Recent Findings of Research in Economic & Social History

The extent to which the education system has contributed to the failings of the British economy has been the subject of continued controversy from the 1870s to the present day. In this stimulating article Michael Sanderson examines the evidence on the relationship between diminished industrial competitiveness and educational defects. He challenges the usual assumption that education bears some of the blame for Britain's relative decline, and concludes that wealth is created by businessmen not by teachers.

Education and the Economy, 1870-1939

Between 1870 and the present day Britain has declined relatively from being the world's leading industrial nation to sixteenth in economic performance. Throughout this time contemporaries and historians have placed the blame on defects of English education as a contributory cause of this deterioration. [1]

Cause for concern

The links between diminished industrial competitiveness and educational defects were seen at the Paris International Exhibition in 1867. The superiority of French textiles, fine art crafts and German steel armaments prompted the first of various factors seeking to draw education closer to the service of industry. First Parliament established a succession of official investigations into education and industry, by Bernhard Samuelson (1868), the Duke of Devonshire (1871-5) and Samuelson again (1884). These raised the public awareness of the importance of education in Britain's retaliation to increasing foreign competition from Germany and the USA.

Secondly the late Victorians' perception was that they were being overtaken by industrial competitors, manifest in the 'Made in Germany' and 'American Invasion' scares of the 1890s. This was exacerbated by the belief that Britain was passing through a Great Depression in the 1880s. Indeed the Royal Commission on the Great Depression devoted a whole volume to technical education. The nightmare of the dyestuffs industry lurked in the public mind; an industry invented in England, lost for lack of education in organic chemistry, seized by the invincible German chemists who turned it into an international monopoly.[2]

Thirdly, the foreign competition itself drew attention to the industrial education of competitor nations. In Germany British visitors found much to admire in the Trade Continuation Schools teaching crafts to teenagers, the Technical High Schools which were high level technological universities, and the world supremacy of German university organic chemistry. In France they saw the Grandes Écoles, engineering-based colleges superior to universities and educating the business, political and military elite of the Third Republic. Their artisan craftsmen were also better trained. The USA provided the exemplar of engineering education and management and business schools.

Fourth, a pressure group was formed to advance the cause of education and industry. Its members indefatigably publicised the cause. Most were academics (Lyon Playfair, Philip Magnus, T.H. Huxley, Henry Roscoe, Henry Armstrong). Many were also active politicians (Playfair, Magnus, Roscoe, Haldane, Samuelson, Aj. Mundella, Sydney Webb). Almost all were Germanophiles, having been students or educational investigators there. The National Association for the Promotion of Technical Education was a focus of their activities. For some of them this concern was enriched by the contemporary debate about free trade and protection. Free traders (like Playfair) argued that the only way for Britain to sustain its industrial economy with the free acceptance of imports was to match them with English goods of superior quality and value. Only education and training would pro - vide real protection. Conversely protectionists (like Philip Magnus) argued that although tariffs were necessary so too was education to prevent industry slackening, were the stimulus of competition to be removed. Germany and France were both highly protected economics laying great stress on education.

Fifth, two changing features of British industry placed a greater reliance on education. From the 1890s British firms started their own research in company laboratories. This now required not merely routine testers and lab boys but graduate chemists and engineers. At the

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other end there was a constant complaint about the 'decline of apprenticeship' as a consequence of the mechanisation of mass production industry. The firm in such circumstances had to look to the education system for graduates and technicians it could not train itself.

Finally the approach to the Great War and the War itself had powerfully stimulating effects. As admiration of Germany turned to hatred from the late 1890s so there was a concern in Britain for 'national efficiency' to match our deadliest economic and military rival. Not least, home industry had to free itself from its reliance on German experts, especially chemists, working in England. It led to a Germanisation of English education in the 1900s - the chartering of civic universities, the reorientating of secondary education, the creation of Imperial College and junior technical schools. The War itself led to a much closer involvement of the universities and industry in research in a whole range of products from drugs and explosives to glass and steel. Perhaps for the first time there was a wider appreciation of how important the universities were for the national economy.

**Educational change**

Under these various influences the English educational system was transformed to make it more relevant to industry in the late nineteenth century. The civic universities were established at Manchester (1851), Leeds (1874) as a direct response to the Paris Exhibition, Sheffield (1879), Liverpool (1881), Bristol (1876). These were supported by local businessmen and, like the German Technical Schools, were closely related to local industry in their teaching and research - Sheffield with steel, Leeds with dyeing, textiles and leather, Liverpool with shipping propulsion and food chemistry. Their numbers of students rose from 560 in 1861 to 14,042 by 1911 and six received their chartered independence between 1900 and 1909.

At a lower level Quintin Hogg started the Regent Street Polytechnic in 1882, providing technical and moral education for apprentices. The numbers of Polytechnics burgeoned to 8 by 1900. In 1880 the City and Guilds of London was established to channel livery company money into technical education as the Victorian equivalent of their earlier medieval concern about apprenticeship. They built splendid technical colleges at Finsbury Park (1881) and the Central Institution (1884), a notable engineering college which became the engineering faculty of Imperial College. Even more importantly they established a system of technical examinations from 1879. By 1904, 23,119 candidates were taking examinations in 73 different subjects in 467 centres. The major element in this growth was the creation of the municipal technical college by the Technical Instruction Act of 1889. This enabled towns to build and support technical colleges and 160 towns did so.

A most important change in this period was the reforms associated with Sir Robert Morant (the Permanent Secretary of the Board of Education) in the 1900s. Out of the chaos of the provision of elementary education was fashioned a tripartite system. Local Education Authorities were authorised to establish grammar schools under the 1902 Education Act. Central Schools with a commercial bias emerged and, most importantly, junior Technical Schools were established from 1905. Most children received merely an elementary education to the age of 13. But the possibility now existed for one or two per cent of working class children to reach grammar schools through scholarships. A quarter of the intake of grammar schools now came from elementary schools. This re-organisation of primary-secondary education made possible the tapping of potential talent for industry

<table>
<thead>
<tr>
<th>Year</th>
<th>University Students</th>
<th>Technical Education Students</th>
<th>Junior Technical Schools Students</th>
<th>Grant Aided Secondary Schools Students</th>
</tr>
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<tbody>
<tr>
<td>1871</td>
<td>5,560</td>
<td>38,015</td>
<td></td>
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<tr>
<td>1881</td>
<td>16,850</td>
<td>61,777</td>
<td></td>
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<tr>
<td>1891</td>
<td>16,013</td>
<td>148,498</td>
<td></td>
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</tr>
<tr>
<td>1901</td>
<td>17,839</td>
<td>285,444</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1911</td>
<td>26,414</td>
<td>767,121</td>
<td>2,906 (1913)</td>
<td>161,000</td>
</tr>
<tr>
<td>1921</td>
<td>30,591</td>
<td>1,400,600</td>
<td>12,256</td>
<td>362,000</td>
</tr>
<tr>
<td>1931</td>
<td>37,255</td>
<td>1,209,991</td>
<td>21,945</td>
<td>411,090</td>
</tr>
<tr>
<td>1938/9</td>
<td>56,000[4]</td>
<td>3,457 (1937)</td>
<td>30,457</td>
<td>470,100</td>
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<th>Refrences</th>
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<td>[b] Higher education (The Robbins Report) 1963, Cmnd2154, p.15</td>
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Based on figures given in:

from the ex-junior Technical School technician to the graduate scientist and manager.

**Defects and criticisms**

The developments outlined in the previous three paragraphs were all positive factors drawing education closer to industry. Yet other features, notably of the education of the upper classes, have been seen as sinister defects sapping our industrial performance. The public schools have been accused of contributing to the decline of the industrial spirit. Allegedly, they neglected science for the pursuit of the classics and athletics, projected snobbish gentlemanly, even gentry, values rather than those of the entrepreneur and industrialist. They also directed boys to the professions and public service in Church, politics and armed services rather than to business. After the 1860s and the Clarendon Commission many schools did start science teaching and did receive more businessmen's sons; 14 percent of the intake into Winchester were of this background. Reciprocally more public schoolboys did go into industry; 17 percent from Winchester, around a quarter from Clifton; Marlborough and Merchant Taylors in the 1900s. Yet the serious argument is not so much that the output was too low but that public school boys tended to go back to family firms characterised by conservative nepotism and lack of scientific expertise. Berghoff has argued that the supposed debilitating or other effects of the public schools have been exaggerated since only 18 percent of businessmen in three industrial cities were public school educated. [3]

The arguments against the public schools follow through to Oxford and Cambridge. The two ancient universities were quite different from each other. Oxford remained devoted to classics (136 of its 297 fellowships in 1900 were in this) and its attempts to introduce chemistry and physics before 1914 were a failure. Cambridge by contrast
had very successfully developed engineering, physics, industrial chemistry, and the economics of industry. Cambridge also traditionally took more businessmen's sons than Oxford did. Yet the paradox here was that the outputs of Oxford and Cambridge to industry were remarkably similar - around 15 percent by the 1900s. The implication of this was that employers cared little for the curricula of the universities; whether one was irrelevant for industry and the other appropriate. It suggests that those who recruited from Oxford were looking for generalist civil service qualities rather than either entrepreneurial or industrial-scientific expertise. These were not German, French or American attitudes and may have been dangerous.

**Educators and employers**

Why was education not more effective in its support of industry and what held it back? On the educator's side there was the tradition of liberal education; the belief that the purpose of education was to train the mind for its own sake, to produce the cultivated gentleman. The elevation of these values led to a devaluing of education for vocationalism and training in expertise for doing a job. Oxford and Cambridge espoused liberal education based on classics and mathematics because they were cheap, and maintained the financial independence of the colleges against their respective universities. The ancient universities exerted a curricular stranglehold over the public schools and locked an excessive reverence for liberal education on both.

There is also evidence that, whatever its qualities, English education simply did not produce enough in output. In 1910 there were 16,000 engineering students in German Technical High Schools but only 4,000 in British universities. At the same time there were 5,500 graduate chemists in German industry but only 1,500 in British industry.[4] There is less evidence of industries actually complaining of shortages of high managerial labour. But British firms in metal mining overseas would have employed more British graduates had they been available.

Whatever the defects of the suppliers of education there was also a resistance among employers, who were often accused of preferring 'rule of thumb' and a prejudice against the college trained man.[5] Various reasons may be adduced for this. First, there was the attitude that Britain had achieved its position as 'workshop of the world' up to 1870 with very little educational support. It would take a very acute contemporary observer to recognise whether or when the situation had changed. Secondly, the trade unions were quite hostile to technical education outside apprenticeship. Through apprenticeship they could control entry to skilled crafts and retain the wage differentials of the skilled man. The proliferation of college training would undermine that, as was the case in France. Employers may have paused before antagonising unionists over an issue about which many were indifferent. Thirdly, many employers were in any case quite content with existing apprenticeship and saw no need to supplement or replace it with training outside. Apprentices were cheap and highly controlled within the culture of the firm. Fourthly, it would have occurred to many industrialists that the leading figures behind the movement for technical education were academics and politicians rather than businessmen. The last were relatively few and the claims of technical education may have appeared a 'producers' ramp of vested interests. Fifthly, it was not at all self evident that there was any clear connection between the enthusiasms of certain industries for formal education and their economic success. The cotton industry, our chief export, had little reliance on education for the skill formation of its workforce. Shipbuilding, our most competitively invulnerable industry, relied more on inhouse apprenticeship. Yet the steel industry, though excellently served by Sheffield University, had other

Sanderson, Refresh 17 (Autumn 1993)
These were intended to take pupils from the age of 13 for a technically orientated curriculum in engineering, building or specialised crafts like the needle trades. They were admirable schools but, due to high costs, difficulties of selection and the age of entry, their expansion - to 230 schools and 29,000 pupils, a tiny 2.6 percent of schoolboys - was limited. An opportunity was thrown away from which industry would undoubtedly have benefitted. This was the more deplorable as apprenticeship continued to decline. Robert Fitzgerald notes that in 1925 of 1573 engineering firms only 26 employed an apprentice master. As apprenticeship declined neither state sponsored secondary technical education nor company based training took its place.[6] Thirdly, the major reorganisation of the school system in the 1920s and 1930s also neglected the needs of industry. The Spens Report of 1926 called for ‘secondary education for all’, that all children should pass from elementary schools to some form of secondary school. Yet, in spite of this ideal, 43 percent of II -17 year olds were still in elementary schools by 1937. The chief beneficiaries of the Spens reorganisation were the grammar schools whose pupil numbers rose from 165,570 in 1911/12 to 466,245 by 1937. Hadow (a musician and poetry anthologist) had little interest in technical schools and his reforms gave an academic bias to secondary education. The opportunity to give it an industrial bias with ample Day Continuation Schools and junior Technical Schools provision was missed. The Spens Report of 1938 deplored this but it was too late to effect change.

Fourth, the university sector remained tiny and grew only sluggishly from 40 to 50,000 students i.e. from 1.5 to 1.7 percent of an age group. This was lower than western European, German and US levels. Moreover, in the 1920s and 1930s, only 10 to 13 percent of university students were in technology.

Counter arguments

The usual assumption is that education has borne some culpability for Britain’s relative decline as art of some ‘British disease’. Yet counter arguments are advanced. First, whereas English education undoubtedly was defective between 1870 and 1890, these defects are often assumed to persist through to 1914 and beyond. Yet the changes of the 1890s and 1900s had created quite a good system of education for an industrial society by the 1900s. The period 1870-1914 is not homogenous. Secondly there has been much recent literature ‘redeeming’ Britain’s industrial performance and that of its entrepreneurs. This being so, Stephen Nicholas pertinently asks, if there is no problem why seek an explanation for it? The absolution of the industrial performance also absolves the education system serving it. Moreover Nicholas reminds us that creating systems of technical education entails high costs. Under the British system firms bore much of the cost and passed it on by receiving apprenticeship premiums and paying low wages. To have had considerable state intervention in technical education would have transferred resources from taxpayer to student and denied the state other forms of investment. Nor does he regard the increase in higher skilled manpower that might have resulted as necessary, ‘there is little evidence that more trained engineers would have provided benefits offsetting the greater costs of training and forgone opportunities ... the system worked: it supplied the numbers.[7] Thirdly, Sidney Pollard - in the fullest discussion of this subject - dismisses simplistic complaints of backwardness. Writing from a German as well as an English perspective he praises English physics, Britain's scientific adaptability in the Great War, claims that Britain remained in the forefront of a 'whole gamut of science-based industries' from power engineering to special steels to communications electronics. Only in organic chemistry does he find that education had let industry down, otherwise the science education sector proved to be extremely flexible and capable of expansion.[8]

Conclusion

Wealth is created by businessmen not by teachers. When businessmen fail in their task they like to attribute the blame to the education system. This tradition dates back to the aftermath of the Paris Exhibition of 1867 and is very prevalent now. Education and historians need not always to accept this passed buck as readily as it is offered.

References


