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## Edinburgh Portraits

WILLIAM NICOL, FRSE

c. 1771-1851

LECTURER, SCIENTIST AND COLLECTOR

A D MORRISON-LOW

WILLIAM NICOL was a well travelled Edinburgh promoter of science, who is associated with two inventions of considerable significance. The first was the prism which bears his name, a sophisticated optical filter designed to polarise light. Used in pairs as polariser and analyser, within a microscope, the Nicol prism (fig. 1) was a pioneering device, which enabled minerals to be identified through optical characteristics which derive from their crystal structures. Secondly, Nicol was among the first to use, if not the pioneer who invented, the new and technically demanding method of preparing thin slices

or 'sections' of fossils and minerals for the microscope (fig.2). Both of these advances went largely unrecognised during his lifetime for their far-reaching importance, but in due course they helped to lay the foundations of the modern sciences of mineralogy and petrology.

Nicol lived too early to be recorded in the detailed official registrations of births and deaths in Victorian Scotland. Existing accounts do not altogether agree, but according to the 1851 Census Nicol had been born in the village of Humbie, outside Edinburgh, some eighty years before.<sup>1</sup> There appears to be no record of

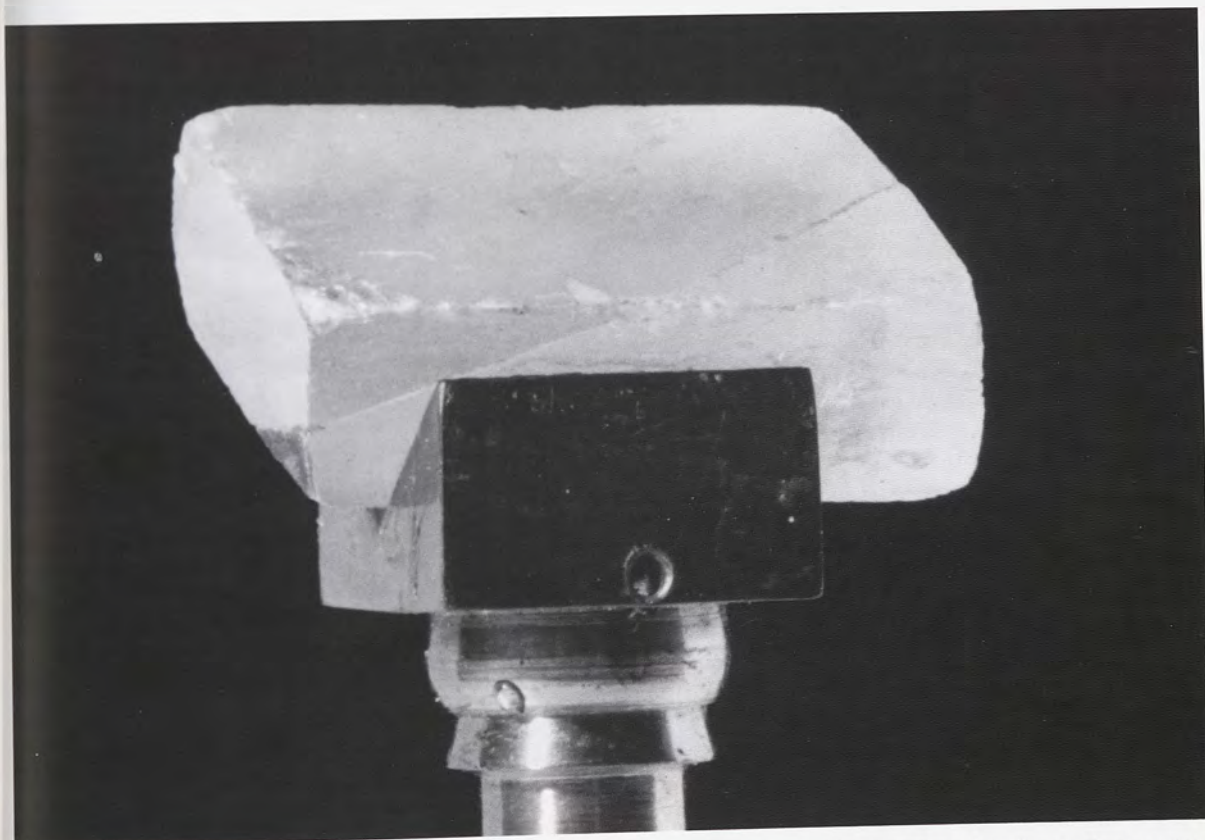


Fig. 1. Nicol prism, made by William Nicol at the age of 80. Now in the Royal Museum of Scotland, Chambers Street. (*Trustees of the National Museums of Scotland; NMS T.1856.54.*)



Fig. 2. Above: Two slides of 'Fossil Wood on glass from Newcastle', bought by Edinburgh University Museum from Nicol in 1836. Below: Early fossil sections, prepared as slides for the microscope, of parts of the fossil tree discovered at Craigleith Quarry outside Edinburgh in 1829, dated 1831 and 1833. (*Trustees of the National Museums of Scotland; NMS T.1984.236.1-2 [above] and NMS T.1984.62.1-3 [below].*)

his birth or baptism, although it can be confirmed from other sources that his parents were Marion Fowler and Walter Nickol or Nicoll, who were married in Humbie in August 1768, and that there was one other child of the union, Marion, born in May 1772, also at Humbie.<sup>2</sup> William Nicol's childhood and youth remain shrouded in obscurity, as does his education. Perhaps the most important influence on his life was the remarkable public lecturer on science, Henry Moyes (1749-1807), who had lost his sight through smallpox at the age of three. Moyes, who is remembered principally as the subject of one of John Kay's celebrated *Edinburgh Portraits*, has sometimes been identified as Nicol's uncle.<sup>3</sup> However, contemporary Scottish manuscript sources have not confirmed a blood relationship: the source of this tradition appears to be a Doncaster newspaper advertisement placed by a third party after Moyes' death, and the story has taken hold through repetition.<sup>4</sup> It seems more likely that the two men were merely close colleagues. Moyes began his lecturing career in Edinburgh, leaving Scotland in 1779 to tour Yorkshire and the English Midlands, where he met with success and encouragement. In Birmingham he encountered members of the Lunar Society, including James Watt and Joseph Priestley, and in 1784 he ventured across the Atlantic where he lectured in Boston and Philadelphia to great acclaim.

William Nicol apparently became the older man's assistant in 1786 on Moyes' return from America and when Nicol was aged about 15.<sup>5</sup> The fact that he adequately filled this role is demonstrated by him being mentioned in two published letters, dated 1800 and 1801, from Moyes to the physician Maxwell Garthshore (1732-1812).<sup>6</sup> Moyes died suddenly in December 1807: 'At Doncaster, aged 57, Henry Moyes, of Edinburgh, MD. He was delivering a course of lectures there on Natural Philosophy; but being seized with a complaint at the stomach, a short indisposition deprived the world of this Learned and truly valuable Character.'<sup>7</sup> Moyes was certainly

appreciated in Doncaster, sufficiently for the local newspaper proprietor to publish, and offer for sale, a print of the joint portrait by a local artist of Moyes and Nicol (fig. 3), and this was the occasion when Nicol was described as Moyes' 'Nephew, and constant Attendant during the last Twenty Years'.<sup>8</sup>

A contemporary, T. A. Ward, living in Doncaster at this time, recorded in his diary that after Moyes' death, Nicol had to return to Edinburgh to 'settle the Doctor's affairs, which no one could understand so well as he'.<sup>9</sup> The inventory of Dr Moyes' effects included 'Philosophical Apparatus' valued at £11.8.2; however, neither the inventory nor his will mentions William Nicol in any capacity, let alone as heir.<sup>10</sup> Moyes' sole heir was his surviving brother Charles, another brother, the Rev. James Moyes of Edinburgh, an Episcopalian minister, having predeceased him. It seems more likely that Nicol went north to Edinburgh in an attempt to purchase Moyes' apparatus, so that he could continue his lecturing career. In this he was successful, for in the October following Moyes' death it was announced that Nicol, now the owner of Moyes' manuscripts and apparatus, would conclude the abandoned lecture course at Doncaster.<sup>11</sup> At the end of this interrupted course, in December 1808, the *Doncaster, Nottingham and Lincoln Gazette* was able to report that audiences had found Nicol a worthy successor to Dr Moyes and that he had been invited to proceed to Nottingham.<sup>12</sup>

This was the beginning of Nicol's career as an itinerant lecturer on his own account, rather than as the valuable assistant and 'eyes' of his famous blind mentor. He is recorded as having given the same type of course as Moyes, usually of twenty or twenty-two lectures, in many provincial centres, including Sheffield, Nottingham, York, Derby, Leeds, Lincoln and Edinburgh.<sup>13</sup> Ward's diary also mentions Nicol lecturing in Sheffield in February 1809, then a visit from Nicol 'on his way from Nottingham to lecture at Leeds' in 1810, and that he gave lectures on natural

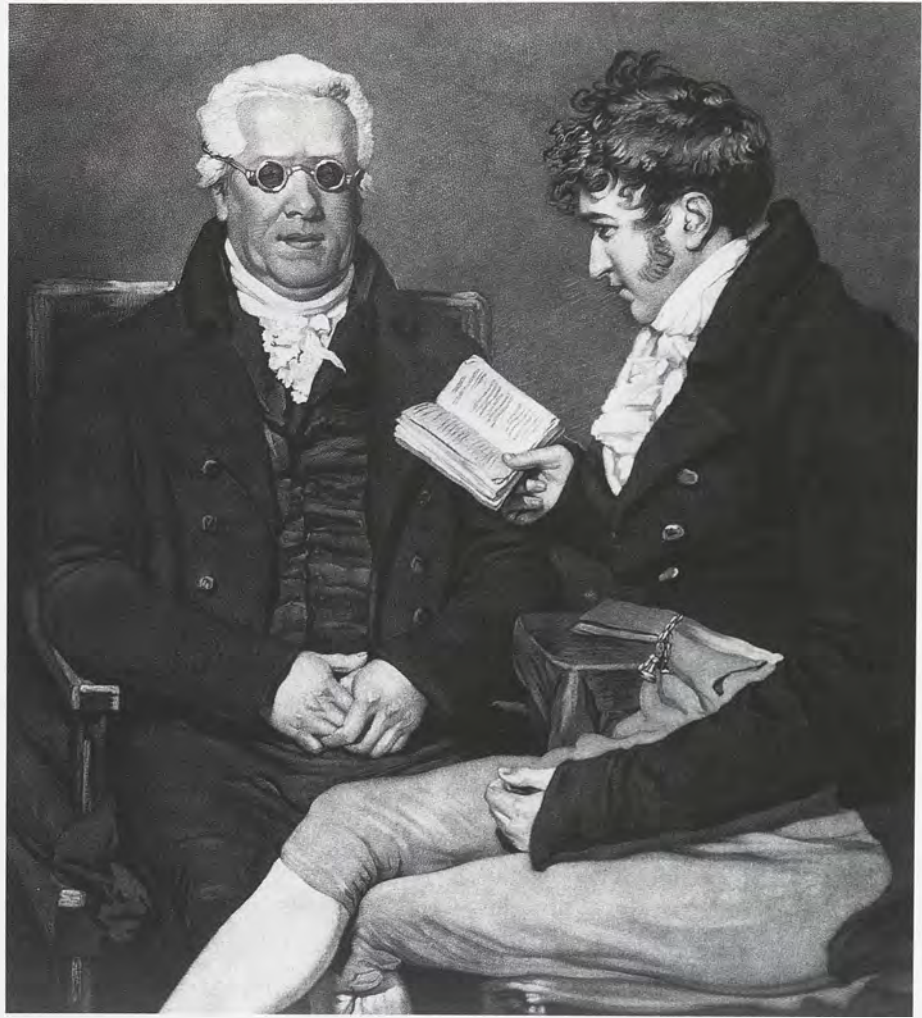


Fig. 3. Dr Henry Moyes of Edinburgh (left) and William Nicol. Engraving by William Ward after the portrait by John Rubens Smith, 1806. (*Trustees of the British Museum.*)

philosophy again in Sheffield in 1818.<sup>14</sup> Harrison has discussed how Moyes' lecture course developed during his career, and how Nicol inherited that plan, of which two lecture prospectuses survive (fig.4), unfortunately both undated.<sup>15</sup> By 1826, Nicol was involved with the newly evolving Mechanics' Institutes which were being set up all over the country, and gave a course of fifteen well received lectures at Derby.<sup>16</sup>

Nicol remained friendly with Edinburgh scientific circles, although he appears to have spent only part of the year in Edinburgh until the early 1830s.<sup>17</sup> He was

elected a Fellow of the Royal Society of Edinburgh in 1838. One of his most influential friends was the professor of Natural History at the University of Edinburgh, Robert Jameson (1774-1854). Jameson was a supporter of the sedimentary theory of the origin of rocks propounded by the German A. G. Werner (1749-1817), and Jameson had been a founder of the Edinburgh Wernerian Society, before which Nicol lectured and demonstrated on a number of occasions between 1814 and 1835.<sup>18</sup> Indeed, all of Nicol's published papers – a dozen in all – apart from two delivered to the British Association for the

Advancement of Science, were published in journals under Jameson's editorship. Jameson also tried to persuade Nicol to accept a professorship in an unidentified institution in 1818. Nicol wrote from Doncaster, where he was lecturing at the time, to a prominent member of the Wernerian Society, George Berry, FRSE (1795-1875), to decline this post, stating that:

In the first place, I can, circumstanced as I now am, realize considerably more after defraying every expence than the other would produce. Secondly my present duties are a mere amusement, the other would harras my soul with destructive anxiety. Thirdly I have become so much habituated to an erratic life which I have led from my infancy that were the pecuniary advantages even ten times greater I should scarcely dare to chain myself down to a permanent abode, and lastly that to a man whose life has extended to nearly half a century – who has already wherewithall to supply his wants – and who feels himself sufficiently happy in his present condition it would doubtless be imprudent to leave the path he has trodden with success ... I am well aware that the superior respectability of a permanent establishment would have considerable weight with many individuals but hitherto at least I have had nothing to complain of in that respect ... I purpose in a fortnight proceeding to Sheffield. I have an audience here amounting to more than a hundred and six weeks does the job.<sup>19</sup>

Here is evidence of a man at ease with himself and his roving lifestyle.

Nicol was elected an Associate of the Edinburgh-based Society of Arts, later the Royal Scottish Society of Arts, in December 1826.<sup>20</sup> It may have been in connection with this improving society, which had close connections with the Mechanics' Institutes, that he gave a series of lectures in Inverness in the summer of 1828.<sup>21</sup> Nicol was now in his late fifties and appears to have settled in Edinburgh about this time, effectively retiring from public lecturing. Despite many recent assertions that Nicol was a lecturer at the University of Edinburgh, there is no evidence for this, and it is likely that his earlier activities have been misinterpreted.<sup>22</sup>

A change in direction of Nicol's life is also signalled by his beginning to publish in 1826, starting with papers on minerals. He had evidently built up a

considerable mineral collection by this time, and was consulted by others with interests in this area. For instance, the famous Scottish physicist Sir David Brewster (1781-1868), who was measuring refraction and polarisation effects in optical crystals at this period acknowledged his debt to Nicol on at least two occasions, in 1826 and 1829.<sup>23</sup> Indeed, it is something of a mystery that Brewster's work on polarisation led to his discovery of 'Brewster's Law' for maximising the degree of polarization at reflecting surfaces, but yet failed to exploit the double-refraction effect in Iceland

**SYLLABUS**  
OF A  
**COURSE**  
OF  
**LECTURES**  
ON THE  
**PHILOSOPHY**  
OF  
**NATURAL HISTORY.**

By *WILLIAM NICOL.*

THIS COURSE

IS COMPRISED

IN TWENTY-~~TWO~~<sup>ONE</sup> LECTURES,

*On the Plan adopted by the late Dr MOYES,*

AND WILL BE ILLUSTRATED BY EXPERIMENTS.

ADMITTANCE to the Whole Course, ONE GUINEA.

to a Single Lecture, TWO SHILLINGS.

EDNBURGH:

PRINTED BY ALEX. SMELLIE

Fig. 4. Syllabus for William Nicol's *Course of Lectures*, undated. (Newcastle-upon-Tyne Public Library.)

spar, harnessed by Nicol to produce an efficient polariser. 'Nicol's prism' was announced by William Nicol in a short paper in 1829, though its significance was not immediately appreciated.<sup>24</sup>

However, Nicol's invention was noticed in due course by William Henry Fox Talbot (1800-1877), the pioneer photographer, and applied by him to the microscope.<sup>25</sup> Although little use was made of the prism in the 1840s and early 1850s, Henry Clifton Sorby (1826-1908) of Sheffield used it in his early papers, which went unappreciated by the geological world at the time, but retrospectively received the credit they deserved.<sup>26</sup> Sorby also used Nicol's thin-section technique, first used in Edinburgh and discussed in a volume about the microscopic structure of fossil plants dedicated to William Nicol by his friend Henry Witham (1779-1844) in 1830.<sup>27</sup> Witham and Nicol subsequently disputed the priority of this invention in some acrimony, Nicol claiming that he had improved a technique used by the Edinburgh lapidary George Sanderson (d.1847).<sup>28</sup>

This dispute marked the end of a fruitful friendship, for in 1829 Henry Witham, his wife and three children had presented William Nicol with a silver snuff box decorated with shell designs (fig. 5), inscribed on the base:

FROM A sincere regard and as a just tribute of Friendship THIS BOX IS PRESENTED TO W<sup>m</sup>. Nicol Esq<sup>r</sup> FLCS &c &c by the following members of the Lartington Conchological Society Henry Witham Esq<sup>r</sup> Mrs Witham Emma Witham Eliza Witham Winnifred Witham Lartington, Co. York 1st June 1829.

In fact, the Lartington society is the earliest conchological society so far recorded, the Conchological Society of Great Britain and Ireland being founded in 1876 as the Conchological Club of Leeds.<sup>29</sup> Amongst the shells in Nicol's collection was one known as 'Nicol's Cone', *Conus nicolii*, the type specimen. It was illustrated, and named by James Wilson (1795-1856), in his *Illustrations of Zoology* in 1831 (fig. 6).

Another author, Captain Thomas Brown, FLS (1785-1862), used items from Nicol's shell cabinet

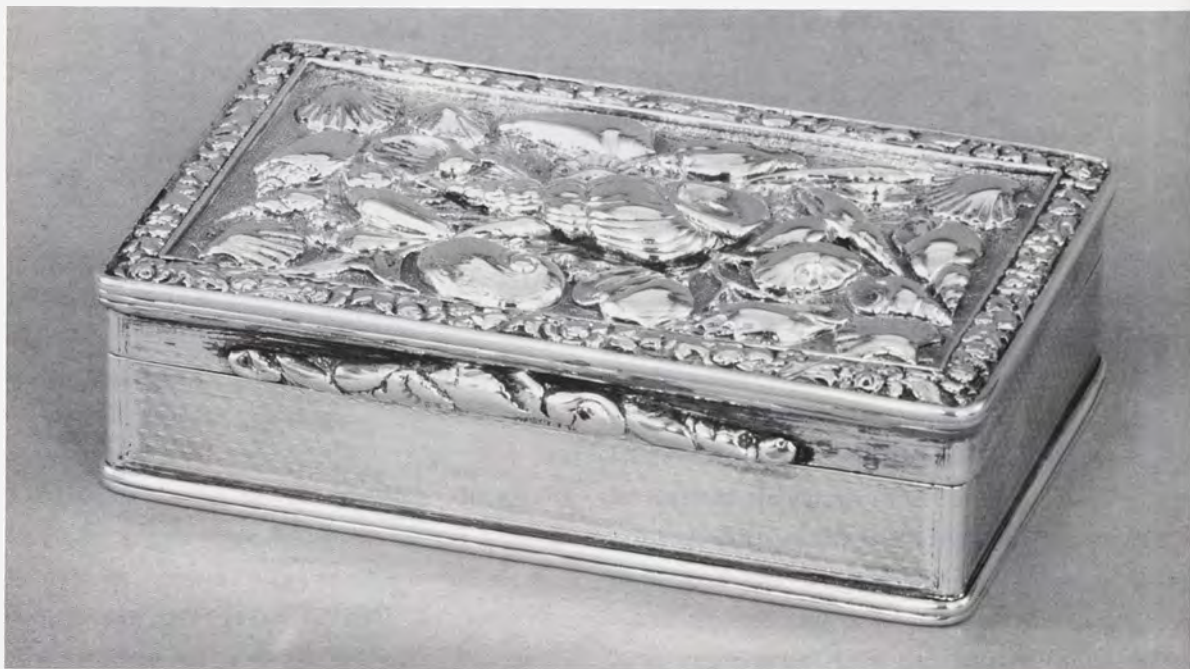


Fig. 5. Silver box, decorated with shell designs, hallmarked for Edinburgh 1828-29, made by A. G. Wightman. Private collection. (*Trustees of the National Museums of Scotland.*)

PLATE XXXVI.



Fig. 6. 'Nicol's Cone', drawn and engraved by W. H. Lizars, plate 36 from James Wilson, *Illustrations of Zoology* (Edinburgh 1831). (Trustees of the National Museums of Scotland.)



in his *Illustrations of the Conchology of Great Britain and Ireland*. In the preface to the first edition of 1827 he credits a 'John Nicol' for allowing him to inspect his collection, but the 1844 edition corrects this to William Nicol. Brown also described two further shells from Nicol's collection in an unsigned article.<sup>30</sup> Their acquaintance evidently stretched over many years, for in 1818 Nicol wrote to an Edinburgh friend:

Enquire what Capt<sup>n</sup> Brown is doing with his advertised work on Conchology. Tell him I got at Scarbro where I was spending six weeks lately some splendid specimens of the Murex Antiquus veldespectus and of the Buccinum Undatum 5 inches long.<sup>31</sup>

After his death in September 1851,<sup>32</sup> Nicol left his shell collection to Alexander Bryson (1816-1866), a younger man who had similar interests, as well as his entire collection of minerals, fossils, books, philosophical and optical apparatus, together with his Edinburgh house and its contents.<sup>33</sup> After Bryson's own death in 1867 the shell collection remained in his family until it found its way to the Royal Scottish Museum (now part of the National Museums of Scotland),<sup>34</sup> and the minerals and fossils were sold at Stevens Auction Rooms, London, where they were acquired by the Trustees of the British Museum in 1868.<sup>35</sup>

## NOTES AND REFERENCES

Over the years many colleagues have helped me to unravel William Nicol's life: Dr Mahala Andrews, David Heppell, Dr A. D. C. Simpson and Dr W. D. I. Rolfe of the National Museums of Scotland; Helen Smailes of the Scottish National Portrait Gallery; Dr Tristram Clarke and Colin Johnston of the Scottish Record Office; and Dr C. D. Waterston and A. R. Waterston, both formerly of the Royal Scottish Museum.

- 1 General Register Office (Scotland), Census of 1851 (Edinburgh, St Cuthbert's), 685<sup>2</sup>/721/16. p. 24. The 1841 Census gives less information. Confusing the issue further, an obituary which appeared in the *Scotsman* on 6 September 1851 states that Nicol died 'in his eighty-third year'. Much of the confusion which surrounds Nicol might have been resolved had the manuscript biography compiled by J. R. Hutchison survived. This was deposited in the biographical files of the Department of Technology, Royal Scottish Museum, by the then keeper, R. W. Plenderleith, in 1964, but sadly a comprehensive search has failed to locate it.
- 2 International Genealogical Index, 1988, East Lothian fiche F0206, p. 1317. William Nicol was described elsewhere as 'son of deceased Marion Fowler, sister of deceased James Fowler at Path-head of Crichton' (Moray District Archives, DJM Ch4/1, 2 April 1813).
- 3 For Henry Moyes, see John Kay, 'Dr Henry Moyes, Lecturer on Chemistry, &c.', *A Series of Original Portraits and Caricature Etchings*, 2 vols (Edinburgh 1837-38), I, pp. 177-179; John Anthony Harrison, 'Blind Henry Moyes, "An Excellent Lecturer in Philosophy"', *Annals of Science*, 13 (1957), pp. 109-125.

- 4 *Doncaster, Nottingham and Lincoln Gazette*, 1 April 1808.
- 5 Harrison, 'Blind Henry Moyes', pp. 119-120.
- 6 *Philosophical Magazine*, 7 (1800), p. 347; *ibid.*, 9 (1801), p. 217.
- 7 *Edinburgh Advertiser*, 15 December 1807. Harrison was unable to confirm where Moyes had obtained his MD.
- 8 *Doncaster, Nottingham and Lincoln Gazette*, 1 April 1808.
- 9 A. B. Bell (ed.), *Peeps into the Past, being Passages from the Diary of Thomas Asline Ward* (London and Sheffield 1909), p. 138.
- 10 Scottish Record Office (SRO), CC 8/11/5, pp. 611-614, Inventory of the personal estate and effects of the late Dr Henry Moyes of Lumbenny; CC 8/8/137, p. 379, Testament of Dr Henry Moyes.
- 11 *Doncaster, Nottingham and Lincoln Gazette*, 7 October 1808.
- 12 *Ibid.*, 9 December 1808.
- 13 Ian Inkster, 'Science and the Mechanics' Institutes, 1820-1850', *Annals of Science*, 32 (1975), p. 454, n. 11.
- 14 Bell, *Diary of Thomas Asline Ward*, pp. 154, 159, 253.
- 15 Harrison, 'Blind Henry Moyes', p. 124. Both pamphlets, entitled *Syllabus of a Course of Lectures on the Philosophy of Natural History by William Nicol*, are to be found in Newcastle-upon-Tyne City Library. Both were printed in Edinburgh; one states on the title page that the course is 'On the Plan adopted by the late Dr Moyes' (see fig. 4), while the other omits the reference to Moyes.
- 16 *Derby Mercury*, 20 September 1826, cited in Inkster, 'Mechanics' Institutes', p. 454.
- 17 He is first listed in the street directories in 1825, as a 'lecturer',

- at 3 Warriston Place; and in 1833 and 1834 at the same address with no profession; then from 1836 until 1851, also with no profession, at 4 Inverleith Terrace.
- 18 J. M. Sweet, 'The Wernerian Natural History Society in Edinburgh', *Freiberger Forschungshefte*, 17 (1967), pp. 205-218.
  - 19 Edinburgh University Library (EUL), Gen. 1996/16, Pollok-Morris MSS., Jameson Correspondence, William Nicol to George Berry, 6 September 1818.
  - 20 *Scotsman*, 9 December 1826.
  - 21 J. Barron, 'The Northern Institution', *Transactions of the Inverness-shire Scientific Society Field Club*, 7 (1906-1912), p. 217.
  - 22 For example, Eugene Frankel, 'Nicol, William', *Dictionary of Scientific Biography*, 16 vols (New York 1970-80), X, pp. 109-110; J. W. Herivel, 'Nicol, William', in Trevor I. Williams (ed.), *A Biographical Dictionary of Scientists*, 3rd edn (London 1982), p. 392; entry 'Nicol, William', in John Daintith, Sarah Mitchell and Elizabeth Tootill (eds), *Chambers Biographical Encyclopaedia of Scientists* (Edinburgh 1983), p. 375.
  - 23 David Brewster, 'On the refractive powers of the two new fluids in minerals, with additional observations on the nature and properties of these substances', *Edinburgh Journal of Science*, 5 (1826), pp. 122-136; David Brewster, 'Account of a remarkable peculiarity in the structure of glauberite, which has one axis of double refraction for violet and two axes for red light', *Edinburgh Journal of Science*, 10 (1829), pp. 325-327.
  - 24 William Nicol, 'On a Method of so far increasing the Divergency of the Two Rays in Calcareous Spar that only one Image may be seen at a time', *Edinburgh New Philosophical Journal*, 6 (1829), pp. 83-84.
  - 25 [W.] H. F. Talbot, 'On Mr Nicol's Polarizing Eye-piece', *London and Edinburgh Philosophical Magazine and Journal of Science*, 3rd series, 4 (1834), p. 289.
  - 26 For a recent assessment, see Beryl M. Hamilton, 'The Influence of the Polarising Microscope on Late Nineteenth Century Geology', *Janus*, 69 (1982), pp. 51-68; also R. H. Nuttall, 'The Origins of Geological Microscopy', *The Microscope*, 25 (1977), pp. 245-250. For the work of Sorby, see Cyril Stanley Smith (ed.), *The Sorby Centennial Symposium on the History of Metallurgy* (New York, London and Paris 1963) and N. Higham, *A Very Scientific Gentleman: the Achievements of Henry Clifton Sorby* (Oxford 1963).
  - 27 Henry Witham, *Observations on Fossil Vegetables, accompanied by Representations of their Internal Structure as seen through the Microscope* (Edinburgh 1831); Nicol's method is outlined on pp. 45-48. The 2nd edition, Henry T. M. Witham, *The Internal Structure of Fossil Vegetables, found in Carboniferous and Oolitic Deposits of Great Britain* (Edinburgh 1833), has deleted all mention of Nicol except one, including the dedication. For biographical information about Witham, see the *Society for the History of Natural History Newsletter*, 19 (1983), pp. 8-9.
  - 28 W. Nicol, 'Observations on the Structure of Recent and Fossil Coniferae', *Edinburgh New Philosophical Journal*, 16 (1834), pp. 137-158; see also A. G. Long, 'The Fossil Plants of Berwickshire, a Review of Past Work. Part 1. Work done mainly in the Nineteenth Century', *History of Berwickshire Naturalists' Club*, 34 (1958), pp. 248-273; and A. D. Morrison-Low and R. H. Nuttall, 'A Note on Early Fossil Wood Sections from the Allen Thomson Collection', *The Microscope*, 32 (1984), pp. 23-28.
  - 29 T. E. Crowley, 'A History of the Society', *Conchological Journal*, 28 (1975), pp. 265-293.
  - 30 [T. Brown], 'Description of Two New Shells', *Edinburgh Journal of Natural History*, 1 (1836), p. 58. For biographical information about Brown, see John W. Jackson, 'Biography of Captain Thomas Brown, 1785-1862', *Memoirs of the Manchester Literary and Philosophical Society*, 86 (1943-45), pp. 1-28.
  - 31 EUL, Gen. 1996/16, Pollok-Morris MSS., Jameson Correspondence, William Nicol to George Berry, 6 September 1818.
  - 32 *Scotsman*, 3 September 1851; obituary, *ibid.*, 6 September 1851. Centenary articles marking this anniversary were J. M. Eyles, 'An Edinburgh Scientist: William Nicol, of Prism Fame', *ibid.*, 1 September 1951 and J. M. Eyles, 'William Nicol and Henry Clifton Sorby: Two Centenaries', *Nature*, 168 (1951), pp. 98-99.
  - 33 SRO, SC 70/4/17, pp. 957-9. Testament of William Nicol, dated 2 April 1842. The house and its contents were left for the remainder of her life to his sister Marion, who died 24 April 1852. For Alexander Bryson, see T. N. Clarke, A. D. Morrison-Low and A. D. C. Simpson, *Brass & Glass: Scientific Instrument Making Workshops in Scotland as Illustrated by Instruments from the Arthur Frank Collection at the Royal Museum of Scotland* (Edinburgh 1989), pp. 112-122.
  - 34 The shell collection is NMS Z.1959.43; the Nicol's Cone type specimen is NMS Z.1954.43.63301. The cabinet in which the collection was housed has carved wooden crests on the doors which have been identified as those of Bryson of Craigton and Nicol, Scotland, from A. C. Fox-Davies (ed.), *Fairbairn's Book of Crests of the Families of Great Britain and Ireland*, 2 vols (Edinburgh 1892).
  - 35 J. M. Chalmers-Hunt, *Natural History Auctions, 1700-1972* (London 1976), p. 106; *Athenaeum*, February 1868, p. 270; *Journal of Botany*, 4 (1867), p. 90; also, W. N. Edwards, 'William Nicol and Henry Clifton Sorby', *Nature*, 168 (1951), pp. 566-567.