

## 5 Specimens of Observation: Edward Hobson's *Musci Britannici*\*

ANNE SECORD

The set of mosses in the Whipple Museum labelled *Musci Britannici*, bearing a title page dated 1818 declaring it to be *A Collection of British Mosses and Hepaticae, Collected in the Vicinity of Manchester, and Systematically Arranged with reference to the Muscologia Britanica, English Botany, &c, &c, &c*, is hard to define (Figure 5.1).<sup>1</sup> It belongs to a genre of publication involving specimens alone that arose out of reservations about the adequacy of drawings in those 'difficult divisions of the Flora' neglected by most botanists.<sup>2</sup> These sets of labelled specimens are known as exsiccatae (from the Latin for 'dried'). They are available in multiple copies, and typically consist of pressed plants all belonging to the same taxonomic group whose identification and arrangement follows that of the most established botanical authorities.<sup>3</sup> The specimens are usually mounted on loose sheets contained in covers or boxes.

The *Musci Britannici* is an early example of such a set of published specimens. It is also an object that, depending on its contexts of use and of preservation, can be seen as a book or as a collection. It thus highlights and straddles the modern division between libraries and museums. Spaces of science have been used to differentiate both practices and things, but the *Musci Britannici* challenges this

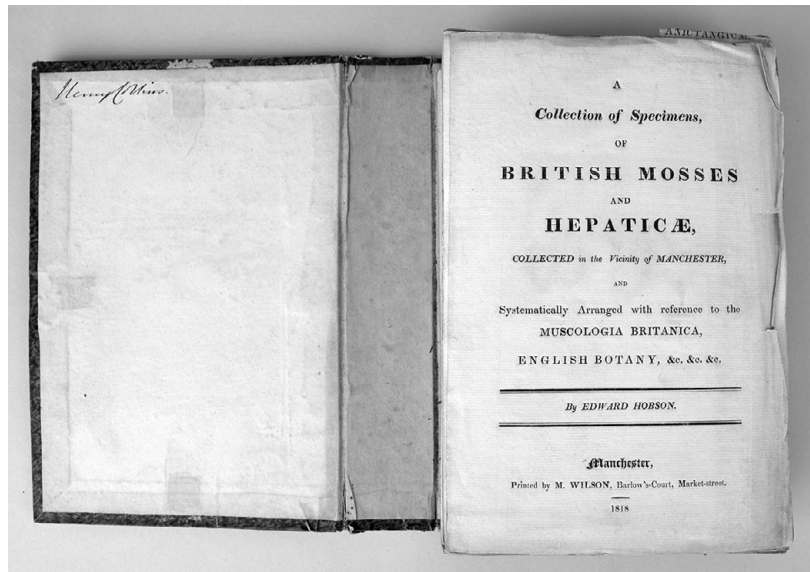
\* I am very grateful to the Gifford family (Kinnordy Archive); the Trustees of the Natural History Museum, London; the Trustees of the Royal Botanic Gardens, Kew; the Herbarium Archive, Manchester Museum, University of Manchester; the West Yorkshire Archive Service, Calderdale; and the Archives of the New York Botanical Garden, for kind permission to quote from manuscripts in their collections.

1 Whipple Museum catalogue number Wh.4577. On the original title page 'Britanica' was spelled incorrectly; some copies of volume one, produced after a second volume was published in 1822, have an altered volume two title page with the correct spelling (see, for example, the copy in the Herbarium, Manchester Museum, University of Manchester).

2 F. Hanham, *Natural Illustrations of the British Grasses* (Bath: Binns and Goodwin, 1846), p. ix.

3 G. Sayre, 'Cryptogamae exsiccatae', *Memoirs of the New York Botanical Garden*, 19, nos. 1–3 (1969–75).

**Figure 5.1** The first volume of Edward Hobson's *Musci Britannici* (Manchester, 1818), showing the casing and title page. This volume contains 119 sheets of specimens. Image © Whipple Museum (Wh.4577).



analytical framework. It also blurs any sharp divide between cabinet and field work, as well as between commerce and the established practice of gift exchange in natural history. As either book or collection, the *Musci Britannici* comes across as a 'black box', in that its scientific and technical work is made invisible by its own success at stabilising and making obvious the objects of scientific study – in this case, the species and genera of mosses and liverworts. It is regarded as both the product and the confirmation of botanical taxonomic practices.

Exploration of the production and distribution of exsiccatae – at a time when taxonomic systems were in formation and discoveries of rare and new species were still being made in certain groups of plants – indicates that, more than books or collections, they were instruments for seeing. The function of the *Musci Britannici* was to hone visual skills and calibrate observational powers. The aim was to produce a consensus about how mosses should be classified by providing the least ambiguous means of observing the basis on which they were ordered.

The *Musci Britannici* did so even for keen field botanists by providing them with the best and most complete specimens available. The importance of having dried plants of this quality was made clear by the Yorkshire botanist Benjamin Carrington, who complained in 1857 that some of his moss specimens were so scrappy that it was 'doubtful how far an opinion can be gained of a

species from such fragments'.<sup>4</sup> When precisely what was being seen was at stake, specimens allowed readers to observe and judge for themselves; they guided and trained the eye in the 'study and collection' of plants.<sup>5</sup> Historians' lack of attention to the observational function of exsiccatae is due perhaps to the more obvious utility and appeal of illustrations. But botanists interested in the classification of contested and difficult groups of plants favoured specimens, precisely because illustrations embodied theoretical decisions concerning which classificatory characters should be noticed.

## Botanical Instruments

Descriptive botany remained the benchmark by which botanists were measured well into the nineteenth century. When, after five successive failures, Charles Darwin was finally elected a corresponding member of the Académie des Sciences in Paris on 5 August 1878, he was surprised to find himself in the botany section rather than zoology. 'It is funny', he wrote to a friend, 'the Academy having elected a . . . member in Botany, who does not know the characters of a single natural order.'<sup>6</sup> Despite his numerous botanical publications, Darwin did not regard himself as a botanist because he engaged in experimental physiological botany and had never done the taxonomic work regarded as fundamental to botanical expertise. Just a year earlier, he had complained to the American botanist Asa Gray that 'It is dreadful work making out anything about dried flowers; I never look at one without feeling profound pity for all botanists, but I suppose you are used to it like eels to be skinned alive.'<sup>7</sup>

The study of plant physiology depended upon intricate experimental set-ups involving apparatus of varying degrees of sophistication. Darwin's son Horace, who undertook an engineering apprenticeship from 1875 to 1878, and established the Cambridge Scientific Instrument Company in 1881, devoted some of his earliest efforts to making instruments for his father's botanical research.<sup>8</sup>

4 B. Carrington to M. J. Berkeley, 23 September 1857, Natural History Museum, London, Botany Library (hereafter NHM), Berkeley Correspondence, vol. 2.

5 Hanham, *Natural Illustrations*, p. vii.

6 C. Darwin to T. H. Huxley, 11 August [1878], *The Correspondence of Charles Darwin* (Cambridge: Cambridge University Press, 2018), vol. 26, pp. 343–4.

7 C. Darwin to A. Gray, 8 March 1877, *The Correspondence of Charles Darwin* (Cambridge: Cambridge University Press, 2017), vol. 25, p. 118.

8 M. J. G. Cattermole and A. F. Wolfe, *Horace Darwin's Shop: A History of the Cambridge Scientific Instrument Company 1878 to 1968* (Bristol: Adam Hilger, 1987).

These instruments were designed to record specific movements in plants, and were inspired by reports of the precision equipment in Julius Sachs's botanical institute in Würzburg, where Horace's brother Francis carried out research over the summer of 1878. After seeing a klinostat, designed by Sachs to measure the effect of gravity on plant growth, Francis told his father that it was 'one machine we must have'. He also expressed his belief that Horace could design an instrument superior to Sachs's, which was 'far from well made'.<sup>9</sup> Francis's confidence was probably based on the expertise Horace had displayed in 1876, when he had built an auxanometer – a self-recording instrument invented by Sachs for measuring the growth of a plant (Figure 5.2).<sup>10</sup>

This emphasis on apparatus, experiment, and measurement seems far removed from the observational taxonomic work Darwin believed marked a true botanist. However, earlier in the century, when floras had yet to be fully catalogued and taxonomic systems based on artificial characters were being challenged by ones based on natural affinities, the classification of plants also required instruments and a variety of manual skills.<sup>11</sup> 'I am become a passionate admirer of the Natural Orders as far as I yet understand them', declared the botanist and future director of Kew Gardens William Jackson Hooker in 1816. Emphasising the 'immense application' that this study required, Hooker was also aware that he had an advantage over most other botanists: 'I may thank my good fortune in having begun Botany with the Cryptogamia, which has given me a habit of dissection that I find of the utmost importance in the analysis of the

9 F. Darwin to C. Darwin, [before 17 July 1878], *The Correspondence of Charles Darwin* (Cambridge: Cambridge University Press, 2018), vol. 26, pp. 295–8. Francis worked as his father's botanical assistant in their home in Down, Kent, from 1874 to 1882. The klinostat designed by Horace Darwin was described and illustrated in Francis Darwin, 'On the Power Possessed by Leaves of Placing Themselves at Right Angles to the Direction of Incident Light', *Journal of the Linnean Society (Botany)*, 18 (1881), pp. 449–55. While Francis believed Sachs's instruments were not well made, Sachs believed the Darwins' botany was wretched; see S. de Chaderavian, 'Laboratory Science versus Country-House Experiments: The Controversy between Julius Sachs and Charles Darwin', *British Journal for the History of Science*, 29 (1996), pp. 17–41.

10 In 1894, E. Hamilton Acton and Francis Darwin, then reader in botany at Cambridge University, stated in their *Practical Physiology of Plants* (Cambridge: Cambridge University Press, 1894), p. 140, n. 2, that the auxanometer constructed by Horace Darwin in 1876 was still being used in the Cambridge laboratory.

11 J. Endersby, *Imperial Nature: Joseph Hooker and the Practices of Victorian Science* (Chicago: University of Chicago Press, 2008), pp. 54–83.

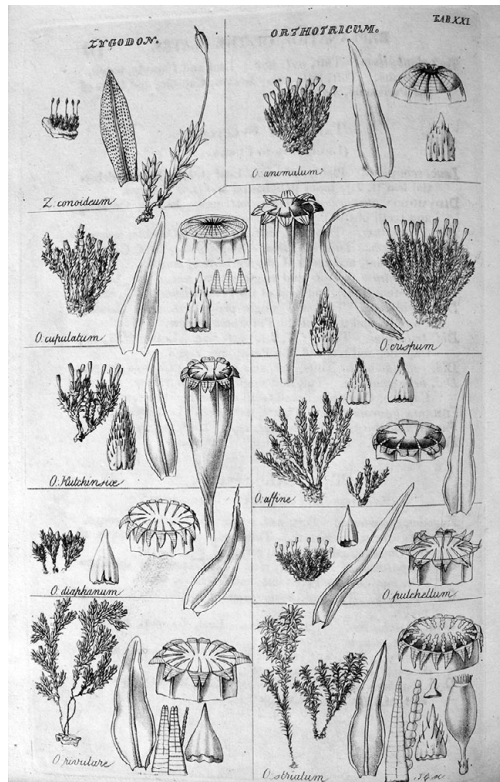
**Figure 5.2** A self-recording auxanometer for measuring plant growth, made by Horace Darwin in 1876. Image © Whipple Museum (Wh.2766).



flowers & fruits of the phænogamous plants.<sup>12</sup> Unlike phaenogams (flowering plants), which were easy to classify using the artificial system of Linnaeus, cryptogams (non-flowering plants such as mosses, algae, and lichens) had long been regarded as some of the most complex groups of plants to order. Not only was their manner of reproduction puzzling and their family connections difficult to determine, but their minute size required the use of a microscope for the detection of the relevant characters by which their identity and affinities could be established.

In late 1816, Hooker was working with the Irish botanist Thomas Taylor on a monograph of British mosses, the *Muscologia Britannica*, which contained both written descriptions and illustrations of the plants at their natural size, with magnifications of the features by which they were classified (Figure 5.3). The skilful manipulation of a microscope, some artistic talent, and a competent engraver were essential to producing reliable information about these plants. But there was nothing easy or consistent about any of these stages. Not only did Hooker and Taylor drastically reduce the number of moss

12 W. J. Hooker to C. Lyell, 2 October 1816 (Kinnordy Archive).



**Figure 5.3** Plate 21 from W. J. Hooker and T. Taylor's *Muscologia Britannica* (London, 1818), showing the magnified features by which mosses of the genera *Zygodon* and *Orthotricum* were identified. Author's copy.

species, they also 'declined quoting' the illustrations in one of the standard floras of the period because they were so 'excessively bad'.<sup>13</sup> The variability in quality of how these plants had been figured by earlier botanists, and the fact that illustrations embodied theoretical decisions concerning which characters were thought to define a species, made the use of dried specimens preferable, especially before the classification of mosses was fully established. An 'admirably preserved & arranged' moss specimen 'is better distinguished than by the most elaborate figure', Hooker stated in a private communication, and he and Taylor also declared this publicly in their illustrated monograph: although they emphasised the 'utmost care' with which their figures of mosses had been drawn, they admitted that well-prepared specimens were far superior 'in point of accuracy to the best of plates'.<sup>14</sup> Hooker and Taylor did not refer to specimens in general but directed their readers' attention to the *Musci Britannici*.

<sup>13</sup> W. J. Hooker to C. Lyell, 9 January 1817 (Kinnordy Archive).

<sup>14</sup> W. J. Hooker to C. Lyell, 14 October 1821 (Kinnordy Archive); and W. J. Hooker and T. Taylor, *Muscologia Britannica: Containing the Mosses of Great*

Systematic botany has been characterised by Lorraine Daston as a process of identification and nomenclature, in which descriptions, illustrations, dried specimens, and actual plants are not interchangeable but interlocked. Descriptions and illustrations aimed to represent plants in general terms, emphasising only the essential characters that distinguished a species, while dried and growing plants conveyed the idiosyncrasy of individuals, omitting none of their non-essential features. The interlocking of these elements of descriptive botany was essential both in the field and in the herbarium.<sup>15</sup> However, until a classification was stabilised through repeated and consensual observation, descriptions and illustrations were not regarded as reliable. The *Musci Britannici* was a key element in establishing the early-nineteenth-century order of mosses.

### Making the *Musci Britannici*

The copy of *Musci Britannici* in the Whipple Museum must be one of the most unusual products of Eton College to end up in Cambridge. It was purchased in 1997 when the Eton College Natural History Museum sold this collection of mosses following the successful sale of several other sets of dried herbarium specimens.<sup>16</sup> The privileged provenance of this copy of *Musci Britannici* stands in stark contrast with the impoverished status of its maker, but in so doing it reflects the history of its production and distribution. It is one of about twenty-five sets made by Edward Hobson, a poor warehouseman in Manchester, in 1818. Hobson was born in Ancoats Lane, a working-class industrial area of Manchester, in 1782, but from the age of three was raised by an uncle in Ashton-under-Lyne following his father's death and his mother's subsequent alcoholism. First trained as a muslin weaver, by 1815 Hobson had become a warehouseman. From 1809, he had established friendships with other artisans in the area who collected plants,

*Britain & Ireland, Systematically Arranged and Described; with Plates Illustrative of the Characters of the Genera and Species* (London: Longman, Hurst, Rees, Orme, and Brown, 1818), pp. viii, x.

15 L. Daston, 'Scientific Objectivity with and without Words', in P. Becker and W. Clark (eds.), *Little Tools of Knowledge: Historical Essays on Academic and Bureaucratic Practices* (Ann Arbor: University of Michigan Press, 2001), pp. 271–4.

16 Maggs Bros Ltd, Catalogue 1224 (1997), 'Medicine, Science and Natural History', item 207.

but it was Hobson who stimulated an interest in mosses.<sup>17</sup> In order to identify the mosses that they found, Hobson visited Chetham's Library in Manchester to consult the most authoritative book on moss classification.<sup>18</sup> Unable to afford a microscope, the only instrument he had to examine his specimens was a 'common pocket lens'.<sup>19</sup>

When William Hooker and Thomas Taylor embarked on their monograph, mosses were regarded as fiendishly difficult – hard to see when growing, impossible to investigate without a microscope, and with no stable classification. Their study required exceptional powers of observation and, given how few botanists collected mosses, a dedication to obtaining specimens. In a botanical community consisting largely of private individuals, held together by correspondence, exchanges of specimens and information, and the bonds of friendship thus generated, the discovery of a keen observer, regardless of social class, was greeted with the same delight as the discovery of a rare plant. On hearing about a workingman whose particular skill lay in the ability to find mosses, Hooker therefore made a point of meeting Hobson for the first and only time in Manchester in 1815. Hobson, who had been allowed a couple of hours off from his work as a packer in a warehouse, delighted Hooker with 'some very excellent mosses' and by 'how well he had named his specimens'. 'I hardly ever saw a man possessed of more enthusiasm than this poor fellow', Hooker declared soon after the meeting.<sup>20</sup> By way of encouragement, he gave Hobson his Ellis aquatic microscope (Figure 5.4). The instrument had been Hooker's 'companion for many years', which

17 'Edward Hobson' in H. C. G. Matthew and B. Harrison (eds.), *Oxford Dictionary of National Biography: From the Earliest Times to the Year 2000*, revised edn, 60 vols. (Oxford: Oxford University Press, 2004) (hereafter *ODNB*).

18 J. Moore, 'A Memoir of Mr. Edward Hobson, Author of *Musci Britannici*, &c', *Memoirs of the Literary and Philosophical Society of Manchester*, 2nd series, 6 (1842), pp. 297–324, on p. 307. According to G. P. Greswell, *Bibliotheca Chethamensis: Sive Bibliothecae publicae Mancuniensis* (Manchester: J. Harrop, 1826), p. 113, Chetham's Library included J. Hedwig, *Descriptio et Adumbratio Microscopico-Analytica Muscorum frondosorum*, 2 vols. (Leipzig: In bibliopolio I. G. Mülleriano, 1787–93), a folio work consisting of illustrations and Latin descriptions of mosses. Chetham's Library, founded in 1653, was one of the very few public libraries in England before the Public Libraries Act of 1850.

19 Moore, 'A Memoir of Mr. Edward Hobson, Author of *Musci Britannici*, &c', p. 321.

20 W. J. Hooker to D. Turner, 14 October 1815, Royal Botanic Gardens, Kew (hereafter RBGK), 'Sir W. J. Hooker Letters', vol. 1, fols. 200–1, WJH/2/1.



**Figure 5.4** An Ellis-type aquatic microscope, similar to the microscope given to Edward Hobson by W. J. Hooker in 1815. Image © Whipple Museum (Wh.1824).



allowed him to know exactly what could be seen through such a microscope.<sup>21</sup>

Hobson not only supplied Hooker with fine specimens of rare and new species of mosses, but also, with Hooker's encouragement and guidance, produced several sets of dried specimens for sale arranged according to Hooker and Taylor's monograph, which was also published in 1818. In early-nineteenth-century Britain, when botany was pursued mainly by independent individuals scattered across the country, often with little or no access to the few public collections of note, herbaria were largely private collections. Moss specialists in particular collected in the field as much as they prepared and studied dried specimens in their cabinets in order to build up their collections, even if they also employed collectors to travel further afield. There was therefore a market for exsiccatae. Hobson's *Musci Britannici* sold for £1, and was widely admired for its excellence and beauty. For Hobson, producing sets of specimens both enhanced his reputation and was a way of making some extra money.<sup>22</sup> The context of the making of the *Musci Britannici* clearly shows the interaction of patronage, commerce, polite exchange, and working-class participation in science.

21 Moore, 'A Memoir of Mr. Edward Hobson, Author of *Musci Britannici*, &c', p. 27. The 'Ellis' was a dissecting microscope with moving objective; see G. L'Estrange Turner, *The Great Age of the Microscope* (Bristol: Adam Hilger, 1989), p. 270.

22 £1 was probably more than Hobson's weekly wage (Moore, 'A Memoir of Mr. Edward Hobson, Author of *Musci Britannici*, &c', p. 322).

The production of sets of specimens for sale reveals a division of labour and distinctions in intellectual or social status. Apart from the initial identification and arrangement of specimens, gentlemen botanists regarded the preparation of exsiccatae as unremunerative and time-consuming work, undertaken only when essential for the benefit of science. Hooker, for example, rejoiced in the public interest in the Reverend Miles Joseph Berkeley's sets of fungus specimens, but regretted 'the great *manual* labor [*sic*] you have in collecting & preparing the specimens'.<sup>23</sup> In contrast, when the Scottish workingman Thomas Drummond began making extraordinary discoveries of mosses in Scotland, Hooker thought it entirely appropriate to encourage him, as he had Hobson, to prepare exsiccatae for sale. Aware that Drummond had a not very 'creditable' character, rather than send him money Hooker proposed to provide him with 'five pounds worth of neatly done up books' in which to fasten the specimens, and to take in return some copies of the work.<sup>24</sup> Drummond was later sponsored to collect in America with the aim of making exsiccatae, but his sudden death in Cuba in 1835 left Hooker feeling obliged to 'convert what specimens of plants are in hand into money' for the benefit of Drummond's family. To this end, Hooker recruited the help of the moss expert William Wilson in Warrington, who was willing to identify Drummond's mosses but not to prepare the exsiccatae. Instead, he considered hiring 'some neat handed female willing to work for 6<sup>d</sup> or 1/- a day' to fasten down the specimens, before persuading his wife to do the work.<sup>25</sup>

Wilson's stress on neat-handedness in preparing exsiccatae is telling, and Hobson struggled more with the basic manual skills of laying down, ordering, and labelling specimens than might appear from his *Musci Britannici*. While Hooker acknowledged that he did

23 W. J. Hooker to M. J. Berkeley, 3 September 1836, NHM, Berkeley Correspondence, vol. 7. Emphasis in the original.

24 W. J. Hooker to Lyell, 16 November 1823 (Kinnordy Archive). Drummond possessed a 'fatal propensity for strong drink' (ODNB). He did, however, produce two volumes of *Musci Scotici; or, Dried Specimens of the Mosses That Have Been Discovered in Scotland; with Reference to Their Localities* in 1824 and 1825, and *Musci Americani; or Specimens of the Mosses Collected in British North America, and Chiefly among the Rocky Mountains* in 1828.

25 W. Wilson to W. J. Hooker, 15 November 1839, RBGK, Directors' Correspondence, vol. 13, letter 174; Wilson to Hooker, [16 March 1840], RBGK, Directors' Correspondence, vol. 15, letter 245. Drummond's mosses were issued in 1841 as *Musci Americani; or, Specimens of Mosses, Jungermanniae, &c. Collected by the Late Thomas Drummond, in the Southern States of North America*, with the title page stating that they were arranged and named by W. Wilson and W. J. Hooker.

‘not know any Naturalist who has searched for Mosses more successfully than Hobson has done in their native stations, nor one who has discriminated them more accurately’, his efforts in bringing out Hobson’s work were directed largely to improving Hobson’s manual skills.<sup>26</sup> From the very start of their exchange, Hooker had urged Hobson to take more care in drying specimens; he was still complaining in 1818 that ‘the specimens you have sent me if they were ever so rare are hardly fit for my herbarium the leaves are so twisted and muddled’.<sup>27</sup> Hooker had also criticised Hobson’s preparation of a specimen that had arrived ‘so loaded with the earth on which it grows that I can hardly distinguish the fructification nor fasten it down in my herbarium’. In preparing *exsiccatae*, neatness was essential. Hooker sent Hobson a published set of Swiss mosses to act as a model, and suggested that Hobson

make up a hundred good specimens . . . & fasten them down *neatly* upon paper of the size & form of the Swiss ones . . . There is no need for so very smart a cover as the one I send. But the whole should be got up *very neatly* . . . Whatever you put in dry carefully & let me see specimens . . . that I may confirm the names . . . Observe not to dry *thick tufts* of specimens, but rather divide them & let them be slightly pressed, so that they may lie well between the papers.<sup>28</sup>

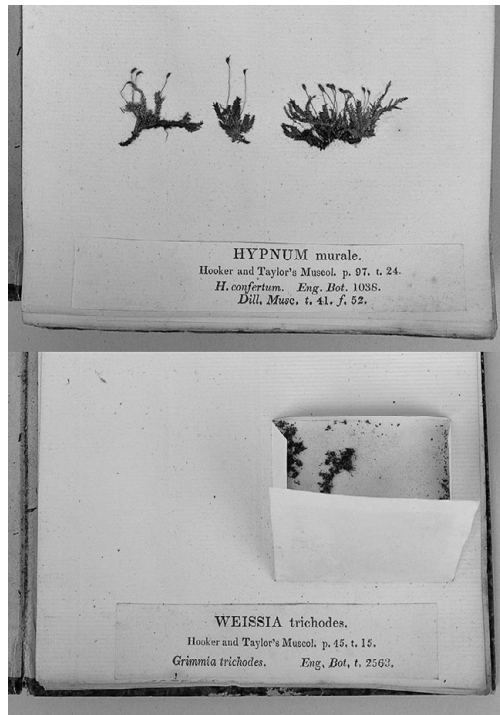
Hobson, acting on this advice, prepared a preliminary set of mosses which ‘much pleased’ Hooker, but also produced another spate of instructions. The paper must be thicker, the casings must accommodate the number of pages exactly, the pages must be cut ‘with an instrument at the Bookbinders’, the ribbands with which the casings were tied needed to be narrower, and the little bands of paper used to fasten down some mosses should be as small as possible and only used for woody stems. ‘I have sent a list of 100 arranged & named correctly’, Hooker told Hobson, suggesting he add ‘the places of growth to such as are not very common’. Two days later Hooker remembered to remind Hobson not to place his mosses in the same place on every page but to vary their positioning so that the pages lay

26 J. Moore, ‘A Memoir of Mr. Edward Hobson, Author of *Musci Britannici*, &c’, [2nd edn] (Manchester: Simms & Dinham, and Samuel Boardman, 1843), title page.

27 W. J. Hooker to E. Hobson, 27 October 1816 and 1 August 1818, Herbarium Archive, Manchester Museum, University of Manchester, GB 2875 BAL/1 (MANCH 595153), Edward Hobson correspondence (hereafter MM), pp. 153 and [160].

28 W. J. Hooker to E. Hobson, 21 June [1817], MM, p. 155.

**Figure 5.5** Pages from Edward Hobson's *Musci Britannici* showing (top) fixed moss specimens and (bottom) a small pocket containing loose specimens. Image © Whipple Museum (Wh.4577).



flat in the case, to fasten them with 'strong gum mixed with flour-paste', and to enclose very minute ones in little cases of paper (Figure 5.5).<sup>29</sup>

Then there were the instructions for the labels. If Hobson did not think he could get the labels printed, Hooker pointedly suggested that perhaps 'some friend' could 'write them in a good hand.'<sup>30</sup> Neatness was an attribute much valued and noted by botanists, and included the labelling of specimens. Good handwriting was thus another manual skill necessary for the maintenance of a well-ordered collection. It was for the herbariums of expert cryptogamists and genteel collectors that the specimens in *Musci Britannici* were destined. Hobson chose to have his labels printed.

29 W. J. Hooker to E. Hobson, 18 August 1817 and 20 August 1817, MM, pp. 157 and 158. The Whipple set no longer has the ribbons by which the loose sheets were secured in the case, but the inside of the case shows faint marks on the side, top, and bottom where they were positioned (see Figure 5.1).

30 W. J. Hooker to E. Hobson, 18 August 1817, MM, p. 157.

## The Publication Circuit

The ability to produce multiple sets of the same plants was limited by the quantity of the rarest specimen.<sup>31</sup> It was therefore essential to build up stocks of specimens before embarking on the sale of exsiccatae. However, given the time-consuming labour of producing sets of specimens as well as the costs involved in printing labels and buying paper and cases, it was also important that Hobson, before starting work, acquired subscribers for the *Musci Britannici* to ensure that he made 'no more than are spoken for'.<sup>32</sup> 'I will do all I can (if you determine upon it) to recommend it', Hooker assured Hobson, '& will mention it in my *Muscologia*, which is now about to appear.'<sup>33</sup> Hooker and Taylor announced Hobson's intention to produce exsiccatae, pointing out how much more accurate and how much cheaper sets of specimens were than plates.<sup>34</sup> The orders began to flow in.

But this was not all that flowed in. Both specialists and enthusiasts began to offer Hobson mosses. The production and distribution of the *Music Britannici* thus reveals how even a commercial enterprise was dependent on the system of knowledge and specimen exchange built up through correspondence networks for mutual benefit of all participants. 'I shall be very glad at any time to supply you with any specimens in my power, that may be likely to be of service to you', the botanist and clergyman William Bree told Hobson after purchasing his copy of *Musci Britannici* and ordering two more copies for Warwickshire botanists.<sup>35</sup> Edinburgh botanist Robert Kaye Greville placed an order after he had seen his friend John Stewart's copy of Hobson's 'valuable work', offering at the same time a good stock of some specimens.<sup>36</sup> Greville continued to supply Hobson with specimens, and by 1820 hoped that what he sent might 'hasten the appearance of a second volume'.<sup>37</sup> Stewart, a botanical lecturer in

31 After distributing Drummond's mosses, Hooker and Wilson complained that his 'stock' of American liverworts was 'very meagre; scarcely sufficing for the 20 sets which are already sold' (W. Wilson to M. J. Berkeley, 28 January 1843, NHM, Berkeley Correspondence, vol. 11).

32 W. J. Hooker to E. Hobson, 21 June 1817, MM, p. 155.

33 W. J. Hooker to E. Hobson, 21 June 1817, MM, p. 155.

34 Hooker and Taylor, *Muscologia Britannica*, p. x.

35 W. T. Bree to E. Hobson, 23 July 1818, MM, p. 123.

36 R. K. Greville to E. Hobson, 28 June 1819, MM, p. 131. John Stewart issued *Hortus Cryptogamicus Edinensis* (exsiccatae) in 1819; see R. Desmond, *Dictionary of British and Irish Botanists and Horticulturists* (London: Taylor & Francis, 1994).

37 R. K. Greville to E. Hobson, 30 September 1820, MM, p. 133.

Edinburgh, also offered to help Hobson, and commented that anyone in Edinburgh acquainted with cryptogamic botany was 'quite delighted' with the *Musci Britannici*.<sup>38</sup> Hooker's close friend and keen muscologist Charles Lyell (father of the geologist) sent choice specimens to Hobson, and also hoped that the demand for the first volume would encourage Hobson to publish another volume very speedily.<sup>39</sup> Susannah Corrie of Woodville near Birmingham regretted she was prevented by illness from sending more specimens, while the plant collector Margaret Stovin of Derbyshire wondered how Hobson made the time 'with other necessary avocations to compleat so beautiful a work'.<sup>40</sup>

Time was the crucial issue. Hooker thought that preparing moss exsiccatae might be a way for Hobson to earn 'a few shillings', but acknowledged that Hobson alone could judge the 'value' of his time and whether it was worth undertaking such work.<sup>41</sup> As demand for the first volume of *Musci Britannici* grew, Hobson himself began to express concern that making up the volumes was so time-consuming that it left him little opportunity to collect mosses. It was only with the help of Hooker and Lyell in particular that Hobson was able to complete twenty-five copies of the first volume and then embark on twenty sets of a second volume.<sup>42</sup> However, progress was so slow that the naturalist John Edward Gray, then an assistant in the British Museum, wrote to the botanist Roberts Leyland of Halifax in July 1822 to enquire whether he knew 'Mr. Hobson the author of the *Musci Brittanici*, a most excellent collection of British specimens of Mosses'. 'I have his first part & wrote directly for the second, but I have [not] heard any thing from him & have lost his Direction,' Gray explained to Leyland.<sup>43</sup> By this time, Hobson had, in fact,

38 J. Stewart to E. Hobson, 6 July 1818, MM, p. 179. When Edinburgh lecturer James Robinson Scott showed his class Hobson's *Musci Britannici*, his student William Jardine immediately placed an order for his own copy (Jardine to Hobson, 13 July 1818, MM, p. 165). Scott went on to issue *Herbarium Edinense* (exsiccatae) in 1820 (Desmond, *Dictionary of British and Irish Botanists and Horticulturists*).

39 C. Lyell to E. Hobson, 18 January 1819, MM, p. 170.

40 S. Corrie to E. Hobson, 18 April [1822] and 6 November 1823, and M. Stovin to Hobson, 12 April 1829, MM, pp. 125, 126, and 180. Susannah Corrie was the wife of the Unitarian minister John Corrie, who was president of the Birmingham Philosophical Society from 1812 to 1839.

41 W. J. Hooker to E. Hobson, 21 June 1817, MM, p. 155.

42 Draft of a letter from E. Hobson to W. J. Hooker, n.d., MM, p. 159; E. Hobson to C. Lyell, 3 February 1819 (Kinnordy Archive).

43 J. E. Gray to R. Leyland, 24 July 1822, West Yorkshire Archive Service, Calderdale, SH:7/JN/B/66/78.

begun preparing his second volume, and Hooker was one of the first to receive a copy in 1822. Declaring himself 'much pleased' with the 'very interesting volume', Hooker urged Hobson to supply as quickly as possible copies to the purchasers of the first volume who wished to buy the second.<sup>44</sup>

The publication of a second edition of Hooker and Taylor's *Muscologia Britannica* in 1827, detailing some newly discovered species, prompted Hobson to consider a third volume of *Musci Britannici*. At this point it was not time that Hobson lacked but specimens, as he explained to Hooker: 'In consequence of the Bankruptcy of my late Master . . . I am now out of employment for some time and should have time to go on with a third Vol<sup>m</sup>. of British Mosses &c if I had sufficient quantity of some species that are mentioned in the annexed list.'<sup>45</sup> On this occasion, however, Hooker was discouraging. He did not possess sufficient specimens himself and did not think Hobson could obtain adequate supplies to make up volumes 'without great delay'; instead he suggested that the volume be devoted to cryptogams more generally and also mentioned that Hobson could obtain Scottish mosses by 'entering into an exchange' with Hooker's Scottish protégé, Thomas Drummond.<sup>46</sup>

The production of Hobson's *Musci Britannici* shows that, even as a commercial object, it depended upon the networks of polite exchange. But it is important to recognise just what was being purchased. It was not the case that gentlemen like Lyell provided Hobson with specimens that were then sold back to them. The principle of gift exchange in natural history with respect to specimens and knowledge was not violated.<sup>47</sup> Rather, what was being paid for was the manual labour involved in making exsiccatae and the quality of the specimens included therein. This was especially the case with species that were difficult to find 'in fruit', that is with the capsules that were essential to identifying some species of moss. The difficulties of collecting sufficient fruiting plants, the time-consuming fixing of specimens, and the system of payment may have

44 W. J. Hooker to E. Hobson, 8 June 1822, MM, p. 162.

45 E. Hobson to W. J. Hooker, 20 June 1827, RBGK, Directors' Correspondence, vol. 8, fols. 32–3 (letter 22).

46 W. J. Hooker to E. Hobson, 20 March 1828, MM, p. 164. Hobson, in fact, persevered and a few copies of a third volume of *Musci Britannici* were produced (see, for example, the set in the Herbarium, Manchester Museum, University of Manchester).

47 For acceptance of these norms of exchange by all social classes, see A. Secord, 'Corresponding Interests: Artisans and Gentlemen in Nineteenth-Century Natural History', *British Journal for the History of Science*, 27 (1994), pp. 383–408.

made preparing exsiccatae unappealing to gentlemen botanists, but such work did not threaten the norms of exchange networks.

## Conclusion: Exsiccatae Unbound

The role of different observational tools for seeing in botany is exemplified in the early career of William Hooker's son Joseph. When Joseph Hooker set off as assistant surgeon and ship's botanist on an expedition to the southern oceans and Antarctica, his ambitions included describing a genus of mosses for his first paper at the Linnean Society of London.<sup>48</sup> Conditions were hardly favourable. In rough icy seas often 'he & his microscope had to be lashed to the table from the rolling of the ship'.<sup>49</sup> Nonetheless, Joseph managed to produce copious drawings of highly magnified dissections that were essential for identification. His appreciation of the rationale behind the classification of this difficult group of plants had, however, been formed much earlier through exsiccatae.<sup>50</sup> In the calmer waters of Berkeley Sound, Falkland Islands, he received a reminder of what had inspired his love of mosses. His father had sent him, half way round the world, the recently published 'Memoir of Mr. Edward Hobson'.<sup>51</sup> Although Joseph regarded himself 'a born Muscologist' because both his mother and his father independently began their botanical studies with the mosses, his latent powers were, he claimed, stimulated 'by a book in my father's library . . . by Edward Hobson, of Manchester'.<sup>52</sup>

48 J. D. Hooker to W. J. Hooker, 25 November 1842, RBGK, 'J. D. Hooker Correspondence 1839–45 from Antarctic Expedition', letter 72 (fols. 128–33), JDH/1/2.

49 W. J. Hooker to W. Wilson, [1843], RBGK, 'Letters from W. J. Hooker', fol. 90, WJH/2/8.

50 For more extensive discussion of exsiccatae as observational tools, see A. Secord, 'Pressed into Service: Specimens, Space, and Seeing in Botanical Practice', in D. N. Livingstone and C. W. J. Withers (eds.), *Geographies of Nineteenth-Century Science* (Chicago: Chicago University Press, 2011), pp. 283–310. Exsiccatae are still a common way for lichen taxonomists to convey and distribute their species concepts.

51 This copy of Moore, 'A Memoir of Mr. Edward Hobson, Author of *Musci Britannici*, &c' bears the inscription 'J. D. Hooker. R.N. | H.M.S. "Erebus" | Received Berkeley Sound | Falkland Isl<sup>s</sup> | Nov<sup>r</sup>. 23. 1842.' (RBGK, Library, P920.HOB).

52 L. Huxley, *Life and Letters of Sir Joseph Dalton Hooker*, 2 vols. (London: John Murray, 1918), vol. 1, pp. 3, 5; and 'Sir Joseph Hooker's Reminiscences of Manchester', *Lancashire Naturalist*, 1 (1907–8), pp. 118–20, p. 119, reprinted from *Manchester Guardian*, 30 March 1898, p. 10. Joseph's mother, Maria Hooker, was the daughter of Dawson Turner, who had studied and published on cryptogamic botany.



The *Musci Britannici* probably remained part of William Hooker's library until his death in 1865, when his cryptogamic collections, his private property up to this point, were sold to the Royal Botanic Gardens at Kew, where he had served as director from 1840.

The Yorkshire botanist and clergyman James Dalton, Joseph Hooker's godfather and William Hooker's close friend, probably kept his copy of Hobson's *Musci Britannici* in his library too. But this presented Dalton with a dilemma when he decided to donate his moss herbarium to the York Philosophical Society. He wished to include the mosses prepared by Hobson in his collection as they possessed 'the *authority* of a good Muscologist'. There was only one solution. Dalton hoped that Hobson would not be 'offended' by his 'begging to be considered a purchaser' of another set of specimens because he could not bear to break up the 'beautiful' set he had already received.<sup>53</sup> Moreover, for those actively studying mosses, dissection of specimens was often essential; for this reason the Irish botanist Thomas Taylor had asked for duplicates of Drummond's American mosses 'in order that he might be able to preserve the published spec<sup>ms</sup>. from mutilation'.<sup>54</sup>

Hobson's *Musci Britannici* was an observational tool. Yet, from the perspective of the present, it is all too easy to regard it only as a self-explanatory taxonomic exercise showing how a particular group of plants was classified at a specific point in time. Hobson's *Musci Britannici* is thus taken to represent the end point of a collection rather than a stimulus to observation. Many of the copies in public institutions reinforce this notion. Where preserved in libraries, the scientific relevance of the *Musci Britannici* has dwindled to little more than a collection of specimens trapped in an obsolete taxonomic system. The most extreme case is the copy in Chetham's Library, Manchester, which has been bound as a book. In contrast, when found in herbariums, the pages of *Musci Britannici* are either dispersed among the larger collection of plants, or, if kept in their covers, reordered by later users who have arranged and renamed the specimens according to more recent

53 J. Dalton to E. Hobson, 20 March [1819], MM, p. 127. W. J. Hooker gave Joseph the second name of Dalton after James Dalton, and both editions of Hooker and Taylor's *Muscologia Britannica* are dedicated to Dalton.

54 R. Spruce to W. Wilson, [31 October 1843], Archives of the New York Botanical Garden, William Wilson Papers.

classifications.<sup>55</sup> Even those copies that remain in their original format relatively intact, like the copy in the Whipple Museum, no longer explicitly impart their function as a method for learning how to observe. It is by considering both production and consumption that the *Musci Britannici* shows its potential as an instrument of observation. The point of exsiccatae was not only to convey a systematic understanding of difficult groups of plants, but also to hone observational skills by guiding and training the eye. The publication of specimens labelled with their species names and arranged into genera provided a way for the botanical community to calibrate its vision and test new classifications.

55 For example, the Manchester Central Library set (BR 588.2 Ho 1) was later rearranged according to William Wilson's *Bryologia Britannica* (London, 1855), while the set in the Olney herbarium, Brown University, was reorganised according to P. Bruch, W. P. Schimper, and T. Gumbel's *Bryologia Europaea* (6 vols., Stuttgart, 1836–55).