

Objects of Understanding

Historical Perspectives on Material Artefacts
and Practices in Science Education

Edited by

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Object Lessons from the Asylum

The Portable Museum of Thomas E. Dexter

STEPHEN JOHNSTON

Introduction

How to teach? What to teach? The caricatured image of the Victorian schoolroom paints it as a scene of rote learning, with corporal punishment to reinforce Bible study and the three “R”s of reading, writing and arithmetic. While there may be some truth to the stereotype, there were also emerging alternative models for elementary education, intended to be both more humane and more intellectually stimulating for pupils. A much-publicised method was that of object lessons.

Inspired by the work of the Swiss reformer Johann Heinrich Pestalozzi, object lessons were a key element of 19th-century progressive education (Reese, 2019). Pupils were expected to observe, identify and describe physical items, developing the senses and responding with the heart as well as the head. Often considered particularly appropriate for younger children, proponents nevertheless argued that the perceptual and higher analytical abilities of a wide range of students benefitted from the method. The objects ranged from readily available local materials of animal, vegetable or mineral origin to more exotic items which opened up wider geographical horizons. Beyond natural history, manufactured objects were used to interrogate the workings of the everyday material world.

A central text in the dissemination and codification of the technique was the much-reprinted work of Elizabeth Mayo, first published anonymously as *Lessons on Objects, as given in a Pestalozzian school at Cheam, Surrey* (London, 1830). This not only inspired further practical pedagogical initiatives in Britain but had a genuinely international impact, with the method adopted and adapted in the United States, Canada and India (Carter, 2018; Stanworth, 2014; Sengupta, 2003). It is now clear – not least because their character and emphasis continually shifted through the 19th century –



that object lessons provide a window onto a rich set of cultural, class, gender, racial and colonial issues, as well as contemporary debates on education.

This chapter begins by refocusing on the objects themselves. Ironically, the movement has been studied mostly through texts, with relatively little said about the provision of the specimens that were its basis.¹ I take as a case study the commercially available Portable Museum of Thomas E. Dexter. Dexter had devised his cabinets of objects by the mid-1850s and promoted them publicly from 1857 via a pair of printed manuals; these were reprinted until at least the mid-1870s. Dexter's work has not previously been discussed and it significantly extends modern studies of object lessons. It demonstrates the continuing vitality of physical objects in teaching, when some teachers found printed pictures cheaper and more manageable; and it reveals a hitherto unsuspected vehicle for the spread of the method, not only through commercial provision to schools but also via British army teaching supported by central training at the Royal Military Asylum in Chelsea. The Portable Museum helped science and technology enter the elementary curriculum, and the object lessons taught with it were intended to make pupils take their place in the industrial, commercial and colonial world of the British Empire.

The portable museum

Fig. 1 shows the example of the Portable Museum at Oxford's History of Science Museum. Externally it is a mahogany cabinet with a brass carrying handle, fronted by a pair of lockable doors which open to reveal six drawers. Pulling out the drawers by their front knobs does not instantly disclose their contents: four of the drawers still retain ribboned cardboard covers to provide dust protection. Each drawer slides out completely and, since they are all the same height, they can be rearranged in any order. Each drawer has a printed label: Manufactured Articles, Animal Substances, and two each of Minerals & Metals and Vegetable Productions. The whole assembly is further identified by two printed papers pasted to the inner faces of the doors. Each is shaped under an arch and carries a royal coat of arms with a typographically elaborate text running from one to the other: "Patronized by her Majesty. Portable Museum of natural substances, raw and manufactured, from the mineral, vegetable, and animal kingdoms. || Illustrative of the imports, exports, productions, & manufactures, of Great Britain and her colonies. Compiled and arranged by Thomas E. Dexter, Royal Military Asylum, Chelsea."²

1 Korda (2020) is a recent and notable exception.

2 History of Science Museum, Oxford, inv. 14976. Purchased at Bonhams Knightsbridge, Auction 22832, lot 109: Instruments of Science, Technology and Mechanical Music, 27 October 2015 with support from





Fig. 1 External view of the Portable Museum (all images of inv. 14976 by permission of the History of Science Museum, University of Oxford).

The drawers offer an ordered cornucopia of materials. Card compartments hold individual specimens, nestled on rough wool or held in bottles sealed with cork and red wax, identified by printed tags. The “Vegetable Productions” range from familiar British plant materials such as acorns and galls to classic merchandise of the global spice trade, including pepper, cinnamon, turmeric and cloves (Fig. 2). The drawer for animal substances extends from horn and ivory in raw and prepared states to beeswax and goldbeater’s skin, as well as horsehair, whalebone and a sequence on silk featuring not just the raw, dyed and prepared material but a silkworm and cocoon. Minerals are represented by varieties of salt, clay, stone, marble and such staples of industry as coal and coke; metals appear as ores and in different finished forms. Thus we find copper ore, manufactured copper, copper plate, copper rod and wire and the unmistakable blue of “Sulphate of Copper (Blue Vitriol)” as well as the green of “Acetate of Copper (Verdigris)” (Fig. 3).

Jeri Bapasola. A full set of images, detailed description and its immediately preceding trade provenance are given in its online catalogue record: <https://hsm.ox.ac.uk/collections-online#/item/hsm-catalogue-31215>. (This and all subsequent web links were retrieved and verified on September 1, 2023.)



Fig. 2 One of the two drawers of Vegetable Productions.

The manufactured articles are arranged differently from the rest. Rather than being visible in a compartmentalised array, the single drawer contains a loosely layered set of cards (Fig. 4). Each card gathers together a selection of closely related items and is neatly framed by an embossed leather border with a pink ribbon to lift and carry it. The cards are devoted to topics such as paper, with “Cream Laid Note”, “Tissue & Foolscap”, music, cartridge, “Wall or Printed” (i.e. wallpaper), ornamental, blotting and brown (Fig. 5). These groups of samples feature leather, woollen and linen goods and a hand-labelled set of buttons. There is deliberate cross-over with the coverage in the other drawers. The card for hardware carries nails, screws, pins and needles and its copper nail complements the extensive presentation of copper in Metals & Minerals. While one of the drawers for Vegetable Productions includes raw and prepared cotton,



Fig. 3 One of the two drawers of Minerals & Metals, with copper specimens in the second row from the bottom.

Manufactured Articles has a card for Cotton Goods with samples of Marcella, Printed Calico, Muslin, Corduroy, “Calico, common, unbleached, and twilled”, Cotton Velvet, Velveteen and Moleskin. Similarly, Silk Goods have their own card in Manufactured Articles, to make a connection back to the silk sequence in Animal Substances. This blurring of boundaries is deepened by a set of square samples of “British and Foreign Woods”. These should ostensibly belong amongst the Vegetable Productions but are currently in the drawer of Manufactured Articles, presumably because they are mounted together on card in the characteristic format of that section (Fig. 5).



Fig. 4 The drawer of Manufactured Articles arranged to display sample cards for straw and plait, buttons and woollen goods.

When acquired by the History of Science Museum, the cabinet and its hundreds of specimens were accompanied by two slim publications, a modern on-demand facsimile of Dexter's work on *Animal and Vegetable Substances* (1857) and an original printing of his follow-up text on *Mineral Substances*. When first published in 1858, the latter included a short, separately paginated section towards the end giving statistical information on Britain's imports and exports in 1857. The copy with the cabinet updates this information with an equivalent section for 1873. It was therefore presumably printed in 1874, and it is tempting to take this as the date of the cabinet itself. However, it is not certain that the booklet belonged originally with the cabinet – like the on-demand facsimile it may have been added later.

Whatever the relationship of the two texts to this particular example of the cabinet, these works are richly revealing of Dexter's aspirations for object lessons and the detailed methods and content he proposed, as well as his marketing of the Portable Museum. Before turning to his work in its educational and commercial context, the author himself should be introduced.



Fig. 5 The drawer of Manufactured Articles showing sample cards for types of paper and British and foreign woods.

Thomas E. Dexter

Thomas Dexter is not a well-known figure in the history of either science or education. There is no modern biographical study and, though the Portable Museum was by far his most visible public initiative, he presented his role in deliberately modest terms. In the preface to his *Mineral Substances* (1858), Dexter made “no claim to originality” in the production of the cabinet or its accompanying texts, referring to himself as simply a compiler. He had gleaned his information from many sources over an extended period “amid the turmoil and excitement of active employment as an elementary teacher”. This depth

of experience warranted his assertion that the materials were both practical and suitable for classroom teaching.

Dexter had followed his father into elementary teaching. Born in 1813 in Southwark in London, he took over as a school master from his father Henry at the recently-founded Guildford Infant School in about 1832 (Nicholas, 2010). Thomas Dexter remained at the school until 1839, marrying the widow Eliza Pearce in 1833 with whom he had at least 5 children. At the time of the 1841 census he was running Holy Trinity and St Mary's National School in Guildford, again in succession to his father (Clements & Rowe, 2022). From the record of his children's place of birth he must have continued in Guildford until after 1843, but there is then a gap in the evidence for a few years.³ He next appears at the Royal Military Asylum in Chelsea, probably shortly after 1846. His wife died in 1848, perhaps in childbirth, as Thomas was left with 4 children from 5 to 13 years old, and a newborn infant. The next year he married Ann Groves, who had been a school mistress at the Asylum since at least 1841 and who was its Matron in 1861. Thirteen years Dexter's senior, Ann died in 1875, while Thomas retired some time before the 1881 census, when he was recorded as a Retired Schoolmaster in lodgings in Sydenham. He was buried with Ann in 1888.

A few traces of Dexter's professional activity can be recovered, such as his election along with sixteen others to the College of Preceptors early in 1859.⁴ At the end of the same year he gave an evening lecture based on his experience with the Portable Museum to the annual meeting of the Associated Body of Church Schoolmasters and Schoolmistresses.⁵ Though closely linked to the Royal Military Asylum, he also taught privately and gave public lectures. From a local newspaper advertisement he appears as a lecturer at St Leonard's College for Ladies in Chelsea in 1857, and the same newspaper carried an advertisement at the beginning of 1860 for Dexter's availability to give "lectures upon popular and scientific subjects, illustrated by Dissolving Views, beautifully delineated by means of the Oxycalcium Light, interspersed with Chromatropes and Caricatures, combining variety, amusement, and instruction".⁶ The power of lime-light had enabled the magic lantern to engage larger audiences and Dexter was one of many to harness the technology and the fashion for the latest projection techniques. He gave travelling lectures, reportedly around England, and was sufficiently reputed

3 For these and the following biographical details I have used the Ancestry.co.uk website, which provides convenient access to data and scans from census records at the National Archives as well as baptisms, marriages and deaths. Data for Dexter is assembled at <https://www.ancestry.co.uk/family-tree/person/tree/172282734/person/182238198239/> (behind a paywall).

4 *Daily News* (London), Monday, February 21, 1859.

5 *Morning Chronicle* (London), Saturday, December 31, 1859.

6 *West Middlesex Advertiser*, February 7, 1857, p.1 and January 28, 1860, p.4.



to provide general interest “entertainments” illustrated by dissolving views with the magic lantern as far afield as Belfast.⁷

Educational method and commercial provision

As with his magic lantern lectures, so with his Portable Museum: Dexter was a follower rather than a pioneer. By the mid-1850s, when he first began to assemble the cabinet, object lessons were becoming part of a progressive mainstream rather than a radical innovation. Elizabeth Mayo reflected on the changing educational environment when, after a dozen reprintings, she updated her *Lessons on Objects* for the first time in the mid-1850s. Back in 1830 “the idea of systematically using the material world as one of the means of educating the minds of children, was so novel and untried a thing in England, that the title ‘Lessons on Objects’ excited many a smile, and the success of the little volume was deemed to be, at best, very dubious”. By 1855, as she noted in the preface to this 14th “edition”, the work was much used in teacher training, ensuring that it was subsequently spread widely across the country.

Mayo arranged her lessons in five series, graded in order of increasing difficulty and abstraction. Pupils were to begin with the use of the senses to identify the qualities of objects, and then progress to compare, classify and finally to reason on cause and effect. Separating out essential and accidental qualities they were, by the end of the course, expected to demonstrate understanding through prose composition. The aim was to follow what was understood as the natural sequence of learning, rooting the method in the nature of the mind.

Dexter was more prosaic in approach, and focused more on method than philosophical underpinnings. Writing in the preface to his booklet on minerals and metals he recommended that each individual material be handled under five simple headings: definition of the item; its properties; its uses in the arts and sciences; its geography; and any general or statistical information connected with it. These topics were to be pursued by multiple means. Pithy questions were always necessary to animate the class, and the blackboard was the place to explain difficult terms. Maps made geography “attractive and delightful” by showing the countries where raw materials originated and the manufacturing towns in England where they were transformed.⁸ Like Mayo,

7 *Belfast Morning News*, Friday, March 31, 1865 (vol. X, issue 1607, p.3). Dexter spoke twice on this trip to Belfast. The first illustrated lecture was on “Scenes in Many Lands; or, All Round the World”. The second was on “The Castles and Abbeys of the United Kingdom” and took place at the Belfast Music Hall on Friday 21 April (*Belfast Morning News* front-page notice for that day). The same topic was used to begin the Spring 1867 session at the Chelsea Literary and Scientific Institution, where Dexter’s dissolving view lecture was followed by, amongst others, J. H. Pepper from the Royal Polytechnic Institution: *West Middlesex Advertiser*, December 29, 1866, p. 2.

8 Dexter (1858), unpaginated preface.



Dexter believed that object lessons should culminate with pupils recording on slate or paper what they had learned. This was “a most valuable means of improvement in writing, orthography, composition, and a clear expression of ideas”.⁹ Particularly rich objects such as copper would need to be spread across several lessons; he thought any one session should not exceed 45 minutes.

Dexter also revealed that, even when the principle of object lessons was accepted, there could still be resistance and misunderstanding. In the same preface he noted – in a way still almost invariably echoed in response to pedagogical innovation – that some teachers claimed they could not make time in their curriculum for object lessons. Others apparently believed that the lessons were only “for the amusement of very little children”. While he could cite expert opinion to rebut this latter mistake the principal aim of his work with the Portable Museum was to directly address two other obstacles: some teachers complained that they lacked suitable objects, while others pleaded that they lacked information.

The Portable Museum was the answer to the first obstacle: a standardised, off-the-shelf cabinet of objects available for sale. Dexter’s two booklets on animal and vegetable substances and on minerals and metals remedied the second objection. They were precisely tailored to the cabinet and could be used by a teacher to prepare lessons, or as study texts by more advanced pupils.

In devising a commercial solution to the provision of objects, Dexter was again following precedent. From the very first edition of *Lessons on Objects* onwards, Elizabeth Mayo’s work typically ended with an advertisement for cabinets of at least two different sizes and prices. In 1830 these were listed as available from a single, named cabinet maker. But in later printings such as that of the 6th edition of 1837 the variety of cabinets was multiplied, as was the number of London suppliers, which now included a range of publishers as well as the original individual maker. At least two cabinets constructed in accord with Mayo’s prescriptions have been identified in London. The example at the Victoria & Albert Museum is less flexibly arranged than in Dexter’s later design – the drawers drop down in sequence into a box – but other elements were echoed by Dexter, such as the provision of cardboard compartments and printed object labels.¹⁰

Dexter also followed Mayo’s lead in offering different versions of the Portable Museum. An advertisement in the endpapers of the 1857 book on animal and vegetable substances shows that the Oxford cabinet is an example of the largest and most expensive model. Its “handsome Mahogany Case, with ... folding doors, ornamented with brass work” was in contrast with a smaller and cheaper 5-drawer version in a stained deal case. Dexter also offered an intermediate model for the East India Company which

⁹ Ibid.

¹⁰ Educational specimen box, Victoria & Albert Museum, acc. no. B.5:1 to 5–2009; illustrated at <https://collections.vam.ac.uk/item/O213531/educational-specimen-box-unknown/> and described in detail there. Further discussion in Korda (2020), pp. 211–213.



retained the mahogany case and folding doors but compromised on just 5 drawers. The same three models were also advertised in the 1858 minerals book, with the individual prices increased between 11 and 20 %. Whereas the cost of a cabinet for the complete Elizabeth Mayo course remained constant at £1 15 s from the later 1830s to the mid-1850s, Dexter's top of the range model was £4 4 s in 1858.¹¹

That price discrepancy might seem to condemn Dexter's Portable Museum to an exclusive and affluent audience. Yet the Oxford example is not a unique survivor: at least five others have appeared at auctions and online sales in the past dozen years. All have been the 6-drawer model, in various states of completeness. While there is no evidence on the number that were made, their recent frequency in the trade does suggest production in some quantity. Moreover, the Portable Museum was not completely fixed in form. Slight differences, such as changes in the colour and shape of the notices on the doors and the labels on the drawers, indicate manufacture over a more or less extended time period.¹²

The portable museum in public

While the physical form of surviving cabinets hints at the extent and longevity of its distribution, the accompanying booklets provide valuable insights on its marketing and public reception. When Dexter first published *Animal and Vegetable Substances* in 1857 the endpapers carried an advertisement for not only the three models and their prices but a note of where the cabinets could be purchased: the publishers Groombridge & Sons; the National Society's Depository in Westminster; and at Dexter's own institutional address in Chelsea. The Depository was probably the main outlet, since the National Society was a major player in educational provision, from school construction to teacher training. Its full Charter title of 1817 (the National Society for Promoting the Education of the Poor in the Principles of the Established Church throughout England and Wales) might imply a focus on religious instruction, but from the 1840s its Depository stocked a wide range of books and equipment.

Dexter's 1857 advertisement noted one other venue where the cabinet was displayed rather than sold: the Educational Division of the South Kensington Museum. This was a brand new and extremely popular cultural venue on what were then the outskirts of London. Opened in June 1857, the South Kensington Museum welcomed nearly

11 For wider comparison, the cost of Dexter's booklets was 2 shillings each, so the largest cabinet's price was more than 20 times the combined cost of the accompanying texts.

12 Three different examples can be seen in the record of past sales on the invaluable.com website, two of them with notices on the doors in rectangular rather than arched form. A distinct – perhaps later – version with blue drawer labels and a different design of door notices can be seen at <https://www.sellingantiques.co.uk/970930/victorian-collectors-cabinet-portable-museum-with-contents/>.



three quarters of a million visitors in its first 18 months (Sutton, 2013). The successive editions of the Catalogue of its Educational Division document a rapidly expanding collection over the next few years, and the feverish pace of pedagogical publishing. Dexter took the opportunity of the new Educational Division to donate the Portable Museum and its accompanying publications. These were then duly listed in the catalogue editions. At least one copy of the fourth catalogue edition of 1859 also preserves a rare piece of Dexter's advertising ephemera.

The compilers of the Educational Division catalogues invited publishers to submit their trade lists to supplement the formal part of the catalogue. This free advertising enormously expanded an already substantial publication. The fourth edition had 30 pages of preliminaries and 250 pages of catalogue, but the copy at the University of Wisconsin has a total of 1164 pages – a huge harvest for the connoisseur of advertising. Most of these ephemeral contributions are stuffed with stock listings, whether for school furniture, books or maps. Dexter appears in alphabetical sequence with an atypical offering: a 4-page brochure under the title "Dexter's Cabinet of Natural History", with a detailed breakdown of the 320 specimens in the larger version of the cabinet, and a brief description of the two smaller versions. It also reveals that more avenues for marketing and sale were being added. As well as the South Kensington Museum, the cabinet could also be viewed at the Royal Polytechnic Institution, and bought at a second publisher.¹³

By the time Dexter followed up on *Animal and Vegetable Substances with Mineral Substances: Being an Explanatory Text Book of the Minerals and Metals Used in the Arts and Manufactures* (1858) he was able to incorporate in the endpapers a section of testimonials from a range of sources. A second edition of *Animal and Vegetable Substances* in 1860 further expanded this evidence of reception and use, which now covered more than 7 pages. Dexter drew on positive reviews in literary magazines such as the *Athenaeum* as well as local newspapers (such as the Chelsea and Westminster-focused *West Middlesex Advertiser*) and those with a wider circulation (the *Morning Herald*). Copy in such publications was often lifted with little alteration from Dexter's own works. The Portable Museum was also noticed in the more specialist periodical press. There was

13 Dexter's catalogue listings are at pp. 102, 159 and 169 of [South Kensington Museum] (1859). (Previous editions have not been examined.) The brochure in the University of Wisconsin copy is available at <https://babel.hathitrust.org/cgi/pt?id=wu.89o54398649&seq=477>. Dexter continued to feature in subsequent editions. [South Kensington Museum] (1867) not only lists the full cabinet at p. 246 but in the mineralogy section at p. 346 notes the availability of a more specialised and cheaper offer: "Dexter's Collection of upwards of 100 Specimens of Minerals and Metals. In mahogany glazed case; size 18 by 13 inches. With Explanatory Text-Book. 11 10 s. T. E. Dexter." The supplementary advertising by the publishers A. N. Myers in the Bodleian Library copy of this edition includes a section on "Collections illustrating Geology, Mineralogy, &c" which features the largest and smallest versions of the main Dexter cabinet but not this specific mineral version (unpaginated but at page scan 761 of the PDF at <http://dbooks.bodleian.ox.ac.uk/books/PDFs/591013420.pdf>). The other collections offered by this publisher underline Dexter's position at the top of the range of commercial provision.



a flurry of (often short-lived) new titles on education in the 1850s (Tropp, 1958), testament to the swirling currents of debate and multiple constituencies for the subject. Several of them reviewed Dexter's booklets – *The Literarium or Educational Gazette*, *The School and the Teacher*, *The Pupil Teacher* – and more established publications such as the *Educational Times* were also positive. Dexter was able to recruit praise from several authors and journalists, including W.J. Lake who noted Dexter's cabinet approvingly in the preface to his *Book of Object Lessons. A Teacher's Manual* (1857). Perhaps the testimonials from practising teachers would have weighed most heavily for those seeking reassurance in advance of an expensive purchase. Several heads and schoolmasters in London noted the success of both the cabinet and Dexter's texts, but the Portable Museum was not just a metropolitan phenomenon. Dexter had elicited comments from Wales and Yorkshire, and from different sorts of establishment: a Wesleyan School, a teacher training college, a Commercial School in his former home of Guildford and an Industrial School in Surrey. Some of the testimonials were from colleagues, including the principal of the Ladies College in Chelsea where Dexter also taught. In that case and elsewhere, the cabinet was reported as having been in use since at least 1856.¹⁴

Dexter and his publishers were clearly energetic in exploiting the dynamism of the educational marketplace to ensure the Portable Museum reached a wide audience. He also mobilised personal contacts to create an impressively full set of testimonials. But the Portable Museum was also rooted in Dexter's own teaching practice. His institutional setting provided another – much less familiar – route for the spread of the cabinet.

Institutional context: The Royal Military Asylum

Founded by the Duke of York, the Royal Military Asylum (RMA) opened in 1803 and was originally for orphans of rank and file soldiers killed in the Napoleonic Wars. It was run on a monitorial system, in which the teacher instructed pupils who in turn became responsible for the teaching of the other children. Whatever its charitable ambitions, it was very limited as an educational institution: the curriculum aimed at no more than the basics of reading, writing and arithmetic for children who, if they did not enter the army, were intended to be put out to a trade or domestic service at the age of fourteen.

14 The endpapers of Dexter's publications – including the *Mineral Substances* copy at HSM Oxford – are often defective. Fortunately the British Library has full copies of the minerals text (shelfmark 7108.a.40.) and of a c.1874 reprinting of the 1860 second edition of *Animal and Vegetable Substances* (shelfmark 7002.a.17.). Both have been scanned and are available online at https://access.bl.uk/item/viewer/ark:/81055/vdc_100022612262.ox000001, https://access.bl.uk/item/viewer/ark:/81055/vdc_100040437286.ox000001 respectively.



The school inspector Henry Moseley was instructed to visit in 1846 and delivered a damning report to the Committee of Council on Education: “in the whole of my experience now extensive in the inspection of elementary Schools, I have visited none so little deserving of commendation”.¹⁵ In terms of educational attainment, discipline and diet, Moseley painted a deeply unflattering comparison with the Royal Naval School in Greenwich and he felt bound to express his “sense of the injustice which has been done these children in debarring them almost from their infancy from every element of instruction proper to the growth of their intellectual life”. Part of the problem lay with their instructors. Secular teaching was in the hands of School Serjeants, three of whom had previously been army privates and the other three non-commissioned officers. “In respect to their qualifications for the responsible duty of instructing youth I have no other means of forming an opinion than that which is supplied me by the gross ignorance of the boys under their charge.”

In response to this Dickensian picture, a radical reform was instituted at the RMA with civilian rather than military teachers and the addition of a “Normal School” for teacher training from 1847, accompanied by a “Model School” whose pupils were taught by the trainees. This structure had been developed in experimental form at the Battersea Training School from where Walter McLeod, one of its masters, moved to the RMA to oversee teaching methods. The progressive credentials of Battersea were evident from McLeod’s teaching of arithmetic following Pestalozzi’s method. Significantly, he also included “gallery lessons from objects”.¹⁶ The Battersea precedent was followed at the RMA where, by the beginning of the 1850s, both natural history and object lessons were included in the curriculum.¹⁷ While we do not know the exact date of Thomas Dexter’s arrival as an elementary instructor in the main establishment, it was clearly part of this dramatic overhaul – in the 1851 census he is described as Infant School Master in contrast to McLeod’s role of Model School Master.

McLeod was a much better-known pedagogue than Dexter and must have been a valued ally. Dexter’s preface to *Mineral Substances* anonymously quoted him as an eminent writer on education and in the same book he provided a testimonial which noted that the cabinet “has been used in the schools of this institution for some years”.¹⁸ The

15 National Archives TNA WO 43/796/749; this and the following quotations are cited from the online transcript at http://www.richardgilbert.ca/achart/public_html/articles/york/inspector.htm. This website provides much useful context for the RMA.

16 Allen (1844), p. 69. For Battersea more generally, see Rich (1933), ch. 3, “The Battersea Experiment”.

17 Anon. (1852), p.333. This anonymous review is attributed in the Wellesley Index to the Chaplain-General of the armed forces and inspector of military schools, the Rev. George R. Gleig. This is plausible not least because Gleig figures as a key actor in an extended interlude on the reform of the RMA (pp. 324–334). Though offering a differently accented (and more colourfully journalistic) account of the reform process, it agrees on the shocking nature of its previous educational regime.

18 It may not be a coincidence that, in its endpapers, the British Library copy of the first printing of *Mineral Substances* has a sheet advertising McLeod’s many elementary school books on reading and writing, arithmetic, grammar and poetry.



reference to schools in the plural indicates that its use was not restricted to either the main establishment or the Normal and Model Schools. Dexter himself confirms the point in the preface to *Mineral Substances* (1858) when he notes that he is not the only one at the RMA to teach from the cabinet: “the lessons have been used by himself and the students in training”.

The Portable Museum was genuinely embedded in the teaching of the repurposed RMA. The institution provided not just a testbed but a launching pad for its promotion, since the Normal School produced schoolmaster sergeants who were dispatched throughout the army. In the endpaper advertisement preceding *Mineral Substances* (1858), Dexter not only repeated the message of the cabinet itself – that the Portable Museum was patronised by the Queen – but stated that it was already in use “in the Normal, Model, Regimental, and Garrison Schools of the British army”. In 1860 the phrase was expanded to specify “in this country and in India”.¹⁹ How widely, how effectively and for how long it was used there is unknown. (Similarly for the smaller variant supplied to East India Company schools.) But this extended network shows that, in the period before the state provisions of the 1870 Education Act, there were surprising and novel institutional avenues down which progressive education travelled.

Conclusion: Industry, commerce and empire

Whatever the long-term effect of object lessons in the British army, Dexter’s own larger ambitions centred on preparing pupils who understood the British Empire’s global reach and its commercial and industrial character. The presence of statistical summaries of annual imports and exports in his handbooks underlined both the diversity and the huge quantities of materials coming into and out of the country, and the dizzying sums of money at stake. The Portable Museum miniaturised and made material the remote realm of abstract economic data, making tangible the transformation of raw materials and the movement of products. Whereas “the Great Exhibition of 1851, was an Object Lesson upon a world-wide scale” (Dexter, 1858), the Portable Museum was to spark understanding in the classroom.

In addition to training institutions, commercial, elementary and infant schools and also Mechanics Institutes, Dexter even advertised the cabinet as suitable for home use. One of his testimonials came from the prolific technical journalist Peter Lund Simmonds, who attested that “In my own family your Cabinet has been long highly appreciated, and forms a constant source of attraction both to the children and their friends”. The two men were certainly acquaintances because Simmonds proposed Dexter for membership of the Society of Arts, where the Portable Museum was displayed in the

19 Dexter (1860), p. iv.



Society's 11th annual exhibition in the spring of 1859.²⁰ They were also intellectually aligned, and Simmonds' career conjures the wider ideological world of active colonialism and imperial political economy which the Portable Museum supported. He describes himself in the testimonial as a "scientific writer and popular lecturer" with a special interest in "the details and statistics of commercial products, and our manufacturing industries". The credentials presented after his name indicate how he dovetailed with Dexter's interests: "P. L. Simmonds, Esq., F. R. G. S., F. S. S., author of the "Commercial Products of the Vegetable Kingdom;" "Dictionary of Trade Products;" and many years editor and proprietor of the "Colonial Magazine;" honorary and corresponding member of many home and foreign commercial and scientific societies, &c".

Simmonds had even had a curatorial role in a display of "trade products and objects of natural history" sponsored by the Royal Society of Arts in the wake of the Great Exhibition.²¹ While Simmonds contributed to a providential view of infinite imperial expansion in the waste spaces of underdeveloped colonies, Dexter's vision was perhaps less grand – and certainly less explicitly articulated. But the concrete details of the Portable Museum could nevertheless bring home to children the commercial and imperial order they should serve. As he put it in the preface to *Mineral Substances* (1858): "A long experience as an elementary teacher has proved to the writer that there is no subject so well calculated to arrest the attention; to develop the intelligence; to create new and correct ideas; to impart a sound and practical education; to prepare the pupil to enact his part in the busy scene of life, as a systematic, judicious, and well digested course of Object Lessons".

What of the Portable Museum now? The "correct ideas" and practical education appropriate to Victorian Britain are gone. But in a post-colonial world, Dexter's cabinet has a renewed museum role. With its explicit invocation of empire and industry, it can still serve as an educational resource: no longer as uncritical celebration, but as a window onto a system of production that was global in extent and extractive in character. The neatly arranged compartments of the cabinet's drawers systematically obscure any trace of the struggles and exploitation that the raw materials and manufactured goods represent. But they can now serve as conversation starters to begin the exploration of more complex narratives than those reported by Thomas E. Dexter. In that sense, they are now entering a new chapter as "objects of understanding".

²⁰ Email from the Royal Society of Arts archives, 2 August 2023, confirming that Thomas E. Dexter was elected a member on 30 November 1859 at the proposal of P. L. Simmonds. The Portable Museum was listed in the catalogue of the Annual Exhibition at p.380 of [Society of Arts] (1859); in his search for testimonials, Dexter missed the positive comment in the review of the exhibition in *The Engineer*, 7 (29 April 1859), p. 293.

²¹ For Simmonds: Greysmith (1990) and Cooper (2011).



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