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Frederick Taylor 'invented' scientific management at the turn of the 20th century, and offices today are organised in his image. Designers, argues James Woudhuysen, should pay as much attention to Taylor's story as to that of the Bauhaus



'The analysis of a piece of work into its elements almost always reveals the fact that many of the conditions surrounding and accompanying work are defective. Knowledge so obtained leads frequently to constructive work of a higher order, to the standardization of tools and conditions, to the invention of superior methods and machines.'

Frederick Taylor, *The present state-of-the-art of industrial management*, 1912

This is a belated review of a little-known but vital book. Judith Merkle's *Management and Ideology* (University of California, 1980) is densely written, but revealing. It looks at the impact the American engineer Frederick Taylor (1856-1915) has had on the way industry is organised. It contains lessons for anybody interested in the production process, the design process and how the two interrelate.

These lessons are contemporary in nature. Society has changed a lot since Taylor's time; in particular, the organisation of industry has come to mean the organisation of offices as much as that of factories. However, Taylor's message is a durable one. His distinction was to show that what counted on the shop floor was not this or that machine, but a planned system of controlling the *complete production process*. This is a point just as relevant to today's information-handling work environments as it was to the metal-bashing halls of Taylor's era. It is not a question of which desk, chair or vdu is 'the answer', but of how all of these items relate, both to each other and to the human beings and services that surround them (*Design*, April 1983).

First and most obviously, *Management and Ideology* unveils the Taylorite framework behind much of American management practice. As Merkle shows, business schools like Harvard and Wharton were special targets for Taylor and his disciples, and owe much to him. So does Operational Research, the mathematical system of making decisions that grew up in the Second World War and is known in business as Management Science. So do the PERT and CPM systems of project management, as used in NASA missions and in the development of much other American rocketry besides. So does time and motion study, as adopted by companies such as RCA and General Electric; and so does modern cost accounting, as conducted by firms such as Du Pont. Even quality circles, devices which certain academics like to contrast to systems originated by Taylor, stand in his tradition. Formally speaking, quality circles are about the product of the production process, not the process itself: They are supposed to be job-enriching, not deskilling. They are organised by workers on the shop floor, not white-collar experts in Taylorism. But in one fundamental respect they directly resemble Taylor's methods: they are about the continual, collective and conscious redesign of the production process.

This leads to the second reason why *Management and Ideology* is significant. For designers in particular, it underlines the importance both of design for more efficient production and of ergonomics. True, Merkle makes little direct mention

of design and, astonishingly, none of ergonomics: but the implications to be drawn from her are clear.

'Production', which embraces not only industrial manufacture but also office life and housework, is something designers can and must make more efficient. Whether they are dealing with capital, contract or consumer goods, industrial designers have a duty to make those goods easier to work with. The same goes for interior, information and graphic designers. In turn, all this implies that designers must study user behaviour a lot more seriously than they have done to date.

How did Taylor come to have such influence? Between 1880 and 1900, he tried to sort out the production process at two US steel companies, Midvale and Bethlehem. At the Paris Exposition of 1900 he won international acclaim for his development of 'high speed' steel, a material which held its cutting edge while red hot and which therefore permitted machine speeds to be increased the world over. Then, in a series of books based on his experiments, Taylor spelt out a number of methods of raising productivity in manufacture.

You could speed machines up, in part by redesigning them. You could time work tasks, subdivide them, allocate most to unskilled labour and give every employee written work orders on how to do his job. You could prevent the labour process from being interrupted by unnecessary breakdowns. You could reorganise stocks and tools to speed access to them (especially in emergencies), devise tool designations which could be committed to memory, and improve tool design.

The most controversial of Taylor's methods were his incentives for piece work and his call for regular, timed rest periods. But Taylor had other proposals too. Better accounting of incentives, records and stocks was one; yet in Merkle's view the most important was that separate rooms be put aside for the specialists in scientific management who were to be charged with overseeing the productivity raising process.

This, Merkle argues, was Taylor's way of justifying his desire to create a new industrial middle class of white collar managers and neutral technocrats. Indeed creating such a class was, in Merkle's opinion, Taylor's chief goal, to the extent that he hoped that society's 'chiefs' might eventually grow so numerous as to eliminate its 'injun's'.

In the USA anarchic industrialisation had led to day wages, labour disorder and incompetent foremen, while (though Merkle does not mention it) immigration furnished America with large supplies of unskilled labour. By 1911, the year of 'efficiency fever' in the USA, Taylorism had arrived, even if it was more a synthesis of existing concepts than an entirely novel contribution. While an emerging force of middle class progressives hit the headlines by prosecuting Eastern Railroads for its high charges and outdated organisational habits, 'scientific management' was held up as the means to crush trade union syndicalism and so overtake the mighty engine of British industry once and for all.

Thus, for designers, Merkle serves as a warning – because she shows that attempts to raise the efficiency of production have always prompted political disputes. No matter how much they painted themselves as a new class of neutral, objective professionals, Taylor and his followers were always surrounded by both fame and notoriety. Designers would be foolish to imagine that their own efforts to raise productivity in factories and offices will meet with a different reception. A particular, productivity raising design may have a humanistic content, because it genuinely lightens a worker's load, but it may merely deskill the worker and extort more of his or her energies. Where the emphasis of a new design lies will always be a moot point.

Much of Taylor's success came down to his personality. An ingenious Yankee and a New England puritan, Taylor retired young on his high speed steel patents. From then on he proselytised with even more charisma than he had shown before. Hateful of alcohol and given to mineral water and midnight runs in the snow, Taylor built up a personal circle of technically minded, forward looking financiers, plus a group of lieutenants trained in polemics – both with outside critics and with each other. There was Henry Gantt, who used bar charts to plan output levels at Remington Typewriter and who mixed bonuses for supervisors with programmes for industrial democracy. There was Carl Barth, who interpreted Taylor's experiments with a slide rule so as to give lathe operators at Winchester Repeating Arms and Pullman Palace Car formulae with which to improve their performance. Finally there were the Gilbreths. Frank developed the 'motion' bit of time and motion study; Lillian applied scientific management to housework.

Together, Taylor's allies and his own forcefulness enabled him to have a lasting effect on management literature and habits. They also enabled him to move from being an upper middle class kid with an eccentric interest in rules and factories to being a millionaire with an accredited profession to his name. But Taylor made enemies. Though firms such as Yale, the lock manufacturers, profited by adopting Taylor's plans, most found their implementation a lengthy and very expensive affair. As for the labour movement, it despised Taylor.

Taylorism did not spread without difficulty. In Lloyd George's Britain, unlike the USA, inventors were held in low regard and no layer of ambitious engineers sprang up to give Taylorism the social clout it required. In France the backward and repressive nature of factory regimes ensured that Taylorism had a rough ride.

Nevertheless, Taylorism made enormous strides after the First World War, a period which saw it consolidated on an international scale. Vickers, Michelin and Mussolini all became converts. In 1918 French premier Georges Clemenceau circulated weapons factory chiefs with an instruction to study Taylor. Finally in 1925 French management theoretician Henri Fayol, long considered one of Taylor's principal opponents, came round to merging scientific management with the elitist doctrines he had laid down himself.

By this time Taylorism was a truly pervasive force. Surprisingly, Merkle devotes little attention to its effect on the production process in offices, or to its ascent in Japan. It is also sad that her treatment of Taylorism's subsequent evolution in the USA focuses more on the hold it gained over government and education than over industry; sad, too, that her description of its rise in the Soviet Union under Lenin (who had his criticisms of it) and Stalin (who did not), while extensive, tends to be superficial. But Merkle gives a compelling account of the imprint Taylor made on Germany, the country most impressed by the USSR's use of scientific management to accelerate industrialisation, and where Taylorism was later warped to run concentration camps more efficiently. As late as 1960-61 some of Germany's top industrialists were men who had spent the 1930s studying American factory rationalisation first-hand.

What are we to make of *Management and Ideology*? Despite its weaknesses – in particular the fact that it leaves the reader burning for more information on Taylorism since 1945 – Merkle's study is just as much essential reading to the designer as any book on William Morris or the Bauhaus. It suggests that the productivity-raising, politically-charged side of design is something we can expect to see a lot more of in years to come. Because her history of Taylorism is a very balanced one, Merkle confirms that it has flourished most in times of heightened international competition and war. Indeed it appears that Taylorism has been one of the main ways by which civilian production has been turned over to military standards of rigour and precision - something that is happening more and more these days. Nearly 70 years after his death, the ghost of Fred Taylor lives on.

'I asked permission to make a series of careful scientific experiments to find out how quickly various kinds of work ought to be done. These steps were taken in an earnest endeavour to correct one of the crying evils of the older system of management.'

Frederick Taylor, *Hearings to investigate the Taylor and other systems of Shop Management*, 1912