

PRESIDENTIAL ADDRESS

‘What is technology?’: education through museums in the mid-nineteenth century

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I have been honoured by Her Majesty with the first presentation to a chair which is new to this University, and new to the other Universities of the country. The title of the Chair, also, is as novel as its creation, and the term ‘Technology’, by which it is distinguished, is so unfamiliar to English ears, and so inexpressive to English minds, that I must, at the very outset, explain what the branch of knowledge is which I am called upon to profess.¹

These are the opening words of the inaugural address, entitled ‘What is Technology?’, of George Wilson, delivered at the University of Edinburgh on 7 November 1855. Wilson had just been appointed Regius Professor of Technology. Earlier in the same year he had been made Director of the newly created Industrial Museum of Scotland. Up to that time, Wilson had operated as a zealous and popular private lecturer in chemistry, at the fringes of university teaching. He was particularly interested in the applications of his subject and, in achieving these two posts, he at last found himself in an influential position to establish educational programmes based on chemical processes and the industrial arts. My Presidential Address, appropriately delivered in the Science Museum, one of the major museums of its kind, will be concerned with the establishment of science museums in Great Britain in the middle of the nineteenth century. These were intended by the government to provide the public with a means of education and instruction in the industrial arts following the 1851 Great Exhibition. I shall be concentrating very largely on the personal vision of George Wilson in Edinburgh and how he set about attaining it. As we shall see, the Science Museum itself had a hesitant, uncertain start: the idealism of Edinburgh’s Industrial Museum was lacking. But after Wilson’s death in 1859, the innovative role of the Edinburgh Museum, perhaps symbolized by the change of name from Industrial Museum of Scotland to Edinburgh Museum of Science and Art in 1861, lapsed. I shall suggest reasons for this.

The role of science museums has rarely been well defined, in contrast to the objectives of, for example, museums of antiquities, decorative arts or natural history. For most of this century, debates about the function of science museums have continued. But Wilson’s initial vision of the museum was particularly clearly focused, and he frequently wrote and

* Director, British Museum, London.

1 George Wilson, *What is Technology? An Inaugural Lecture. Delivered in the University of Edinburgh on November 7, 1855*, Edinburgh and London, 1855, p. 3. Note that in using the term ‘English’, Wilson is not intending to differentiate the English from the Scots. He simply means those who use the English tongue.

spoke about it. In a lecture given in the Philosophical Institution in Edinburgh in 1856, he declared:

An Industrial Museum is intended to be a repository for all the objects of useful art, including the raw materials with which each art deals, the finished products into which it converts them, drawings and diagrams explanatory of the processes through which it puts those materials, models or examples of the machinery with which it prepares and fashions them, and the tools which specially belong to it, as a particular craft. Such a museum should also include illustrations of the progress of each industrial art from age to age; of its dependence on the sister arts, and the extent to which it ministers to them; of its relation to the products of our own country, and to those of foreign lands; of the amount of wealth which it consumes, circulates and produces; of its healthfulness as a vocation for the different sexes and ages; of its relation to good morals, and the service which it can render the State by employing the needy, increasing the comforts of the poor, advancing the civilisation of all classes, adding to the material, intellectual, and moral prosperity of the whole nation, and, through it, more or less the entire world.²

As has been demonstrated in recent works, the first half of the nineteenth century in Britain was a period which offered a multiplicity of opportunity for non-formal education in the sciences and the arts.³ Lectures and shows of all kinds, from the incompetent and entertaining to the serious and the worthy, were pursued by a voracious public. Most were provided by freelance entrepreneurs whose interests were unashamedly pecuniary. But there were also the more seriously established institutions which were intent on providing systematic education. The fortunes of mechanics institutes fluctuated, but they existed everywhere. In Scotland there were numbers of private lecturers who made a living by supplementing courses provided by the universities. Government itself became involved directly in funding museums of a scientific and industrial nature. In 1837, the Museum of Practical Geology, to illustrate the geology of the British Isles and to show its practical benefits, had been established in London. Dublin had its counterpart from 1847, the Museum of Irish Industry, which treated industry as well as geology. It was in this environment of varied educational provision in science that George Wilson was brought up and to which he would contribute so enthusiastically.

George Wilson was born in Edinburgh in 1818, the son of a businessman whose family had originated in Argyll.⁴ His addiction to education started at an early age: at school in the session 1828/29, George and others established a 'Juvenile Society for the Advancement of Knowledge' which produced its own journal and ran its museum. He left the High School at the age of fourteen and entered the Royal Infirmary as an apprentice in the laboratory. Here he was to remain for four years, although he benefited from the easy access to university courses. In fact, a large proportion of those registered for lectures were not matriculated students, and only a small proportion of those went on to graduate.

Shortly after starting his apprenticeship, Wilson attended the University mathematical lectures of William Wallace and the extra-mural class in natural philosophy run by John Scott Russell for medical students. A year later, in November 1833, Wilson started to study

² George Wilson, *On the Objects of Technology and Industrial Museums. Two Lectures Addressed to the Philosophical Institution, Edinburgh, in February 1856*, Edinburgh and London, 1856, 13, 14.

³ See, for example, Ian Inkster and Jack Morrell (eds.) *Metropolis and Province: Science in British Culture 1780–1850*, London, 1983, and Richard Altick, *Shows of London*, Cambridge, Mass., 1978.

⁴ For much biographical detail, see Jessie Aitken Wilson, *Memoirs of George Wilson*, Edinburgh, London and Cambridge, 1860, *passim*.

chemistry with Thomas Charles Hope and anatomy with Alexander Monro *tertius*, both with the University, and anatomy with John Lizars, who was an extra-mural teacher and, incidentally, much more popular than the uninspired Monro who held the chair almost as of family right.

Though Wilson graduated as a surgeon in 1837, his heart was not in medicine. He referred to his medical studies as an 'irksome burden', seeing medicine as only 'a door of entrance to the prosecution of physical sciences'. Even more strongly, he wrote: 'my energies have been directed to the zealous study of the physical sciences, and, above all, chemistry, in which I hope to distinguish myself...my harassing connexion with the Infirmary has long since ceased'.⁵ Writing to a friend, Margaret Mackay of Glasgow later in the year, the romantic George wrote:

I am over head and ears in love, and the object of my attachment so thoroughly engrosses my thought, that I have scarce a speculation to give to anything else, and though I have wooed her steadfastly, she, with the coyness and fickleness of her sex, gives me but doubtful signs of a reciprocity of affection, and I feel that I make but small progress in her esteem.⁶

After several more sentences in this vein, the frustrated Miss Mackay will have discovered that George was writing not of his amorous feelings towards her, but about the 'Right noble Science of Chemistry'. George Wilson never married and, perhaps, no surprise.

Having completed his studies in surgery, Wilson now embarked on study to complete his MD, whilst working as the assistant to Robert Christison, professor of medical jurisprudence. This may seem strange, given his negative remarks about the subject. But it was necessary to attain his medical degree before he could be accepted as a qualified teacher of chemistry to medical students. 'I should be most miserable as a practitioner, for I am neither intellectually fitted for discerning the nice shades of disease... nor am I morally formed to grapple with the tremendous moral responsibility that in my eyes hangs over my profession' he wrote,⁷ while his sister had complained 'His small sleeping compartment at home was fitted up in every corner with bottles, flasks, retorts and such paraphernalia.'

By 1837, Wilson had already made a tentative start to establish himself as a private lecturer, demonstrating experiments to an audience of twenty. In that same year, a most significant friendship started. He, and a medical student from St Andrews, Lyon Playfair, joined a student society which had been founded by Edward Forbes, professor of natural history. This was the Oineromathic Brotherhood (the word being compounded from the Greek, *wine, love and learning*). Playfair's later influence was going to prove the greatest benefit to Wilson.

After graduation in 1838, George decided to visit his brother in London. There he visited the British Museum, where he gazed on the 'splendid fossils' and the 'huge crocodile-like monsters of the ancient deep'.⁸ And, again, significantly, he paid a call on Thomas Graham, Scottish born professor of chemistry at University College who had earlier taught at the Andersonian Institution in Glasgow. Just before Wilson was due to return to Edinburgh, Graham unexpectedly offered him a place in his laboratory as an unsalaried

5 *Ibid.*, 79, 81.

6 *Ibid.*, 99.

7 *Ibid.*, 141.

8 *Ibid.*, 161. The natural history collections were still housed at Bloomsbury when Wilson visited them.

assistant. This was too good to refuse and Wilson found that his fellow-assistants were Lyon Playfair and James Young, later to establish the shale oil industry in Scotland. Amongst the students in the laboratory was David Livingstone. This was truly a Scots corner of London.

As far as scientific instruction was concerned, the London scene was frenetic.⁹ At the top end of the market were University College and King's College, founded in the 1820s. Formal education was available at the Royal Institution, where in the 1830s Faraday was teaching, and there were other rather less prestigious institutions which based themselves on the Albermarle Street prototype. Lower down the social scale were the mechanics institutes: by 1830, there were thirteen active in London. Then there were the scientific shows which provided demonstrations: the most serious were the Adelaide Gallery, founded in 1832, and the Polytechnic Institution of 1838. These were among London's great attractions: although there is no account of Wilson attending these protoscience museums, it is difficult to believe that he was not lured to inspect them. He was introduced to Faraday and attended a course of lectures on electricity. His brother, Daniel Wilson, wrote of the experience 'subject and lecturer alike furnished a rich treat to the young chemist. Faraday delighted him in all ways; a self-made man, and yet with a manner so modest, and a bearing so kindly to the eager inquiring youth.'

Another institution which Wilson may well have visited was the Museum of Practical Geology. From 1845, Lyon Playfair was appointed chemist to the Geological Survey and the Museum and Playfair became a focus for further educational initiatives.¹⁰ 'To visit the school' Playfair wrote 'became a fashion among men of leisure', but he added 'The professors gave courses of lectures to working men in the evening, always attended to the full capacity of our lecture theatre.'¹¹

George Wilson made several efforts to join the London teaching scene. First he tried for the London Philosophical Institution but the Managers felt that there was already sufficient chemistry provision. He then followed a lead that a College for Civil Engineers was to be established at Putney. But this proved abortive. Daniel Wilson did discover a vacant position at a small medical school, but George turned it down because of the low income it would yield. Faraday could not help, saying that Britain, unlike every other civilized country, offered no help to young chemists.¹² Wilson made the best of a bad job, declaring 'The London students are notoriously the most unscientific students on the face of the earth' and determined to return to Edinburgh.¹³

Edinburgh, though in most ways not as developed as London, had established a not inconsiderable base of scientific teaching establishments.¹⁴ There was, of course, the University with its widely acknowledged reputation for science courses, developed in the eighteenth century largely as a result of the successful medical school. It was by no means

9 J. N. Hays, 'The London lecturing empire', in Inkster and Morrell, *op. cit.* (3), 91–119.

10 Robert Bud and Gerrylynn K. Roberts, *Science Versus Practice: Chemistry in Victorian Britain*, Manchester, 1984, 56, 88.

11 Wemyss Reid, *Memoirs and Correspondence of Lyon Playfair*, London, 1899, 93.

12 Wilson, *op. cit.* (4), 217.

13 *Ibid.*, 244.

14 Steven Shapin, "'Nibbling at the Tears of Science": Edinburgh and the diffusion of science in the 1830s', in Inkster and Morrell, *op. cit.* (3), 151–78.

unusual that artisans attended courses: the glass-maker Archibald Geddes had attended Joseph Black's chemical lectures in the 1770s. There were also special science lectures for lawyers: James Boswell was one who attended. In the 1820s Black's successor Thomas Charles Hope had held much sought after popular lectures, which were much appreciated by fashionable ladies. According to Henry Cockburn, the ladies declared 'that there was never anything so delightful as these chemical flirtations. The Doctor is in an absolute ecstasy with his audience of veils and feathers, and can't leave the Affinities.'

With the needs of working people more carefully considered, the School of Arts was established in 1821 for the scientific instruction of artisans. Three years later, the Watt School of Arts was founded on the model of the Andersonian Institution in Glasgow. Aiming at a rather different market was the Edinburgh Philosophical Association. Again Henry Cockburn defined its constituency:

It is a sort of popular unendowed college, where lectures are given to all, male or female...the lectures are on botany, geology, chemistry, astronomy, physiology, natural philosophy, phrenology, and education...It is a very useful establishment, giving respectable discourses very cheaply to a class of persons for whose scientific instruction and amusement there is no other provision...It is gratifying to see hundreds of clerks and shopkeepers, with their wives and daughters, nibbling at the teats of science.¹⁵

In addition to all this there was the complex network of extra-mural teaching.¹⁶ Competition between lecturers for students could be fierce. On occasion, groups of teachers who could offer a range of courses co-operated by forming colleges, though they seem to have been short-lived. The 'Argyle Square School of Medicine' was established by 1838/39 and other geographical concentrations could be found in Surgeon's Square and Brown Square. By 1841 these may have coalesced to form the 'Queen's College', whose class list boasts twelve science teachers (Wilson amongst them) together with five teachers of languages.¹⁷

It was quite usual for lecturers to teach in several organizations. In the mid to late 1830s, for example, David Boswell Reid taught chemistry and physiology courses in twelve different bodies. George Wilson followed this pattern though he started quietly and became depressed. 'Things here... are looking very ill; the classes are very thin; my own is like to be exceedingly small', he wrote.¹⁸ But things improved gradually. He had enthusiastic, large audiences at the Philosophical Association. Jessie Wilson wrote that seats were taken an hour before her brother was due to start his lectures. He developed a course on animal chemistry for senior students. He taught specialized subjects to the surgery class. He held a practical chemistry class at Queen's College from 10 a.m. to 4 p.m. each day. He was appointed lecturer on chemistry at the Edinburgh Veterinary College, and he held a course of lectures to young ladies at the Scottish Institution on Saturdays. In addition, there were Tuesday evening lectures at the School of Arts. In 1834 he wrote 'You will not suspect me of vanity if I tell you a thing or two about my lectures. I have twenty students at my ten a.m. medical class; forty at my twelve o'clock (three days a week) veterinary class; some

15 H. Cockburn, *Journal of Henry Cockburn 1831–1854*, 2 vols., Edinburgh, 1874, i, 73, 74.

16 Douglas Guthrie, *Extramural Medical Education in Edinburgh*, Edinburgh and London, 1965, *passim*.

17 *Ibid.*, 19.

18 Wilson, *op. cit.* (4), 263.

hundred young ladies at the Scottish Institution; and some two hundred stout fellows at the School of Arts.¹⁹ No wonder he was heard to remark ‘Well, there’s another nail put into my coffin’ after a particularly onerous teaching session on a Tuesday evening.

There was a much less well developed system of scientific shows in Edinburgh compared with London. The Natural History Museum of Edinburgh University was accessible to the general public and, indeed, had had a splendid purpose-built gallery provided by the architect William Playfair, which had opened in 1826. But the physical sciences were not provided for by any equivalent of the Adelaide Gallery or the Polytechnic Institution. The Royal Scottish Society of Arts had been founded in 1821 and encouraged innovation and invention in science and technology. It had a collection and an honorary curator, but, it seems, no actual public museum.²⁰ Occasionally shows seem to have been put on in the Waterloo Rooms, home of the Edinburgh Philosophical Association. One particularly successful occasion was the display of Robert Davidson’s electric locomotive, which had had a trial on the Edinburgh to Glasgow railway.

Already by the late 1840s, murmurings and mutterings were being heard in Edinburgh about the lack of a government-funded museum of the type which had been established in London and Dublin. Adam White, an old schoolfriend of Wilson who was working in the British Museum (and who arranged for Wilson to be admitted to the Museum on ‘private’ days) wrote a plea on Scotland’s behalf:

A National Museum must not be linked to Natural History; let it be co-extensive with Art and Science – let it be a nucleus to which the spirited Sons of Scotia may give and bequeath pictures, statues, specimens, books and mss. Let it be a place to which your hardworking Sailors, Soldiers, Merchants and Medical men in active foreign service, may delight to send specimens of Natural History or curiosities connected with rude and less civilised nations.²¹

There were, in fact, two natural history museums in Edinburgh by the mid-1840s to which the public could gain access: the University Museum, already mentioned, which largely comprised zoological specimens, and the Museum of the Highland Society, with its collection of minerals, rocks and building stones. Towards the end of 1851 the Highland Society made efforts to offer its collection to the nation because it was proving to be a financial drain.²² This was a rather cheeky move, because the Museum had already been bailed out by the government several years earlier with a once-and-for-all grant of £5000. In a letter to Henry de la Beche at the Treasury, the Society spelled out its proposal: a new museum should be established on the lines of the Museum of Irish Industry in Dublin. The Society’s collection should not become part of University Museum.

The Secretary wrote:

19 *Ibid.*, 307. This list of lecture courses by Wilson is not exhaustive: see p. 327 for a lecture series to the Young Men’s Society, and for ‘occasional lectures in provincial towns’, and p. 328 for lectures on the Chemistry of a Candle (shades of Faraday) to two ragged schools.

20 But see RSSA Minutes of Council (on deposit in the National Library of Scotland, Edinburgh), vol. 2, fol. 206 (for 21 October 1852) where the Museum is referred to as being part of the new accommodation at 51 George Street. The curator was Alex Jameson at this time. Regulations concerning the museum can be found at fol. 220.

21 Jenni Calder, *Royal Scottish Museum: the Early Years*, Royal Scottish Museum, Edinburgh: nd, p. 3. For Adam White, see *DNB*. Wilson admitted to British Museum, see Wilson, *op. cit.* (4), 164.

22 Highland Society letter book 12, letter Maxwell to the Rt. Hon. T. F. Kennedy, 4 November 1851.

The Directors of this Society consider that such a general collection, embracing everything that falls within the comprehensive science of Natural History, is different both in character and object from what has been established in Ireland, and not calculated to serve the practical purposes in view. They also think that the strength of the Scotch claim was in adhering to the case of Ireland, and craving a similar boon.²³

This petition was followed shortly afterwards by a memorial to the Treasury from the Royal Scottish Society of Arts on the same theme: a Museum of Economic Geology should be established in Edinburgh.²⁴

There was, however, a dissenting voice raised against the petitioning parties: that of Robert Jameson, professor of natural history. To the University Senate he sent a written Report:

some influential parties in Edinburgh are attempting to pre-occupy the ground, by obtaining from the Treasury pecuniary means for establishing in Edinburgh a New School of Geology and Practical Chemistry – with buildings for these purposes – and a staff of Professors.

This project I consider hostile to the University, because there are already in our Establishment Professors of Geology and Practical Chemistry, provided with most extensive Museums of Practical and Theoretical Geology, and of Practical Chemistry. I may further add that this project is prejudicial, as it interferes with our more legitimate claims for pecuniary aid for the extension of the Museum buildings.²⁵

Jameson persuaded his colleagues to set up a committee to draft a counter-memorial to the Lords of the Treasury, and in March 1852 this was communicated to them. The wording was subtle: all mention of a museum of practical geology was dropped and the professors concentrated on the natural history museum. A new national collection should not be established, but the University Museum should be expanded into a public one, run by the University. A building four times the size would be needed.

The matter of the new museum for Edinburgh was vigorously taken up by Lyon Playfair, who after his involvement with the Great Exhibition had become Secretary of Science in the Department of Science and Art, a new government body established within the Board of Trade in 1853. Playfair wrote to the Lord Provost of Edinburgh in April 1854 to explain how he saw the museum which would be established under his Department. There would be two parts to the museum, an industrial part, on the lines of the Museum of Economic Geology in London and the Museum of Irish Industry in Dublin, though extended to ‘general technological purposes’, and the natural history part, which would be based on the University collections which would be handed over to the government. It was important to get agreement from the Edinburgh Town Council, as they were Patrons of the University and, ultimately, policy decisions were determined by them.

Playfair explained:

Though the Patrons of the University would have no controlling power in the management of the new Museum, the Board of Trade would no doubt think that the Museum was used in the best possible way for the advantage of the public if the Professors of the University employed its collections in the illustrations of their Courses with the consent of the Directors of the Museum

23 *Ibid.*, Maxwell to Sir Henry de la Beche, 5 December 1851.

24 Royal Scottish Society of Arts, Minutes of the Council, volume 2 (1841–1858) fol. 192 (minute of meeting for 22 December 1851).

25 Edinburgh University Senate Minutes (volume for 1844–55), meeting of 31 January 1852.

... I would propose that your Lordship should recommend that the specimens now belonging to the University should be given to the Government without any further conditions.²⁶

A resolution was put to the Senate by Robert Christison, professor of medical jurisprudence, and the principles propounded by Playfair were thus accepted by the University. This included the proviso that the Regius Professor of Natural History would continue to be responsible for the natural history specimens, even though they would no longer be university property.

The concern shown by Robert Jameson two years earlier, that the museum might impinge on the interests of the university professors, had not subsided. Christison was instructed to write to Playfair to say that:

the Keeper of the Technological department shall be excluded from converting his Lectures on the Technology of the Natural History into scientific lectures on Systematic Natural History – and conversely they think it will be advisable, also, to secure as far as possible any injurious interference on the part of the Keeper of the Technological department of the Museum with the proper province of the University Professor of Chemistry.²⁷

There had been another slight hitch in the implementation of Playfair's scheme. As he himself recorded:

a deputation from Glasgow had an interview with the President of the Board of Trade and in urging the necessity for such a Museum, laid claim to Glasgow instead of Edinburgh as the city in which it should be built.

In March last another deputation consisting of the Duke of Hamilton, the Duke of Buccleuch, the Duke of Montrose, the Earl of Eglinton, the Earl of Dalkeith... were of the opinion that Edinburgh, being the Capital of Scotland, possessed superior claims to Glasgow as the seat of the proposed Museum.²⁸

With the support of such a galaxy of grandees, there was no alternative but to the museum being in Edinburgh. The site chosen was to the west of Robert Adam's and William Playfair's new building for the University of Edinburgh, now called the Old College. A redundant hospital and chapel were purchased for £7000, and the Town Council also threw in a parcel of land which it owned. Altogether 3755 square yards were made available. It was estimated that the revenue costs would be £2000 per annum and that a salary of £300 was required for the director of the industrial department.

There remained the problem of selecting the industrial director. Playfair's old friend Edward Forbes, professor of natural history at Edinburgh, proposed himself.²⁹ Playfair was firmly against this idea, writing that Forbes would not be able to devote enough time to the technological collections after he had cared for the natural history specimens. The real reason for dissuading Forbes may have been that Playfair had already decided that another old friend, George Wilson, was the man for the job. Already by June 1854, a cryptic reference in a letter to Wilson indicated that this was the case.³⁰ Although land had been purchased near the University quadrangle, there were long delays in establishing the

26 Edinburgh University Senate Minutes (volume for 1844–55), meeting of 4 April 1854 (fol. 467).

27 *Ibid.*, fol. 471.

28 West Register House, Edinburgh, File ED4/15, letter of 1 May 1854 from Lyon Playfair.

29 Science Museum Library, London, Playfair's letter book as Science secretary to the Department of Science and Art, copy letter to Edward Forbes, 22 May 1854, fol. 37.

30 *Ibid.*, copy letter to George Wilson, 5 June 1854, fol. 42.

museum and it was not until the end of February 1855 that Wilson at last heard that he was going to be director of the Industrial Museum.³¹ Now Wilson could embark on the teaching programme that he had been planning in conjunction with developing the technological collections.

The appointment of Wilson seems to have caused consternation amongst certain members of the University Senate. They knew of Wilson as a highly popular private lecturer who now had an official appointment, and they could see their class fees draining away in Wilson's direction. They probably complained to Playfair, because in a Memorandum, he wrote:

The disadvantage of having [Wilson's classes] unconnected with the University is that the lecturer might come into collision with the courses on Chemistry, Mechanics, and Natural History in the college, and thus a feeling of hostility might arise between the Museum and the University, when it is so desirable to have entire co-operation and identity of interests.³²

Playfair was also concerned about staffing demands for the Museum which he considered unnecessary, with the University and its teaching staff immediately alongside. The solution was becoming clear to him: as the professor of natural history was ex-officio curator of the museum collections in that science, why should the curator of the technological collections not be ex-officio professor of technology at Edinburgh University?

'The duties of the Professor', Playfair wrote, 'could be so arranged with the Senatus as to be supplemented to the existing courses without interfering with them.'

Playfair had clearly already broached the idea with William Gregory, as he further wrote,

The Professor of Chemistry, whose class would be most influenced by the establishment of such a Professorship, assured me that it met his warm approval as a means of preventing collisions which must obviously arise, if the technological collections were illustrated by courses of lectures conducted in a separate establishment so close to the University.

It was a brilliant solution. The curator of technology would be given status as a professor, and yet he would come under the control of the University. George Wilson accepted the appointment of Regius Professor of Technology in August 1855, and he was admitted to the Senate in November

But this was not the end of the affair. J. D. Forbes, professor of natural philosophy, had many concerns.

I am surprised to find the [the commission] includes no definition of that very vague term [technology] now introduced (for the first time I believe in Britain) as the title of a chair. The word is not to be found in Johnson's Dictionary, and as far as etymology goes, it might apparently entitle the Professor to lecture on any subject within the faculty of Arts... This is the proper time... for the Senatus to give expression to their opinion of what subjects really ought to be included under this most vague and indefinite commission.

Forbes went on to complain that Wilson was undercutting the fees for chemistry. Wilson only charged 5 shillings for matriculation whilst others charged £1. Moreover the class fee for technology was only 3 guineas whilst for other classes it was 4 guineas.

³¹ *Ibid.*, 20 February 1855 (incorrectly dated '54') fol. 120.

³² West Register House, Edinburgh, File HH5/27, Memorandum by Lyon Playfair, c. 24 July 1855.

This minor irritation did not deter Wilson, who was preparing his inaugural lecture which was delivered two days after Forbes' outburst. Curiously, Wilson referred little to the Museum and his plans for it: much of the lecture considered man as a higher animal who had to develop technology to improve his lot:

Clotheless creatures by birth, we are also tool-less ones. Every animal is by nature fully caparisoned for its work; its tools are ready for use, and it is ready to use them. We have first to invent our tools, and then to fashion them, and then to learn how to handle them.³³

He carefully outlined his teaching scheme and was sensitive to areas of overlap which the Senate had debated. 'How shall I limit myself to selected arts, and not encroach upon the subjects taught from the existing University chairs?' Wilson asked. 'In short, I have to face the dilemma: How shall I faithfully fulfil my commission, as Professor of Technology, and yet faithfully respect the rights of my brother professors?'³⁴

Responding to his question, he explained that a systematic course of lectures would be given on applications of science to the Industrial Arts. He elaborated on the relation between his teaching role and the museum: 'the Museum will minister to the Chair, not the Chair wait upon the Museum; and accordingly I will attempt such a course in winter, without waiting for specimens to accumulate'. He also pointed out that the chemical arts, rather than the mechanical industrial arts, would form the main subject of his lectures. Wilson outlined general subject areas whereby his course would be divided into ten divisions, based on types of material, for example metals, ceramics and glass, textiles, and building materials. Other topics included what Wilson called 'the economic development of electricity' and the 'the economic applications of light'. Still concerned about his colleagues' interests, he explained at the end of this listing 'The programme... touches on every side, upon subjects discussed by other professors; but it only touches upon them. My teaching will, in general, begin where theirs is deliberately arrested, not as exhausted, but as designedly proceeding no further.'

Wilson's first course of technology lectures seems to have been immediately successful. Forty students registered and they took, according to Wilson 'much interest in the subjects brought before them and are pledged to contribute to the Museum'.³⁵ Wilson gave more detail about the students for the 1856/57 session. There were now fifty-two students who were categorized as 'seniors of the legal, military and medical professions', 'amateurs unconnected specially with any calling', and 'young men, under training as engineers, dyers, paper makers, silk weavers, merchants, farmers, teachers, and lawyers; or are preparing to emigrate to the colonies'.³⁶ Again Wilson stated in his annual report that the Museum was indebted to the technological pupils for contributions to its collections. As well as daily lectures, Wilson arranged visits to such places as iron foundries and glass houses, and these visits had the reverse effect of interesting workmen in the Museum. So much so, that Wilson proudly recorded that the workers of a large glass house arranged

³³ Wilson, *op. cit.* (1), 12.

³⁴ *Ibid.*, 17.

³⁵ Appendix B to the 3rd Report of the Department of Science and Art 'Annual Report of the Director of the Industrial Museum of Scotland' [for 1855], London, 1856, 192.

³⁶ Appendix C to the 4th Report of the Department of Science and Art, 'Annual Report of the Director of the Industrial Museum of Scotland' [for 1886], London, 1857, 168.

to visit the Museum *en masse* on a public holiday so that he would give them a lecture on the history of glass making.

Numbers were slightly down in the 1857/58 session, the result, Wilson surmised, of the 'commercial distresses of the country'.³⁷ But Wilson's influence through lecturing spread beyond his University classes. He was much in demand, and he reported that 'a large section of the community who cannot be addressed in another way have through this channel been awakened or revived to an interest in the Museum'.

Though frustrated by the apparent unwillingness of the government to provide funds for purpose-built facilities – he referred to having to use 'a most inconvenient lecture-room at a distance from the temporary depository of Museum specimens' – Wilson continued his mission with unabated zeal, both at a challenging level to those with training, and to 'a large body of working men' as he put it. For his final course of lectures, eighty-six students enrolled.

Wilson's preoccupation with formal teaching became increasingly subordinate to the growing Museum. In addition, there was a laboratory with an assistant attached where analysis was taught, and a library, to develop. In fact these inter-dependent facilities were a carefully considered concept which Wilson described as 'a fourfold idea', exhibition galleries, laboratory, library, and dissemination of information. (This is curiously parallel to Bacon's enumeration of the essential apparatus of the learned gentleman: cabinet of curiosities, laboratory, library, and garden-cum-menageries.³⁸)

The development of the collections can be clearly traced through Wilson's annual reports and through the inventory books. His main concern was to accumulate groups of objects which would illustrate manufacturing processes. As examples, early donations came from Price's Patent Candle Factory, Bonnington Chemical Works and St Helen's Glass Company; ceramics came from Godfrey Wedgwood, india rubber from Charles Mackintosh and Company, and so on. Wilson was clearly interested in small-scale manufacturing as well. From Mr Geikie of Edinburgh came an assortment of examples of the uses to which human hair was put, from Mr Oliver and Mr Main, samples illustrating hat manufacture, from Messrs Cowan and Sons, illustrations of the different stages in the manufacture of brown paper from straw.

In addition to solicited groups of objects such as these, a number of pre-existing collections were donated: in the first year, the Architectural Institute of Scotland transferred its collection of building stones, the Royal Scottish Society of Arts its models and machines, and the Highland and Agricultural Society its agricultural implements and machinery. In succeeding years the Museum of Practical Geology donated duplicate specimens and the Commissioners of the 1851 Exhibition offered contemporary ceramics, horseshoes and coach furnishings. Donations started to pour in from individuals, especially from those Scots who had spent periods abroad: from the Rev. J. Millar native fermenting bowls, tools, weapons, articles of dress and a model canoe from different parts of India and the Pacific, from Dr Hunter of Madras, specimens of shellac and samples of silk, and from Dr Fayrer, a costly gold embroidered cashmere coverlet received by him from the King of

37 Appendix F to the 5th Report of the Department of Science and Art, 'Annual Report of the Director of the Industrial Museum of Scotland' [for 1857], London, 1858, 154.

38 Oliver Impey and Arthur MacGregor, *The Origins of Museums*, Oxford, 1985, 1.

Oude. It is almost with bated breath that the reader of the 1856 Annual Report wonders whether Patrick Dudgeon's 'magnificent gift' of spinning wheels, looms, printing blocks and patterns of chintzes has arrived from China. 'With the greatest regret the Director has to announce the receipt of a letter informing him that the ship bearing this gift... is long past due, and there is much reason to fear has been lost at sea' wrote Wilson, though, with a sense of relief, an appendix to the Report announced 'I have received a letter from London informing me that the *Agra* has reached that port in safety, and that cases containing Mr Dudgeon's donation are on their way to Leith.'

Over Wilson's four-year period as Director, it was estimated that 10,350 models and specimens were acquired, and that if these had been properly displayed they would have filled a space equal to that available to the Museum of Practical Geology. Wilson developed plans for a purpose-built museum with the government architect Francis Fowke but he was not to see the building started. Wilson's collection could not be properly displayed. In 1858 Wilson had to record that:

the greater part of the objects acquired... are collected within the old Trades Maiden Hospital, whilst a number of the more bulky objects are stored in the Independent Chapel... a few of the objects are so arranged in glass cases as to admit of being examined, though only infrequently but the great majority of the specimens are simply stored away in safe receptacles... In consequence of this state of matters, the accumulation, not the exhibition, of specimens and instruments is the end kept chiefly in view.³⁹

An analysis of the 10,350 objects collected reveals that they can be grouped into 512 acquisitions, some of which were groups of material of considerable size, for example the donation by Godfrey Wedgwood in 1856 included 601 individual items. I have attempted to categorize the 512 acquisitions under nine headings. Three of these, Industrial Arts, Relics and Antiquities, and Geology, account for 80 per cent. There comes a large drop to the next three, Foreign Ethnology, Natural History, and Science and Engineering, which account for 15 per cent. It is perhaps surprising that Wilson did not concentrate more on material relating to the history of science. He had strong interests in the past and had written an excellent account of the early history of the air-pump in 1849 and in 1851 he published a substantial biography of Henry Cavendish. 'An Industrial Museum cannot be complete without historical illustrations of the progress of the useful arts',⁴⁰ he declared at a lecture in 1857. Indeed, he argued for the preservation of early instruments which were associated with heroic scientific figures. 'The spectacle of such things', he went on to say, 'ministers only to the good impulses of humanity.' His major acquisition in this area was the collection of early chemistry demonstration apparatus from Edinburgh University, some items of which dated back to the mid-eighteenth century. This was passed to him by his old friend Lyon Playfair, who in 1858, somewhat surprisingly, had decided to return to academe and had landed the chair of chemistry at Edinburgh.

I shall now briefly return to London, where it might have been expected that Playfair would have been supporting similar moves in the metropolis.

³⁹ Science and Art Department of the Committee of Council on Education, *Directory of the Industrial Museum of Scotland*, London, 1858, 7.

⁴⁰ Evidence of Major-General E. R. Festing. See *Second Report from the Select Committee on Museums of the Science and Art Department*, London, 1898, p. lxviii.

The South Kensington Museum got off to a slow and indecisive start as far as its science and technology collections were concerned. Emphasis was on so-called 'ornamental art', a public museum being established at Marlborough House in 1852 under the aegis of the newly established Department of Practical Art. Its energetic Secretary, Henry Cole, was to prove the greatest influence on government museums in the nineteenth century.

In a sense, the Museum of Ornamental Art was a natural development of the earlier government-sponsored Schools of Design, which were established in 1837 to 'extend a knowledge of the Arts and of the Principles of Design among the people, especially the manufacturing population of the country.'

The collection at Marlborough House was much more concerned with influencing public taste than in explaining manufacturing processes. Charles Dickens, having visited the Museum, reported in *Household Words* how shocked he was to find that many of his own goods and chattels were lacking in the Correct Principles of Ornamental Art.

The Queen's Speech of 1853 declared that it was the government's intention to promote practical science as well as art. This had the effect of uniting the Museum of Practical Geology and the Museum of Irish Industry under one government department, and it meant that when the Museum of Ornamental Art had to move out of Marlborough House to a purpose-built museum in South Kensington, the 'Brompton Boilers', accommodation was provided for science collections as well.

But the science part of the museum proved to be a rag-bag of pre-existing collections, lacking the clear philosophy of development which Cole provided for the art side. In effect there were six separate narrowly-based science museums squeezed into the Brompton Boilers. Perhaps that with the clearest intent was the Educational Collections, which opened to the public in 1857. This was a large assemblage of school fittings, books, drawing and painting apparatus, globes, chemistry sets, and so on, which was deposited by publishers and manufacturers. It was effectively a trade fair, to be inspected by potential clients, members of the teaching profession.

Additionally, and more in the museum tradition, was the Models and Patents Collection which had been formed on behalf of the Commissioners of Patents by Bennett Woodcroft. Though it contained some very significant relics, Symington's marine engine of 1787, *Puffing Billy* of 1813 and *Rocket* of 1829, the collection was not under the control of Cole. Unlike other parts of the complex of small museums, the Commissioners insisted on free admission at all times, and the Patent Museum had to have a separate entrance, with a notice which declared 'Entrance Free Daily'. The Patent Museum was not well regarded for teaching: a witness to the Devonshire Commission on Scientific Instruction said that it was 'to a great extent a farce' as many of the most useful mechanical devices had never been patented, and were excluded from the Museum.

Apart from these two collections there were collections of building materials, animal products, food and another independent museum, that of architecture, formed by George Gilbert Scott. But at this stage there were no moves to coordinate the development of these disparate parts into a united, coherent museum. No George Wilson was to emerge at South Kensington.

In a lecture at Edinburgh, Wilson himself defined the science museum scene as he saw it. Considering South Kensington, he mentioned only the Animal Product component,

adding the Museum of Practical Geology and the Museum of Economic Botany at Kew to comprehend 'the entire round of Industrial science' in London. He pointed out that his own Industrial Museum could be considered comprehensive in its ambitions.

George Wilson, never in good health, died in November 1859, and with his demise the programme of technology teaching rapidly faded. Once again, the underlying hostility of Edinburgh University became apparent.

'As the office of the Director ... is now vacant, the Senate trust that no new appointment will be made' a *Senatus Committee* recommended.⁴¹ There then followed an unmistakable bid for part of the teaching:

The Committee consider that the Government should be requested on the part of the Senate to appoint the Professor of Natural History, Chemistry and Natural Philosophy as Scientific Superintendents but be also responsible to a General Director (whose office may be honorary) who would represent the general interests of the public...

The Committee express their belief that... they would... secure to the general public a fuller instruction in regard to the Technological Collections than the system hitherto pursued of confining the lectures upon them to a single Professor, who can only be intimately acquainted with one branch of science. Under these circumstances they consider it desirable that a distinct Professor of Technology should not again be appointed.

The chairman of this Committee was none other than Lyon Playfair, the begetter of the Regius Chair only four years earlier, who had been appointed Professor of Chemistry at Edinburgh in the previous year. Henry Cole, and the Home Office, agreed with the recommendation, and Wilson proved to be the first and only holder of the post.

Wilson was succeeded by Thomas Archer, who had formed a Trade Museum in Liverpool. But he was only accorded the title Superintendent, not Director, of the Industrial Museum.

The teaching aspect of the Industrial Museum did not resume immediately after Wilson's death. In fact there was a gap of eight years until, on 4 December 1867, Lyon Playfair lectured on 'The Air we Breathe', the first of three lectures on chemistry. He was followed by four of his university colleagues, each giving short series on natural history, geology, natural philosophy and botany.⁴² The texts do not survive, but it is clear that the lectures were popular presentations on general aspects of science, quite different in nature from Wilson's on industry and manufactures, and not immediately related to the collection.

There were financial problems on the horizon, however, In his Report for 1869, Archer made a bid for government subsidy to allow the lecturers a fee of £2.10.0 instead of the £1.30.0 he was able to provide, and in the following year, he stated that he had 'much difficulty in obtaining the co-operation of men of sufficient eminence' because of the low level of the fee. After the 1873/74 session, the artisan lectures were discontinued. If the subsidy had been forthcoming, Archer complained, 'an admirable source of valuable instruction would be kept open to an earnest class of students, who although not very

⁴¹ Edinburgh University Senate Minutes (volume for 1855–61), meeting of 9 December 1859, fol. 361.

⁴² Thomas C. Archer, 'Report on the Condition and Progress of the Edinburgh Museum of Science and Art for 1857', p. 1. (Annual Report published by the Science and Art Department of the Committee of Council on Education.)

numerous are sufficient so, I believe, to render their continued scientific training as valuable to the nation at large as to themselves individually. They consisted chiefly of the better class of artisans, who being generally head of families, were thus receiving instruction which they would communicate to their children... I personally feel much disappointed at what I hope is only at most a temporary suspension.⁴³

But times had changed in various other ways as well. The list of acquisitions for that same year shows a dwindling in the industrial material donated and a heavy preponderance towards the applied arts, most of which was purchased. 'My now extensive relations with all parts of Europe', boasted Archer, 'have enabled me to give a cosmopolitan character to the museum which has raised it above the character of a provincial museum and drawn the attention of foreign Governments to it in a marked and very gratifying manner.' The final indignity towards George Wilson's mission was the de-accessioning of his industrial collections: this was at its height in the 1920s and 1950s. There is now remarkably little left to represent this phase in the history of the Museum.

Why, then, was the technological initiative and its aftermath so short lived? A range of factors might be considered.

At Edinburgh, the development of Wilson's museum collections and their use in teaching went hand-in-hand. When the Regius Chair of Technology was suppressed in 1859, it was inevitable that without Wilson's individualistic style of collecting and teaching the Museum would develop along different lines. Wilson had brought technology into the Museum and University from the mechanics institutes and similar bodies. The intramuralization of his subject brought with it his personal following of artisans. The takeover of museum teaching by university professors changed the nature of the courses; a more theoretical approach was adopted and the museum collections became less relevant. Numbers fell off and the Museum could not provide the remuneration which the professors demanded. The scheme had to be abandoned.

Even if Wilson had survived longer, the emphasis may in any case have developed away from technology: the powerful influence of Henry Cole at South Kensington would have been felt by whomever was running the Edinburgh Museum. The collections would have become gentrified. The impetus given by the 1851 Exhibition to the establishment of national museums was based on public interest in contemporary manufactures and design. But this was moved, under Cole's guidance, towards a reverence for what became known as decorative art, a sort of half-way stage between manufactures and fine art. An 1863 Review of the South Kensington Art collections indicates this: 'The aim of the Museum is to make the historical and geographical series of all decorative Art complete, and fully to illustrate human taste and ingenuity. Second rate works should only be acquired as substitutes until better works can be obtained.' There would be no gutta-percha or Price's wax candles in the Art Collections. This push up-market inevitably affected Edinburgh. While Wilson stated in 1855 that 'The Industrial Arts admits of a simple division into Mechanical and Chemical Arts' the term had a different cultural meaning in South Kensington. *The Handbook on the Industrial Arts* of 1876 equated Industrial Art with 'art-workmanship' in the first sentence of the Introduction.

43 Ibid., Report ... for 1874, p. 2.

What is surprising, is that organization of science collections in South Kensington into the Science Museum was so delayed. It was not until the 1874 Royal Commission on Scientific Instruction that it was proposed that the science collections at South Kensington should be integrated and expanded. This did not happen until 1884, and then in accommodation totally inadequate for its purpose. It was a Select Committee of 1897 which proposed new buildings, and the administrative and physical separation of the science and art collections. It was 1909 before a serious effort was made to plot the future of the new museum. And South Kensington had to wait until 1928, seventy years after the building of the Brompton Boilers, for the next purpose-built accommodation to become available.

I do not think that I can claim that Wilson had a major, long-term influence on the way in which museums developed in Britain and Ireland. As the founder-director of the Industrial Museum of Scotland he had to be deeply involved in practical concerns such as squeezing money out of the government for his building, becoming a public figure to plead his case, and attending to the petty jealousies of his colleagues in the University. It is undeniable that he did achieve much in his four years in the post and it is open to speculation how differently museums would have evolved if he had enjoyed a twenty-year reign, as did Cole in South Kensington.