013. Trained in 'time & motion study, incentive bonus schemes, job evaluation, production management', Crosse and Blackwell, 1954-64.

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