

## SCIENCE IN THE PUB: ARTISAN BOTANISTS IN EARLY NINETEENTH-CENTURY LANCASHIRE

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“Do you not think, sir, as I am unknown ... I might make inquiries, and ascertain the feeling of the people better if I went on foot...?”

“That is a wise thought of yours.... But country people are inquisitive; what do you propose to be?”

“Well, sir, ... I could represent myself as an artist; or I could cram my pockets with plants and roots as I went along, and say I was a botanist in search of specimens.”

“Stick to the artist, Jabez; our country botanists would soon floor you on their own ground — they know more of plants than pencils, I’ll warrant.”

(Mrs G. Linnaeus Banks, *The Manchester man*)<sup>1</sup>

Historians have often been frustrated in recovering the perspective of working-class participants in the pursuit of knowledge, especially when this involves the natural sciences. With a few notable exceptions, the study of working-class science has revealed more about the dominant middle-class ideology than its supposed subject matter.<sup>2</sup> Such studies reflect a model of popular science that Whig social reformers believed in: a diffusionist model in which knowledge was handed down in Mechanics’ Institutes or through the publications of the Society for the Diffusion of Useful Knowledge. Heroic biographies of working men published in ‘improving’ journals and later in the more celebrated works of Samuel Smiles and William Jolly, purported to show the moral benefits of such pursuits and to promote the philosophy of individual self-help.<sup>3</sup>

Largely informed by this literature, historians have noted the involvement of artisans and operatives in natural history as it became increasingly popular in the late eighteenth and nineteenth centuries. That manual workers could participate in this area has been attributed to the accessibility of nature and natural productions; the gathering of specimens, it seems to be assumed, required little expertise. Amusing accounts of working men using Latin names while speaking in broad dialect are quoted, but little attention has been paid to how or why these men acquired this terminology in the first place.<sup>4</sup>

Rather than view the working classes merely as a problem for Broughamite Whigs anxious to establish a disciplined work force through the use of science

education, this essay sets out to investigate the practice of science from a working-class point of view. The artisan botanists of Lancashire provide an unusually rich source for such a study.<sup>5</sup> However, this has not been generally perceived because of the failure to locate the artisan botanists in context. It is only once the *place* in which they practised their science has been established that it becomes possible to attempt to recover the experience of participants — from the illiterate gatherer of plants to the most expert with a command of the Linnaean system — and to show how the entire range of this activity was a communal concern.<sup>6</sup>

My focus on the artisan botanists as a group is therefore deliberate. Inevitably, most of the evidence available concentrates on, or is provided by, the botanical ‘experts’ or ‘leaders’ among the artisans. Once placed in context, these men can be seen both to embody and to manage the tense relationship between oral and literary cultures; an analysis of their practice allows us to break the dichotomy between these traditions. To discuss this handful of men in individual terms, as previous studies have done, obscures the context from which they came. It also reinforces the assumption that working-class women were not interested in such pursuits, rather than challenging us to investigate why artisan botany was associated with working *men* in the early nineteenth century. Aspects of working-class botanical practice become clear only in the light of recent historical work explicating the artisan mentality and the view of status being dependent on the possession of a skill.

My interpretation draws on tools from anthropology and sociology for the analysis of social practices. In particular, this study is informed by Pierre Bourdieu’s notion of “habitus”, that is, the shared set of dispositions of a group which generate both individual and collective practices. It also draws on Susan Leigh Star and James R. Griesemer’s discussion of the way in which different “social worlds” intersect in the production of scientific work.<sup>7</sup> The latter provides insights into how cooperation is achieved even though scientific practices and objects might have different meanings to participants from different social groups. The meaning of certain practices, Bourdieu would argue, results from the habitus of a group. Habitus is those attitudes and feelings, both individual and collective, which are produced by shared conditions of existence. Embodied in behaviour, habitus allows for the mixture of freedom and constraint which characterizes social interaction.<sup>8</sup>

The perspective gained from the notion of habitus and an emphasis on the distinction between different social groups, provides the means of understanding the interaction between artisan and gentlemen botanists with regard to artisanal codes of conduct as well as those of gentlemen. Thus, the artisan botanists provide a particularly good example of the intersection of ‘popular’ and ‘élite’ culture. But in order to analyse this relationship, we need to dispel the notion that ‘popular’ and ‘learned’, or ‘high’ and ‘low’, culture are fixed categories defined by their content, and see them instead as emergent social

constructs of the dominant class in the early nineteenth century. In the period when science came to be imbued with cultural authority, the practice of artisan botanists enables us to investigate popular science from a fresh perspective.

#### PLACING ARTISAN BOTANY

Discussions of working-class cultural endeavour often focus on north-west England where, as E. P. Thompson noted, in the early nineteenth century “there was certainly a leaven amongst the northern weavers of self-educated and articulate men of considerable attainments. Every weaving district had its weaver-poets, biologists, mathematicians, musicians, geologists, botanists”.<sup>9</sup> Artisan naturalists have a high profile in these accounts. But by ignoring working-class attitudes to the use and power of such knowledge, particularly the attempt to participate in the culture of the educated classes, these studies tend to portray this activity as too insulated and too limited in its ambitions. Thus, David Vincent claims that working-class naturalists were “simply men who enjoyed walking in the countryside around their homes ... there is little evidence of much personal contact between educated and self-educated botanists or geologists”.<sup>10</sup> Even historians of natural history sensitive to the context of the artisans have considered their enthusiasm for natural history, and botany in particular, as “remarkable” but “unambitious”.<sup>11</sup>

Historians of working-class leisure have also misrepresented the naturalists. Hugh Cunningham draws on commentators who saw the factory system as responsible for producing a new breed of “physically weak ... mentally alert ... over-excited” workers, who found an outlet for their nervous energies either in the “depravity of the beer-house” or in “the intellectual leisure of botany, music or reading”. Peter Bailey, on the other hand, recognizes that popular recreations even within the pub included much that could be labelled “rational”. But, while he considers the emergence of debating societies and choirs as part of “the continuing communal nature of working-class recreation”, he sees the pursuit of natural history as characteristic of “the working-class solitary”.<sup>12</sup>

These interpretations illustrate the problems historians have in placing scientific pursuits in the world of popular culture. In part this difficulty is due to the success of the view of science as knowledge that is universal, true and objective. Concomitant with this view, as Steven Shapin and Adi Ophir have argued, is the idea of the philosopher as “a solitary ... placed nowhere in particular on the map of culture”.<sup>13</sup> In a class context this is reinforced by studies of literacy emphasizing that “reading and writing are essentially solitary activities” in contrast to oral traditions.<sup>14</sup> Cunningham and Bailey seem to imply that science itself has the power to dissociate working-class practitioners from their own cultural milieu.

If, however, we accept with Shapin and Ophir that “knowledge ... has an irredeemably local dimension” and that “it possesses its shape, meaning, reference,

and domain of application by virtue of the physical, social, and cultural circumstances in which it is made, and in which it is used", then situating knowledge becomes a crucial starting point for the analysis of working-class science.<sup>15</sup> In the case of the Lancashire naturalists, this focus on the place of science means looking at the very heart of popular culture, the public house.

The centrality of the pub in working-class life enables us to construct a context which, despite the paucity and highly mediated nature of much of the evidence, allows us to move from description to analysis in the investigation of artisan science. The perspective gained from focusing on the place of science is particularly helpful for revealing the social world of the artisan botanists and for treating them as a group, rather than as heroic individuals. It opens up the possibility of understanding what it meant for artisans to be engaged in actual scientific practice in a working-class space. We can then analyse the relationship of these artisans both to their own culture as well as to that of the scientific elite, thereby drawing together the differing images of the Lancashire naturalists in the secondary literature.

The pub as the place of artisan science is not obvious from many of the best-known sources, including those by Samuel Bamford, Elizabeth Gaskell and Friedrich Engels.<sup>16</sup> For working-class writers like Bamford, the pub was so much part of everyday life that it was probably not worth commenting on, but the reasons for the invisibility of the pub in most of the literature are an important part of the construction of the middle-class image of the artisan naturalist. The problem of locating artisan botany is especially clear in the two most extensive biographical accounts, by Leopold Hartley Grindon, cashier and botanical lecturer in Manchester, and James Cash, journalist and botanist.

Grindon's *Manchester walks and wild flowers* of 1859 stresses the pastoral, as its title implies. Grindon urged the inhabitants of "grim, flat, smoky Manchester" to "court nature". When "two or three go botanising together," he contended, "new and pleasing links of sympathy are established.... In the town we stand apart, excited and repelled by selfish and rival interests, but in the tranquillity of the fields and woods, united in common pursuits, our jealousies are forgotten, every man is an equal and a brother." Moreover, natural history collections also provided "employment ... for our leisure hours at home". Grindon's book is devoted primarily to describing the botanical delights of various locations around Manchester. The artisan botanists, he told his readers, "acquired their knowledge in the scenes we speak of".<sup>17</sup> Cash's *Where there's a will, there's a way! or, science in the cottage: an account of the labours of naturalists in humble life* of 1873, celebrates the naturalists for their "homely virtues", which he believed gave more satisfaction than political agitation.<sup>18</sup> The "moral feelings" of the artisan naturalists were, he claimed

Strengthen'd and brac'd by breathing in content  
The keen, the wholesome air of poverty.

This quotation from Wordsworth's *Excursion* served to summon up the image of rural cottages, domestic virtue, solitude and true knowledge from nature.<sup>19</sup>

Grindon and Cash associated the working-men naturalists with the pastoral and the home in order to promote, through exemplary biography, the moral benefits of natural history and its suitability for one's hours of leisure.<sup>20</sup> In so doing, they effectively *displaced* artisan science. For, aware of the strong temperance and Sabbatarian movements, Grindon and Cash faced the problem of explaining that the Lancashire artisans held botanical meetings on Sundays in public houses. Pursuits like natural history, after all, were supposed to tempt the working classes away from the pub.<sup>21</sup> Both men referred to the Sunday pub meetings and defended the botanists in the space of little more than a page of their respective works: Cash, a devout Presbyterian, deflected attention away from the pub and back to nature and nature's God, while Grindon effectively neutralized the twin vices of Sabbath breaking and drink by likening the conduct of the artisans in their meetings to that of a "religious service".<sup>22</sup>

In order to understand this emphasis, we need to recognize (as Cunningham has stated) that rational recreation was not invented by the middle class for imposition on the working class, but rather lay in middle-class experience itself. From the late eighteenth century, the increasing economic power of manufacturers, merchants and professionals was translated into a moral and cultural authority. Time away from work was to be devoted to sober, serious, ordered and morally elevating activities (music and the sciences being prime examples), which emphasized the mind and not the body. The moral superiority of the middle class was grounded in their pursuit of rational recreation in contrast to what they saw as the dissipation of the upper classes as well as to the sensual uncontrolled nature of the amusements of the lower orders. Their commitment to rational recreation was manifested in libraries, assembly rooms and literary and philosophical societies. For increasingly powerful liberal dissenting groups in towns like Manchester, intellectual (particularly scientific) culture was widely equated with moral elevation and enhanced social status. Until the 1820s, rational recreation was exclusive to the middle and upper classes. As the problems of public order and industrial discipline increased, however, it was seen by social reformers as one of the most effective means by which middle-class values could be transmitted to the working class. In this way, they believed, popular values and customs would be replaced by a common morality which would produce social order.<sup>23</sup>

From the 1820s, debate raged about the best ways to effect this moral improvement in the working classes. Although the aims and means suggested by various groups differed, there was broad agreement that social reform depended on tempting working people away from the public house. Temperance reformers and Sabbatarians focused attention on the evils of drink; but public houses were also attacked because of their strategic role in the organization of working-class culture and their association with seditious gatherings. Even friendly

societies, welcomed by the middle class as signs of self-help among the working class, were viewed with suspicion because they met in pubs.<sup>24</sup>

The discovery, then, that rational pursuits, especially science, were associated with the pub was inconceivable to many in the middle class: it trumpeted the failure of such knowledge to imbue its consumers with the desired notions of order, self-control and sobriety. This was not simply because drink was equated with sensual and often bestial behaviour, but also because the pub was the most securely established and enduring bastion of working-class culture, impenetrable by those outside this culture.

The importance of the pub in working-class life has emerged clearly in recent investigations of popular culture, work and leisure. Such studies have emphasized that the dichotomy between work and leisure was not typical of early nineteenth-century artisans. The pub operated as an extension of the workplace: not only were working men paid there, but many houses were trade specific. They operated as houses of call, and were the location of friendly societies, benefit clubs, and illegal trades meetings. Drinking itself was often exclusive to particular occupational groups. The close union between a trade and a particular public house was often reflected in the names of pubs such as "The Carpenters' Arms", "The Spinners' Arms" or "The Hatters' Arms". The collective values and beliefs of the working community were thus sustained in both the workplace and the public house. The pub was also where most popular recreations took place, with publicans sponsoring a whole range of activities from bull-baits to gooseberry shows. Middle-class reformers, whose lives reflected a sharp distinction between work and leisure, urged the working classes to spend their leisure hours at home. In so doing, however, they ignored the fact that for many artisans, especially weavers and shoemakers, home was their workplace. The pub, therefore, offered far more than drink. As Leon Faucher, visiting Manchester in 1844, noted:

The public-house is for the operative, what the public squares were for the ancients. It is there where they meet one another, and where they discuss the topics in which they are interested. Their meetings, whether permanent or accidental; their masonic lodges; their mutual aid societies; their clubs and secret societies, are all held in public-houses.<sup>25</sup>

Although the pub was by its very definition *public*, during the first half of the nineteenth century it rapidly became an exclusively working-class location. By 1850 "no respectable urban Englishman entered an ordinary public-house, and by the late 1830s the village inn, where all classes drank together, had become a nostalgic memory".<sup>26</sup> To the middle class, the public house together with the workplace represented, as Clive Behagg has argued, "an unknown culture at its strongest points": the two loci at which "working-class culture appeared at its most impenetrable".<sup>27</sup> This change came about as much from the withdrawal of upper-class patronage of sports such as cock-fighting and the middle-class

preference for rational recreation, as from the development of working-class organization derived from the collective values of the workplace.<sup>28</sup>

Place assumed immense cultural and political importance in the nineteenth century as space itself became class-specific. Enclosure, the game laws, and the geographical demarcation of towns like Manchester effectively excluded the poor from space that was formerly public. The middle class spent its leisure in exclusive locations such as the Literary and Philosophical Society, in libraries, museums, and other cultural retreats, or in the privacy of their own homes.<sup>29</sup> During the Chartist period the pub was an important part of the "free zone" available for working-class activities.<sup>30</sup> As far as the middle class was concerned the pub had become a private and dangerous place and needed to be rendered more public.<sup>31</sup>

Intrusive policing of pubs during this period continued in force in 1850, backed up by a strong Sabbatarian movement.<sup>32</sup> In a spate of convictions in this year, the artisan botanists fell under suspicion. In November, Joshua Barge, publican in Prestwich, was fined £5 for serving liquor to botanists during the hours of divine service. Reporting the incident, the *Manchester guardian* pointed out that working men

can only pursue their joint scientific inquiries on the Sunday, and for this innocent and praiseworthy object they walk many miles to meet at this house. None of them are ever seen drunk; but the penalty of drunkenness attaches to their blameless assembling, and their meetings are put down by repeated and heavy penalties on the landlord who has dared to harbour a few humble botanists.<sup>33</sup>

The defence of artisan botanists by the leading Whig — and predominantly Unitarian — newspaper indicates not so much the approval of the public house as a location for botanical activity, but rather an affirmation of the belief that education was the primary means by which to improve the working class. In addition, there was a growing sense of guilt among reformers that the exclusive nature of middle-class life had left the working class with nowhere to go but the pub.<sup>34</sup>

The middle-class attack on pubs thus inadvertently compromised the very activity, namely natural history, that social reformers had promoted as a moral influence and counter-attraction to drinking. Grindon later blamed the publican for making the botanists the "scapegoat", but the artisans (many of them destitute at this time) started a collection among themselves in order to pay Barge's fine.<sup>35</sup> This incident, however, did far more than expose sympathies for the intellectual endeavours of the artisans by middle-class journalists who wished to promote education as the means to improve the working class. While the existence of artisans who pursued botany may have been known in the public sphere before 1850, the place of their science and their actual practice were not.

Barge's conviction served to make public a practice that was extremely private, for the incident provoked Thomas Heywood, stationer from Cheetham Hill

and a member of the Prestwich Botanical Society, and John Horsefield, handloom weaver of cheap gingham and president of the society, to defend the Sunday botanical meetings in the *Manchester guardian*. Though addressing the concerns of a middle-class audience, these accounts, together with correspondence, diaries and other sources, provide evidence of the practice of working-class science as well as revealing tensions in the attempt by working men to participate in scientific culture.<sup>36</sup>

#### THE KNOWLEDGE OF ONE BECOMES THE KNOWLEDGE OF ALL

The artisans' interest in "scientific botany" had developed alongside floriculture, horticulture and herbalism. During the eighteenth century, flower and vegetable shows became part of the recreational repertoire of working men; in Lancashire the growing of florists' flowers and the cultivation of the gooseberry were widespread.<sup>37</sup> By the mid-nineteenth century, within a twenty-mile radius of Manchester there were "upwards of three hundred florists, a large number of whom have been growers for nearly fifty years".<sup>38</sup> Gooseberry shows were enormously popular and the winning berries were judged on size alone. These shows were held in pubs with the landlord contributing the prizes. In 1843, the publican Barge of the Ostrich Inn, Prestwich contributed £3 prize money, but no doubt recouped his outlay in the amount of liquor he sold.<sup>39</sup> Warnings that the shows were open only to "honest persons and sound berries" were necessary. At a Middleton gooseberry show in 1813, there were "complaints of the gardens being robbed of Gooseberries" even though growers guarded their bushes by placing scythe blades around them. The injustice of such thefts led the artisan botanist George Caley to fulminate that such "mean depredators ... when detected ought to receive the full severity of the law". Later, to prevent theft or damage before shows, growers would sit outside at night guarding and tending their fruit "like a nurse with an invalid".<sup>40</sup> There were critics, however, who, while approving of the enthusiasm for gooseberry growing, wished to remind the "humbler classes" that gooseberry shows "might be carried on more rationally ... in private houses".<sup>41</sup>

Far more than the growing of florists' flowers or gooseberries, herbalism was part of everyday life for cottagers in Lancashire. Nicholas Culpeper's *Herbal*, first published in 1652, remained popular throughout much of the nineteenth century and in a strong Methodist area like the North-west, John Wesley's *Primitive physic* (1747) was widely used. It was claimed that these two collections of herbal remedies were available even to those who did not own a copy of either because "there would always be one of the books in every row of houses".<sup>42</sup> In most cases for which there is evidence, an artisan's interest in botany was first stimulated by a herbal. One form of "book learning" was therefore substituted for another, and in these cases botany should not be contrasted with herbalism as an oral tradition.<sup>43</sup>

Minimal education and lack of time often posed severe problems for artisans wanting to learn more about plants. Richard Buxton, apprenticed to a shoemaker in Ancoats in 1798 when twelve years old, taught himself to read at the age of sixteen. As a journeyman his interest in botany was stimulated by his master, who allowed Buxton to accompany him when searching for herbs to prepare "diet drinks". Puzzled by plants whose names they did not know, Buxton purchased a copy of Culpeper's *Herbal*. Not satisfied with this, in 1808 he bought William Meyrick's *New family herbal* (1789) from which he learned the Linnaean system.<sup>44</sup> In the 1790s, George Caley, farrier in Middleton, while searching for herbs given in William Gibson's prescriptions for treating the diseases of horses, found that he wanted to know more about plants. Discarding the "petty herbals" which, he complained, "not satisfying my mind ... rather excited me the more", he eventually obtained a copy of the second edition of William Withering's *Botanical arrangement* (1787–92). Flummoxed by the book at first, Caley set himself the task of learning the introduction off by heart over the winter before he tried his "strength in the science" the following spring. Familiar with many plants already, Caley could test his skill in Linnaean classification only by covering their names in the book.<sup>45</sup> At the turn of the century, when in his 'teens, Horsefield became fascinated by Culpeper's descriptions of plants and first encountered the twenty-four classes of the Linnaean system in James Lee's *Introduction to botany* (1760). Over forty years later, Horsefield could still "distinctly recollect the determination that actuated me, to overcome the difficulties that lay in the way of learning them". "I wrote these 24 names down on a sheet of paper," he recalled, "and fixed it to my loom-post, so that when seated at my work, I could always have opportunities of looking it over".<sup>46</sup>

Individual autodidacts usually sustained their initial efforts by finding fellow enthusiasts. In order to have more time to spend with the botanical companions he had sought out, Caley changed his occupation from farrier to weaver. Caley, John Mellor, a handloom weaver in Royton, James Crowther, a porter in Manchester and John Dewhurst, a fustian cutter, began to hold Sunday botanical meetings in pubs during the 1790s.<sup>47</sup> Gradually, artisans from different locations around Manchester began meeting together and thus, according to Heywood, there developed "the Botanist Society ... without any regular place of meeting, without funds, without books, and without rules; a sort of members, but no body, having only one object in common, — their love of plants".<sup>48</sup> Horsefield started to attend these botanical meetings from 1808 — a time when he had no access to books — and found that the difficulties he encountered in trying to apply the Linnaean principles were "by my attending these general meetings, removed by some practical botanist or other, better acquainted with the subject than myself; and many such persons were often in attendance".<sup>49</sup>

For most of the artisans, being "without books" proved to be a serious obstacle, and to overcome it local botanical societies had been established in public houses. The Eccles and Oldham Botanical Societies were founded in the mid-

1770s, and there is evidence of a society being in existence in 1750, which met at "The Shears", Newton Heath.<sup>50</sup> The circumstances of the founding of these early botanical societies are obscure. However, it is clear that members contributed to the purchase of books in the same way that working men pooled their funds to buy newspapers. The membership fee was usually sixpence a month, of which two or three pence went into the book fund. In this way, the Oldham Botanical Society was able to purchase twenty volumes between 1775 and 1795, and over a thirty-year period between 1820 and 1850, the Prestwich society bought 131 volumes which comprised 48 botanical works.<sup>51</sup> E. P. Thompson accounted for "the intellectual leaven" in northern weaving districts by pointing out that many small clothiers were reduced to the status of weavers in this period and would have brought to this group their "educational attainments and small libraries".<sup>52</sup> This certainly was not the case for the Lancashire botanists. It is true, however, that when work was plentiful and funds permitted, artisans also bought their own books. Caley, after a day's work, walked "7 miles on a dark winter's night to purchase a Botanical book by auction".<sup>53</sup> But such purchases usually involved a long period of saving and sometimes disappointment as Buxton experienced when he bought Priscilla Wakefield's *Introduction to botany* (1796). Individual ownership of books also resulted from the demise of a society when the books would be shared out among the members.<sup>54</sup>

Local botanical societies met once a month for the inspection of specimens and the borrowing and return of books. At the end of each meeting, specimens were selected to add to the society's herbarium which, together with the library, was kept in the pub. By 1811, according to Caley, the meetings of the "Weaver-botanists" were "spread over the country" of Lancashire.<sup>55</sup> As Samuel Bamford later recalled, botanical gatherings were so well established that, during the period of the Seditious Meetings Act (1817–18), radical reformers held political meetings under the pretence that they were botanists.<sup>56</sup> It is extremely difficult to recover political or religious sympathies from the sources available and we do not know how many botanical meetings turned into political ones. However, there is some evidence that botanists and herbalists were active in radical politics during the period leading up to Peterloo (1819). Edward Hobson and John Dewhurst narrowly escaped arrest at a weavers' meeting in 1812, while Horsefield attended political meetings from 1816 to 1819 and was present as a spectator at Peterloo. It was the "dear provisions" and "no work" in the aftermath of the Napoleonic Wars, Horsefield claimed, that turned "all my neighbours, as well as myself, into ... politicians". By 1850, he "still read much upon the subject", but had "nothing to do with any party". After the arrests at Ardwick Green in 1817, among Bamford's fellow prisoners were two herbalists, William Kent, who following his release continued "the art and mystery of a herb doctor and distiller of simples", and the appropriately named George Plant, an astrological herbalist. The botanist and herb doctor Joseph Evans was said to be a "thorough radical in politics".<sup>57</sup>

The Methodists provided an organizational model for working-class political movements, and almost certainly served as the source for the organization of artisan botany. The most prominent features of the Methodist system were large gatherings on Sundays and the institution of small class meetings under a local leader.<sup>58</sup> Similarly, the artisans held two kinds of botanical gatherings: general meetings on Sundays, which brought together artisans from a wide geographical range, and small local societies.

It is difficult to obtain a clear picture of the numbers of artisans attending botanical meetings. In 1811, an observer thought that the number of "mechanical" botanists in the villages around Manchester was "very considerable".<sup>59</sup> The sparse evidence indicates that local societies in the first half of the century averaged between eight and forty members. There is no indication of the regularity of attendance of most members, but this may have fluctuated depending on the ability of members to pay the monthly dues. This was certainly true of the general meetings at which the fee was one shilling. Horsefield on one occasion could not afford to attend a Sunday meeting and was able to go only because Hobson paid for him.<sup>60</sup> As one would expect, numbers declined during trade depressions when destitution became severe. Some societies, such as the Tyldesley, were disbanded in the 1826 depression to be revived at a later date. Similarly, according to Buxton, the 1840s saw a decline in the number of botanists. By the 1850s, patchy evidence shows that general meetings had between 70 and 250 participants.<sup>61</sup>

In common with other working-class organizations, rules were imposed by local botanical societies: fines were incurred for turning up without plants, swearing, pinching specimens, and arriving at a meeting in an intoxicated state.<sup>62</sup> Most importantly, of course, there was the obligation to pay the monthly membership fee. This not only enabled the society to purchase books but then became the condition for permitting members to use the library. While societies allowed visitors to attend meetings and look at their collections, only members had the right to borrow books. For this reason visitors contributed only one penny to the book fund. Like regular members, however, they had to pay an additional set amount to attend a meeting. This usually came to three or four pence or whatever the remaining amount of each member's monthly fee was after deducting the book money. This went towards the "reckoning", that is, the amount spent on liquor. Publicans allowed the use of a room for meetings and were responsible for the safe keeping of the society's library and the "box" or funds.<sup>63</sup> In return, members were expected to spend enough on drink to satisfy the publican. This method of payment was commonly called the "wet rent".<sup>64</sup>

As with friendly societies, drink was conducive to a sense of conviviality. The social function of the pub sustained the botanists' communal effort and helped to recruit new members.<sup>65</sup> At the Prestwich society it became common practice that "after the more serious business of the meeting had been disposed of" the assembled company would remain into the night drinking and singing.

Horsefield composed “The Botanists’ Song” commemorating how “science circles with the glass”. James Percival, a gardener, was “rather partial to ... the distilled spirit of the sugar-cane” and James Crowther, a porter in Manchester, claimed that his specimens always looked “best through a glass”.<sup>66</sup> There was, however, no obligation to drink; Edward Hobson, weaver then warehouseman, was “excessively abstemious” and other botanists were “friendly to temperance”.<sup>67</sup> The only obligation was to pay an equal share for the liquor.

The situation changed significantly in the second half of the nineteenth century as alternative meeting places became available and as pubs became more commercialized in regard to their leisure provisions.<sup>68</sup> By 1850, the Royton Botanical Society no longer met in a pub but in a private house, as most of its members did not drink.<sup>69</sup> This change of venue was not necessarily voluntary on the part of the members: the publican, after all, offered many useful services beyond being a vendor of drink. Rather, the issue revolved around the publican’s view of fair payment. He or she anticipated sales of alcohol beyond the required room rent and in many cases refused to allow the use of the meeting room to societies whose members did not fulfil this expectation.<sup>70</sup> No doubt too, some societies felt obliged to move because of public censure of rowdy and drunken participants. In 1880, a botanical society in Hulme recognized that “the Sunday meeting and the ‘beer’ seemed to put us down as a disreputable society” and accepted the offer of a school room for its meetings in order to separate the “Botanists” from the “Beerists”.<sup>71</sup> These were exceptions, however, and most botanical societies continued to meet in pubs until the 1920s.<sup>72</sup>

But books, plants and drink were not sufficient to hold a society together and, in the early nineteenth century, many folded “for want of a person competent to carry it on, and give that information to the members which they sought”.<sup>73</sup> Above all else, a president was required in each society and at the Sunday meetings who could name plants and instruct less experienced members. There is little evidence concerning the appointment or election of the president, but once in office he usually served in this capacity for life — either his or that of the society. While this might seem at odds with the democratic nature of working-class organizations such as friendly societies in which the various offices were rotated among the members, it is interesting to note that even in these cases the office of secretary was usually a permanent and paid position.<sup>74</sup> Just like the president of a botanical society, the secretary of a friendly society possessed skills not equally shared by other members. However, while the office of president may have been the preserve of an individual, his function was to promote a communal activity in which his role was just one part. As Horsefield stressed, “we instruct one another by continually meeting together; so that the knowledge of one becomes the knowledge of all, and we make up for the deficiency of education by constant application to the subject”.<sup>75</sup>

The means by which the “knowledge of one” became “the knowledge of all” revolved around the Sunday pub meetings, the location of which was varied so

that “persons having to travel a great distance one meeting, have it nearer home another”.<sup>76</sup> The artisans’ aim was “specific discrimination and accuracy in botanical nomenclature” and those attending were required to bring plant specimens.<sup>77</sup> These were randomly piled on a table before being named and described by the president, after which general discussions took place. The early method of learning the plant names relied on repetition as a memory device, but some time after 1830 there was a shift away from this communal activity. Originally, as Horsefield recalled, the president

taking a specimen off the table ... gave it to the man on his left hand, telling him at the same time its generic and specific name; he passed it on to another, and so on round the room; and all the other specimens followed in a similar manner. But, from the noise and confusion caused by each person telling his neighbour the name of the specimen, some being unable to pronounce it, some garbling it, and all talking at once, we have been constrained of late years to adopt another method.

By 1850, the president named the specimens while the company remained silent.<sup>78</sup>

Nevertheless, this change did not alter the fact that the president’s skill was judged according to an old, informal and internally governed structure of authority within the *oral* tradition, with those who remembered the most claiming precedence over those with most to learn.<sup>79</sup> What was being judged, however, was a complex mixture of the literary and the oral embodied in a particular individual.<sup>80</sup> When Horsefield took over this role in 1830, he discovered that it “requires no small degree of skill, together with a good memory, to name a heap of specimens amounting sometimes to several hundreds”. Horsefield’s increasing destitution led both the Prestwich Botanical Society and the membership of the general meetings to exempt him from paying his share of liquor money, which was seen as a fair exchange for his skills.<sup>81</sup>

This communal method of learning was little understood by middle-class observers. In 1811, Robert Lyall, house-surgeon to the Manchester Infirmary, “had the curiosity” to attend one of the Sunday meetings held at an inn in the suburbs of Manchester. Over thirty “Gardiners, Weavers, Colliers, Fustian Cutters ... and other tradesmen” assembled, and, as Lyall reported:

Every individual paid a shilling to the Inn-keeper for as much beer as he chose to drink.... After some draughts of beer, the members seated themselves in regular order; & each in his turn produced his flowers, which were one by one handed round the table, after the Chairman or some neighbouring member, had aloud pronounced its Linnaean name.... Strangers are admitted ... & I believe may attend regularly without paying any money except the Inn-keepers fee. Perhaps their manner of proceeding at the meetings is not the best for they learn much by rote — yet I could perceive that some of them understood the Linnaean principles pretty well.<sup>82</sup>

The naming of plants aloud, however, was important when some members were illiterate. In his recollections as an errand boy on the Oldham Road, James Middleton recorded that:

A botanical society existed in Failsworth about 1818.... The members of it were all working men, mostly weavers, some of whom could not read.... They went into the fields and gathered what they called "specimens," which they brought to the meeting of the society to have them named.<sup>83</sup>

Horsefield's father "could never write, and could scarcely read" but he belonged to a local botanical society from which he borrowed the copy of Lee's *Botany* that his son used to learn the Linnaean system.<sup>84</sup>

Female literacy was generally much lower than that of males in this period, and it is usually assumed that women had little part to play in societies of this kind. Whereas women played a major role in oral cultures, the written word accentuated divisions between the sexes.<sup>85</sup> Women's sick clubs for example often had to employ a literate male to act as secretary; the weaver botanist John Martin acted in this capacity to two women's clubs in Tyldesley.<sup>86</sup> As far as it is possible to judge from marriage records, neither of Martin's two wives could write, and possibly were unable to read.<sup>87</sup> The difference in literary skills between the sexes may also account in part for the fact that nineteenth-century working-class "herb doctors", and particularly practitioners of "medical botany" in the 1840s, were male. Where knowledge of the healing and magical properties of herbs had been passed on by word of mouth in local communities and was the secret possession of a few, herbalism was practised by both women and men.<sup>88</sup> What the printed word threatened was not so much the tradition as the role; herbalism survived in printed form but the empowerment through performance associated with its practice by illiterates was lost. However, as indicated above, this should not lead to the assumption of a strict division between oral and written cultures, nor that women participated only in oral traditions.

In the early years of the nineteenth century, women did attend botanical meetings. Lyall reported that many artisans were accompanied by their wives, "some of whom were also Botanists". "I am not quite certain," he observed, "but think, that the women paid nothing".<sup>89</sup> In August 1812, Horsefield went to a botanical meeting in Tyldesley with his sister and a young woman, Esther Eccorsley, who later became Horsefield's wife.<sup>90</sup> As we have seen, illiteracy did not prevent men from attending botanical meetings, although it is probable that most regular members of societies would have been able to read, not least to justify the money they paid towards the book fund.

The decline of women's involvement in the botanical meetings is more likely to be related to the public house becoming an increasingly male domain. By the 1820s, the pub was "primarily a 'masculine republic'".<sup>91</sup> In the Chartist period, women were politically active but their organizations were usually separate from those set up by men, and they often felt uneasy about holding meetings in pubs.

Many male Chartists insisted that a woman's place was in the home. Earlier, the socialist followers of Robert Owen enforced a strict moral discipline on their entire membership by insisting that meetings be held outside pubs in order that women could attend. In contrast, Bamford provides evidence of the active participation of women at political meetings in the period following the Napoleonic wars and up to Peterloo.<sup>92</sup> Although women's friendly societies met in pubs in this period and throughout much of the nineteenth century, they drank and conducted their business as exclusive female groups. So riotous were the annual dinners of women's benefit societies, that the Middleton Botanical Society would change its day of meeting rather than coincide with a women's dinner. In 1815, the Royton Botanical Society found itself meeting on a night when the "house [was] crowded ... owing to a womens' sick club & there having been a bull bait".<sup>93</sup>

From the beginning, men appear to have dominated leadership roles within the botanical societies; all the known presidents and secretaries were male. The degree of exclusion of women by the second half of the century is illustrated by the "extra grand" annual meetings which were instituted around that time to draw together botanists from a wider geographical area. "Wives and sweethearts" were allowed to attend these meetings, but do not appear to have played any part in the proceedings nor even to have been recognized as part of the botanical audience. The purpose of these gatherings was thus as much to provide a day of entertainment as any serious botanical instruction.<sup>94</sup>

Both the local and the Sunday meetings of the artisans not only fulfilled a didactic purpose but also allowed the more expert botanists to accumulate information rapidly. Bringing plants to a meeting and having them named allowed for the discovery of rarities. Middleton recalled that he "once gathered a trailing plant ... for its peculiar beauty and sent it to the local society to have it named. Word came back that it was — I don't know what, but a very rare plant. That is how ignorance sometimes gains reputation."<sup>95</sup> Many of the artisans specialized in particular groups of plants and could use the general meetings to acquire specimens and learn of new habitats: Dewhurst and Hobson, for example, asked members to bring specimens of mosses to a Sunday meeting in 1811.<sup>96</sup>

Amongst those artisans with greater botanical expertise it was, I believe, rare to come across the opinion expressed by George Caley, one of the original members of the meetings held in the 1790s. Returning to Lancashire in 1811 after ten years as Joseph Banks's personal collector in New South Wales, Caley found the Sunday meetings of little use. As he told the botanist Robert Brown: they "would afford a good subject for a satirist to ridicule botany".<sup>97</sup> Caley obviously felt little gratification in the communal method of sharing knowledge and preferred the company of the most botanically skilled artisans such as Edward Hobson.<sup>98</sup> He did, however, continue to attend meetings of the Royton and Middleton Botanical Societies and, in building up his collection of English plants, he benefited from "a few of the Weaver botanists now & then bringing me



plants".<sup>99</sup>

Caley, however, returned to Lancashire as an outsider, alienated from both the popular culture from which he had originally come and also from that of the gentlemen who patronized him.<sup>100</sup> In 1800, though, just after arriving in Parramatta, New South Wales, he had written to the Middleton Botanical Society, declaring:

It is owing to your Society, in a great measure, that my small genius was awaked. I solemnly declare, that I never was more happy than when I first visited you.... My greatest pride and pleasure was informing others of my Botanical discoveries.<sup>101</sup>

#### INTERSECTING SOCIAL WORLDS

David Allen has shown that natural history — and especially botany, with its emphasis on taxonomy, collections, local floras and plant distribution — was open to an extremely wide range of participants in the early nineteenth century. Botanists from all positions in society developed extensive correspondence networks and regularly exchanged specimens and information.<sup>102</sup> The richness of social interaction and the multi-directional flow of information revealed in Allen's work has, however, been obscured by recent enthusiasm for Bruno Latour's model of "centres of calculation" in networks. Useful though this model is in allowing us to understand the means by which botanists at a centre can "act at a distance", it primarily concerns itself with the centre and little attention is paid to the collectors — or periphery — beyond the need to render the information they provide reliable and unchanging (Latour's "immutable mobiles").<sup>103</sup> As such it is an imperial model. Thus, while it applies to such enterprises as the Banksian "empire", with its emphasis on voyages, economic botany and the accumulation of specimens for the massive herbarium at Soho Square, it is not particularly helpful for understanding the full range of early nineteenth-century natural history.<sup>104</sup>

More appropriate for considering the practice of the artisan botanists is the analysis by Susan Leigh Star and James Griesemer of the way in which cooperation (rather than consensus) is achieved between diverse groups involved in scientific work.<sup>105</sup> Their modification of Latour's model allows a more symmetrical consideration of the interests of the different social worlds that intersect in scientific work, and does not "presuppose an epistemological primacy for any one viewpoint". In this way, Latour's hierarchical structure of scientific practice, which considers only the translation of the concerns of the non-scientist into those of the scientist, is replaced by a multiplicity of translations, allowing a richer analysis of local contexts. Importantly, then, this model allows us to consider the social world of the artisan botanists not only in relation to gentlemen botanists, but also herbalists and gardeners. For herbalists, horticulturists and florists did attend artisans' botanical meetings and were members of societies,

but not as botanical recruits 'trained' to produce immutable mobiles. Rather, as Star and Griesemer argue, translation between groups occurs via "boundary objects", that is "those scientific objects which both inhabit several intersecting social worlds ... and satisfy the informational requirements of each of them". Boundary objects (in this case both the plant specimens and the Linnaean nomenclature) may have different meanings to participants from distinct social groups, but can pass between them regardless of these differences.<sup>106</sup>

The model, however, also highlights the tensions inherent in scientific practice involving heterogeneous groups with different interests. This is particularly clear when participants placed different values on the specimens and information exchanged. These tensions were exacerbated when divergent interests existed in one individual, as was the case with several of the artisan botanists.

The joiner Thomas Whittaker of Blakeley, editor of *The gooseberry growers' register*, was "usefully associated" with botanists even though "he would much rather see a big gooseberry than the scarcest plant in England".<sup>107</sup> James Percival was employed as gardener to a gentleman and several other members of botanical societies were gardeners. Many botanists had other interests. For example, Horsefield produced a hybrid lily in his garden, which he sold to a nurseryman, and later a new daffodil; Horsefield's son William competed in gooseberry shows; William Evans, weaver and president of the Tyldesley Botanical Society, and his son Joseph practised as herbal doctors; John Mellor, president of the Royton Botanical Society, was a plant dealer.<sup>108</sup> This mix of interests in botanical societies could cause tensions about which plants were considered the most interesting: in 1831, the weaver John Martin claimed that out of fifteen members of the Tyldesley Botanical Society, "there are only about 2 or 3 of us who may be said to *study* botany". By 1833, he "could scarcely find a man in our part who would look at a native plant". Some had "gone over to the florists, and totally discarded native botany, or rather scientific botany; while some took no notice of a flower".<sup>109</sup>

With the rise of the American system of medical botany in England in the 1840s, the artisan botanists had to counter accusations that they were interested only in the Latin names and the systematic arrangement of plants rather than their medicinal qualities. The journal of the influential medical botanist Albert Isaiah Coffin, active in Manchester from 1847, had declared that "spending day after day, and year after year in studying the names, varieties, species, genera, orders and classes of herbs without knowing their uses and properties" was an "absurdity".<sup>110</sup> Heywood and Horsefield thought critics of this sort were "destitute of intellectual faculties", and defended the botanists (many of whom *were* interested in the medicinal properties of plants) by pointing out that herbalists' ignorance of plant classification could lead to unfortunate misidentifications. They encouraged cooperation by suggesting that herbalists who "wish to avoid ... mistakes ... may receive the necessary information, gratis, at almost any of our meetings, provided they only ask for it".<sup>111</sup> Although Coffin did not think

that systematic botany was essential knowledge for medical botanists, they did concede that it facilitated the “acquisition and diffusion of the medico-botanic system”.<sup>112</sup> But as Coffin became more insistent that the herbs prescribed in his six-shilling *Botanical guide to health* (1845) be purchased from his registered agents, his followers had little need for knowledge which would enable them to gather their own herbs. Twenty years later, however, the ex-Chartist, ex-Coffinite medical botanist John Skelton published a series of articles on “The Sexual System of Linnaeus” claiming that “botany is a necessary branch of medicine” and urging his readers to commit the Linnaean system of classification to memory.<sup>113</sup>

The response to this call to medical botanists appears to have been overwhelming. At a botanical meeting held in 1868 at “Bill’s o’Jack’s” pub, some five thousand working people from Lancashire, Cheshire, Yorkshire and Derbyshire were present, crammed into a wooden hut attached to the public house. “Dr. W. Parkinson, M.D., U.S., Botanic Dispensary, ... Oldham” had been invited to act as chairman, but the naming of the plants was done by the artisan botanist James Percival, mechanic of Prestwich, who had succeeded to the presidency of the general meetings after Horsefield’s death in 1856, and Thomas Ashworth of Oldham. Parkinson, “an ardent disciple of Linnaeus”, addressing his audience of “brother botanists” (though nearly half the people there were women), stressed that “the study of botany among the working-classes was very beneficial” not least because children of parents ignorant of botany were “often poisoned”. The fact that this meeting was reported under the heading “Monstre Meeting of Botanists” indicates that audiences of this size were unusual.<sup>114</sup>

If the desire of medical botanists to become acquainted with the Linnaean system swelled the numbers at botanical meetings from the mid-century, the meetings had nevertheless served a useful purpose for herbalists earlier.<sup>115</sup> Herbalists may not have been interested in the principles by which a specimen was classified, but they did want to know exactly how to recognize those plants that were the basis of cures and how to distinguish them from similar, often poisonous, plants when out gathering specimens. The method of bringing plants to a meeting to be named and handing them round for inspection served this purpose well.

Gardeners and nurserymen, working for the gentry, had good reason to be acquainted with the Linnaean names of plants, for in the eighteenth century, horticulture was second only to the literature on local floras in establishing the Linnaean system in British botany.<sup>116</sup> The first inexpensive book describing the Linnaean classification in English was written by James Lee, nurseryman and gardener, in 1760.<sup>117</sup> This was the work in which Horsefield found Linnaeus’s system described.

Knowledge of the names of plants and their habitats was potentially useful to different groups for varying reasons, which accounts for the mix of interests of members in botanical societies. Conflict between these groups occurred when the plants passing between them did not carry sufficient information and thus

did not function as boundary objects. Such failures in translation resulted from the different attitudes towards the living plants and how their value was measured. Botanists required specimens with roots for drying for herbarium specimens and, in some cases, for growing in their own gardens, but wished primarily to preserve plants in their native habitats. Although Buxton gave the only location in the Manchester area of *Valerianella carinata* as Horsefield’s garden, he deplored the “custom to collect specimens to such an extent, as to destroy the plant”.<sup>118</sup> Herbalists also wished to preserve a growing supply but since their power resided in possessing access to particular plants, they were frequently secretive about stations. Herbalists who had gardens also dug up plants in order to grow their own private supplies. Middleton recorded that most villages had a “‘yarb doctor,’ who sometimes lived in a garden and grew his own ‘yarbs’”.<sup>119</sup> The radical reformer William Kent, imprisoned with Bamford in 1817, practised as a herbalist in Royton. In his cottage, it was reported:

The whole of the ceiling is hung with cords stretched horizontally across the room, and these are thickly covered with herbs either drying or dried; whilst numerous large bags of paper, containing other herbs, are suspended from every available hook or nail in the place. At the end of the house is a garden, with the beds neatly laid out, and kept in trim order — nearly every inch of ground being matted with herbs and plants of one sort or another.<sup>120</sup>

The weaver, William Evans, president of the Tyldesley Botanical Society, was indignant after showing the station of a rare plant to an acquaintance who “went to the place afterwards and digged the plant up!” As a result of this experience (but possibly because he was a herbalist himself), Evans became excessively secretive about the whereabouts of rare plants, and took to botanizing by himself.<sup>121</sup>

Nurserymen and dealers were frequently the least scrupulous in hunting for plants. By the second decade of the nineteenth century the market in Manchester had a flourishing trade in flower roots. The “lovers of plants” in the Manchester area had “begun to pay great attention to cultivating them” and “now buy, sell, barter, &c for them”. This passion for plants continued to increase and by 1859 the Manchester flower-root market was guaranteed to summon up “feelings of the highest astonishment and gratification”.<sup>122</sup> The Lancashire artisans were a source of valuable knowledge: the “Weaver Botanists”, as Caley observed, were “certainly more eminent in possessing varieties of hardy plants than the London nurserymen”.<sup>123</sup> In such a competitive market, the value of a rare plant could best be maintained by having a monopoly over its sale, and this was achieved only by digging up the entire stock.<sup>124</sup> As early as 1812, subterfuge was used by artisans in order to protect plants. Wishing to take *Orchis morio* to the Royton Botanical Society, Caley unsuccessfully searched for plants in a spot where they had previously grown. When at the meeting that evening, he learned “that the *Orchis Morio* had used to grow in great plenty where I had been looking for it

and that the day before a person had gathered all the flowering plants he could meet with to prevent people from getting up the roots".<sup>125</sup>

The accumulation of knowledge for individual gain became more problematic as the century progressed. Safeguards against excessive secrecy were actually embodied in the printed rules of a combined benefit and botanical society founded in 1849, the Hyde Faithful Botanical Society. The "Botanical Rules" warned that: "Any member having a competent knowledge of botany or any particular plant or plants then and there produced, shall freely instruct his fellow members, or be excluded [from] this society" and that "Any member who meets with a scarce, useful, and valuable plant, is requested to take it to the person appointed to cure them, or to cure it himself, that nothing may be lost which may be useful to the society".<sup>126</sup>

As we have seen, within working-class culture the issue of plants as property often created tensions between scientific botanists, herbalists and horticulturists. The question assumed an even greater importance in the dealings of the artisan botanists with practitioners in the middle and upper classes. Historians have found it difficult to get beyond the role of artisans merely as providers of specimens and local information for elite botanists, to an understanding of their role as active participants in a botanical network. Only in times of dire need did artisan botanists collect for gentlemen in return for payment or sell their collections; usually they requested specimens, identifications or other information in exchange. This was particularly true of bryological specimens as few working men possessed, or had access to, a microscope which was necessary for observing the minute characters used in classifying mosses. The use of Linnaean nomenclature allowed artisans to set up networks beyond the range of the local meetings and allowed communication with gentlemen and participation in botanical publications. Although both groups spoke a common Linnaean language, their attitude towards botanical property gave the specimens strikingly different meanings.

Collaboration and exchange of information between artisans with varying degrees of knowledge of a uniform labelling system was made possible by frequent meetings and the naming of huge piles of plants. Gentlemen botanists, however, had little patience with this random method of plant gathering and relied on classificatory systems to provide a standard language. When William Wilson, a gentleman bryologist in Warrington, was visited by a collector of "medicinal herbs", he impatiently noted that the man "knows very little of Mosses or indeed about any thing except English names — his latin is excessively bad — quite an illiterate man —".<sup>127</sup> The herbalist was useless because he had no way of *knowing* which plants Wilson wanted.

In contrast, when John Martin, handloom weaver from Tyldesley, visited Wilson to request confirmation for his identification of a rare moss, Wilson was delighted with him. Immediately reporting the find to William Jackson Hooker, who was preparing the cryptogamic volumes of James Edward Smith's *English*

*flora*, Wilson later remarked that Martin was "void of conceit and offensive familiarity: intelligent without arrogance: studious yet unassuming". He "confesse[d] his poverty without shame" and had an "air of decency" about him. Moreover, judging from the parcels of specimens provided by Martin, Wilson thought him "*addicted to neatness*".<sup>128</sup>

Martin, however, initially approached Wilson with a typical artisanal distrust of a 'middleman' who might appropriate the botanical discovery.<sup>129</sup> Handloom weavers like Martin had suffered a great loss of status by 1830 resulting from their diminished control over the products of their labour. Increasingly dependent on merchants for the sale of their cloth, weavers suffered severe destitution as lack of work allowed middlemen continuously to lower wages. To the degraded artisan, this system was resented not so much for its exploitation, but rather because it was an unequal exchange.<sup>130</sup> In Martin's opinion, fair exchange for his specimens and information was acknowledgement by gentlemen botanists. He was not defending his interests alone: the moss, though identified by Martin, had originally been discovered by the late William Evans, the weaver and herbalist who had served as president of the Tyldesley Botanical Society. "Should you communicate the discovery to any of your botanic correspondents, especially to Professor *Hooker*," Martin stipulated to Wilson, "I hope you will give my deceased friend the honour of the discovery".<sup>131</sup>

This was a group concern, not an individual one. As David Vincent has pointed out, "print is a species of private property".<sup>132</sup> As far as the working class was concerned, the upper classes wielded their power in science largely through the printed word. Not only were individual discoveries by artisans thus appropriated, but, Heywood claimed in 1850, the collective history of the Lancashire botanists was lost because their botanical meetings "were not considered of sufficient importance to record". He based his claim on the following argument. Of the present flora of Britain, more than four-fifths of the plants had been described by John Ray at the end of the seventeenth century: "and we cannot for a moment suppose", exclaimed Heywood,

however indefatigable and persevering he might be, that he could collect them himself ... especially as he refers to Dr. Richardson for the localities of certain plants found about Manchester, and no doubt but that local botanical societies were in existence at that time, who supplied Ray, through the medium of Dr. Richardson and others, with their observations. Though they are not mentioned, yet how often do we see at the present time, when the labouring man ... has discovered any new plant, bird, or insect, &c. that was not known before, and communicates it with particulars, to some one whom he considers understands the subject better than himself, that that person very often claims the merit of discovery (if any merit is attached to it) by making the thing known, while he considers it below him to refer to the humble individual who found it.<sup>133</sup>

Thus Heywood contrasted the attitude to intellectual property as an individual possession secured through print — of great importance at a time when the discovery of a nondescript, or even a rare plant, could secure a gentleman fellowship of the Linnean Society — to the artisans' sense of injustice that their contribution was not recognized. Heywood's language is revealing. He invoked meritocracy in explaining why artisans approached gentlemen botanists; whereas when considering the way in which gentlemen often treated artisan botanists, he employed the language of class.

A specific case illustrates how considerations of class affected personal relations between artisans and those in the botanical élite who encouraged their participation in botany. Gentlemen like Hooker and Wilson knew that their research depended on the work of many collectors and in consequence recognized the need to give artisans the credit they requested. When Hooker received the moss Martin had taken to Wilson in 1831, he duly published the history of this specimen in the *English flora*, giving full acknowledgement to both Evans and Martin, "a zealous and accurate Botanist".<sup>134</sup> But Hooker was interested in more than Martin's moss. As professor of botany at Glasgow, Hooker found that his teaching duties and various publishing ventures allowed him little time to arrange his rapidly increasing personal herbarium. "You have excited my curiosity respecting John Martin" he told Wilson:

Such men are common upon the continent: but in Britain they are raræ Aves & ought to be encouraged. Has he education enough to make a good practical Botanist? & he is sufficiently neat-handed to dry & preserve & arrange specimens well in the Herbarium?

Most importantly, because Hooker kept his herbarium in his home, he needed to know whether Martin had "sufficiently decent & respectable manners not to be a bore in a house?"<sup>135</sup>

Charged with assessing Martin's suitability for such a post, Wilson and his brother Hamlet rode out to the "uncivilised neighbourhood" of Tyldesley to visit the weaver. Far from celebrating the cottage, as Cash would later do, Wilson was shocked by what he saw there. "I did not find that neatness which I expected", he reported to Hooker, and he was puzzled that there were few outward signs of "*order & arrangement*" when Martin's mind seemed to be "very well regulated" and he was "an original & patient thinker". Martin's plant specimens were "rather carelessly mixed in the leaves of a copy of Withering & in other Books, which are not so clean as I expected". Moreover, the man's appearance was "not particularly favourable" and he had "a considerable tinge of the Lancashire dialect".<sup>136</sup> Wilson's views are all the more extraordinary as, prior to his visit to Tyldesley, Martin had dined with Wilson and his brother and Wilson had "perceived nothing *inconsistent* with propriety of demeanour". Hamlet Wilson, however, did think that Martin was less "refined in deportment" than the artisan botanist Hobson, whom Hooker had met. William Wilson's change of opinion

of Martin (whom he had originally considered to be addicted to neatness) no doubt stemmed from the outward disorder of Martin's cottage causing him to revise his view of the inward order of Martin's mind.<sup>137</sup>

Martin, however, had already experienced disappointment in his relationship with Wilson. After their first meeting, he had written to Wilson telling him about the Tyldesley Botanical Society. "If you should have an excursion our way", he pressed on, "I could wish you to contrive to be at one of our meetings, and you will have an opportunity of seeing some of my acquaintance, and lovers of plants, *hate Latin!* Because I am sure that you & I will give the Latin names."<sup>138</sup> Quite what the highly strung and devout Congregationalist Wilson made of this invitation to drop in on a meeting at the "Old Boar's head" is unknown, but he was relieved when Martin later, "with great *considerateness*, left all future personal intercourse" at his disposal.<sup>139</sup> Martin had come to this decision after going through "various agitations" of his mind comparing his situation in life with that of gentlemen botanists who had both time and ability at their command.<sup>140</sup> Specimens and information could move between different social groups but, as Martin realized after reflection, this affinity between botanists could not enact a classless world. Inter-class relationships underlined social differences. Little did he know that Wilson had come to the same conclusion. Martin never heard of the job on offer.<sup>141</sup>

Within the pub, however, the middle- and upper-class expectation of deference from their social inferiors was pointedly ignored by working men. Here, the artisans were in control of the social situation — not because their meetings were private and exclusive, but because the pub was a specific cultural location that belonged to the people.<sup>142</sup> As early as 1811, while Lyall as a gentleman felt comfortable attending the meeting for the naming of plants, he left the room once the flowers had been shown and was "afterwards informed that the evening was spent convivially".<sup>143</sup> Although gentlemen occasionally attended the meetings, social superiority did not entitle them to special privileges. If they went away without the information they sought, Heywood warned, it was because

they are too proud to ask for any information, they think it should be given to them from such poor persons as they consider the botanists to be, without the trouble of asking for it, or even of stating what kind of information they require....<sup>144</sup>

In the pub, gentlemen had to play by the artisans' rules.

#### THE PROPERTY OF BOTANICAL SKILL

The artisan mentality, John Rule has argued, can be approached through the use of two concepts: "independence" and "property of skill". Artisanal independence was asserted both in the workplace and in the public house, and included concern with status, refusal to adopt subservient attitudes, and an aversion to

charity. But the most fundamental concept underlying the consciousness of skilled workers was their sense of possessing a “property of skill”. This was a source of pride to an artisan and entitled him to the respect of others. The notion of skill as a form of property was strongly defended by groups threatened by degradation, and was so deeply embedded in artisan culture that it continued to be shared by deskilled workers, such as handloom weavers and shoemakers. The loss of their “property of skill” resulted from “merchant capitalism”, whereby the products of their labour were appropriated by middlemen.<sup>145</sup> For at least some of the deskilled artisans of Lancashire, botanical skill served to restore a sense of status and respectability.

As we have seen, the Lancashire botanists brought artisanal values to bear on their scientific practice. They asserted their independence in their refusal to show deference to gentlemen within the pub and, as demonstrated by Martin and Heywood, distrusted botanical middlemen. Moreover, while individuals possessed botanical skill, the artisanal practice of botany was regarded as part of a collective craft. For an artisan, the “Mystery” or property of any craft “belonged to no individual but to the body of craftsmen past, present and future”.<sup>146</sup> The collective values of the artisan botanists were maintained through their association in pubs, for here the “Art and Mystery” of botany was conveyed by precept and example just as crafts were learned in the workplace.

The emergence of the pub as a male world in the early nineteenth century was associated with these newly articulated artisanal attitudes towards their trades. As the exclusivity of skilled crafts was threatened in the period of manufacture, artisans, including domestic handloom weavers, combined in order to defend their rights against cheap unskilled labour. Gender distinctions, which overrode considerations of technical aptitude, were also embodied in the definition of skilled labour. Skill belonged to men, and was defended in “association outside as well as inside the workplace in ritual, custom and the ... public house”.<sup>147</sup> Thus, women may have been excluded from botanical meetings on the grounds of who was entitled to possess “botanical skill”, even though they were no less qualified than men to participate in botanical meetings and the methods used to disseminate knowledge were not exclusive in themselves.

The possession of skill imposed on its holder “the obligation of the proper performance of his craft”.<sup>148</sup> For the artisan botanists, this “proper performance” was the achievement of the stated aim of their meetings: specific discrimination and accuracy in botanical nomenclature. The president of a meeting embodied the art and mystery of botany in his performance in naming huge heaps of plants. The possession of skill was most clearly displayed by the use of Linnaean taxonomic names. The artisans defended their use of such terms, for without this knowledge they could not properly be admitted to the practice of botany. Martin clearly demonstrated that it was the possession of this skill that set himself and the gentleman-botanist Wilson apart from those members in the Tyldesley Botanical Society who hated Latin. Sensitive to criticisms that Latin terms “cannot

be learned by the common or uneducated people”, Horsefield did not explicitly defend the artisan botanists in terms of class, but simply stated that the Linnaean nomenclature should be used by “all genuine botanists”.<sup>149</sup> David Vincent has suggested that the decline in grammar school education for working-class children meant that from the 1860s “the chances of a poor man’s child gaining a knowledge of Latin upon which new systems of botanical classification were based were remote”.<sup>150</sup> In fact, it is likely that few artisans in the early nineteenth century understood the literal meaning of the Latin words used in the Linnaean system, but this did not prevent them from learning the nomenclature. For the artisan, the *meaning* of the Linnaean names lay in the display of botanical skill.<sup>151</sup>

Styling themselves as botanists, the artisans maintained a strong group identity. They expected fair exchanges of specimens and information (as much from one another as from gentlemen) and to receive recognition in publications for their discoveries. Moreover, they felt that the skill they possessed entitled them to respect from the scientific community at large. In 1843, William Bentley, blacksmith in Royton, obviously saw no incongruity in writing to enquire whether the Linnean Society of London had “a fund at its disposal to assist decayed persons, who, by their industry have rendered themselves eminent in any branch of Science, which comes under its notice”. By this means, he hoped, the elderly and destitute Mellor, handloom weaver and gardener, who had “pursued Botany to devotion” could be “made independent of parish aid”. Although Bentley’s tone was deferential, the collectivist value of mutual aid, particularly that extended to others in the same craft, is reflected in his view that Mellor’s demonstration of his botanical skill entitled him to help from fellow botanists at a time of need. Bentley was, in effect, treating the Linnean Society (one of the most élitist of the London scientific societies) as a botanists’ benefit club.<sup>152</sup>

For the artisan, then, skill represented “an ‘honour’, the possession of which entitled its holder to dignity and respect”.<sup>153</sup> The transference of these values to the property of botanical skill is most clearly demonstrated by Horsefield. On reading a comment on the “ignorance” and “degradation” of Lancashire operatives in an article by the editor John Claudius Loudon in the *Gardener’s magazine* of 1829, he found himself “vexed” enough to take up his pen and challenge the author:

What your ideas of our “dreadful state of degradation” may be, I cannot positively say: had you used the word destitution instead of degradation, you would have been more correct.... If to be half-employed, half-paid, and half-fed, constitute “dreadful degradation,” I can sincerely assure you we are *now* dreadfully degraded indeed.

As for our “ignorance,” I don’t think we are more ignorant than any other class of His Majesty’s subjects. The intricate paths of science are seldom sought for by any man, whatever his station in life may be ... and even amongst us you might find some instances of devotedness to literature and science ...

botany being a favourite pursuit ... and botanical meetings frequent and well attended.<sup>154</sup>

#### THE POLITICS OF PARTICIPATION

The difficulties of studying popular science are compounded when one is trying to understand the scientific practice of working people. The sources are rarely direct and unmediated and thus usually tell us more about the dominant culture than the popular. As Martha Vicinus pointed out, the judgement of the social worth of working-class recreation in terms of whether it uplifted or degraded, kept "the consideration of popular culture on the level of a moral and intellectual grading system, with 'high' culture always kept as a referent".<sup>155</sup> Although recent studies of popular culture have moved away from this judgemental stance, nevertheless little attention has been paid to those activities considered to belong to 'high' culture when they were practised by the working class. However, as Morag Shiach has argued, the content of cultural spheres, 'high', 'learned', 'popular', can be specified only at particular historical moments by unravelling the historical relations that define them.<sup>156</sup> It is not music, science or poetry that defines polite or working-class culture, but rather the function of these activities, in terms of their practice and meaning, in different social spheres. Class tensions did not disappear, therefore, when the working class engaged in such activities if these occurred outside the control of their social superiors and in a place associated with subversive activities and moral degradation. As Hugh Cunningham has shown, while the working-class enjoyment of music by Handel and Haydn demonstrated that musical taste was not class-specific, strenuous efforts were made by the middle class to provide a more elevating venue for its performance than the pub.<sup>157</sup>

Rational recreation had been deemed particularly suitable for manual workers because of its emphasis on the mind and reason, rather than the body and animality. Middle-class advocates of education argued that if useful and innocent knowledge was impressed upon working-class minds, this would replace low and sensual pursuits and produce correct moral deportment.<sup>158</sup> The belief that thinking and drinking were antithetical persisted, despite reports to the contrary from mid-century. In 1851, it was revealed that working men's libraries were "*held in public houses*".<sup>159</sup> Moreover, in 1867, it was pointed out that "sometimes, notwithstanding their studies", self-educated artisans were "as fond of a glass as their most graceless neighbours". There was even evidence that drunkenness and intellectual pursuits were not incompatible: one "enthusiastic entomologist" withdrew his funds from his burial club in order to go on a drunken "spree" for three or four days.<sup>160</sup> The biographer of the self-taught poet John Nicholson admitted in 1878 that when intoxicated Nicholson did nothing worse than "raving in poetry".<sup>161</sup> As a member of the Manchester Athenaeum had expressed in 1844, working-class interest in activities such as music and

mathematics was "not ... consistent with grossness of taste, or dissoluteness of habits".<sup>162</sup> Nevertheless, the extension of this argument to show that the singing of hymns in pubs was a sign of improvement in the working class was lost on many, particularly Evangelical, middle- and upper-class observers for whom entering any drinking place was dissolute and singing sacred songs in such a place a profanity. Thus, Cash and Grindon, who both benefited from the "real, solid, practical botany" done by the artisans, and occasionally attended meetings in pubs, demonstrated the artisans' moral worth by associating them with "sweet and delicious rural spots" or the cottage.<sup>163</sup> In this context there was little mention of the pub, and certainly none of men like the "battered, unpleasant ... drink-soaked and dirt-encrusted" naturalist that the ornithologist T. A. Coward was later to recall.<sup>164</sup>

The division between head and hand, so fundamental to upper-class English education, was not recognized by early nineteenth-century artisans. Thus, Samuel Bamford, in his eulogy on the intelligence of the Lancashire working class, conflated the middle-class distinction between cultural activities and manual occupations. He nicely reflects the artisanal view of intellectual and occupational practices as skilled crafts (so well exemplified by Horsefield in the previous section) when, in listing the accomplishments of the working class, he moves seamlessly from writing, botany, horticulture, "the abstruse sciences", poetry and music, to weaving, mechanics and mining.<sup>165</sup> Artisans considered respectability to be based on status attainable through craft or skill and saw no contradiction in pursuing botany in the public house.<sup>166</sup>

The pub, of course, was not the only place that the artisan botanists practised their science.<sup>167</sup> However, an understanding of the pub as one of the main sources of sustenance of the collective values of artisanal culture allows us to interpret their practice of botany. For although the middle-class portrayal of the artisans, and, indeed, the material products of their botanical practice, make them look as if they had absorbed the bourgeois credo of individual self-improvement, their scientific practices can be understood only by drawing on work that explicates the attitudes and feelings that constitute artisanal behaviour, namely their *habitus*.

The artisanal values embodied in pub culture, enable us to build up a context that allows for a range of political and religious views among the artisans; for understanding the participation of illiterates as well as experts in plant taxonomy; and for an analysis of the relationships between herbalism, gardening and botany. This provides a way of understanding the experience of ordinary people engaged in scientific pursuits — a history from below — that goes beyond generalizations derived from the public statements of radical or Chartist leaders. The latter have led to characterizations of artisan naturalists as "solitary and superior" autodidacts who "kept a proud distance from the pub".<sup>168</sup>

But these radical leaders gave literacy a new context and meaning by dissociating it from the culture of drink and by making it an integral part of political and social change. Thomas Laqueur has pointed out that the new cultural values

associated with education by sober and rational Chartists like Thomas Cooper and William Lovett mark a sharp contrast with the eighteenth century and those like the “widely read Ashton apprentice who entertained primarily in alehouses”. However, Laqueur’s stress on the division and discontinuity between the radical use of literacy in the early nineteenth century and popular traditions is too pronounced.<sup>169</sup> Iain McCalman has shown that “humour, escapism, sex, profit, conviviality, entertainment and saturnalia should be admitted to the popular radical tradition” not least because these elements probably did more for the survival of the tradition than the “sober, strenuous and heroic aspects which are more customarily described”.<sup>170</sup> So too did drinking, singing and the communal values of artisanal culture sustain the scientific pursuits of the working class in the nineteenth century. Science can be associated with the pub as much as with the radical unstamped press, Owenite Halls of Science and Mechanics’ Institutes.

In cases where there is little evidence of overtly political or ideological agendas, an emphasis on skills and place is as revealing (and more representative) of the practice of working-class science. This does not mean that the activity of the artisan botanists — and their claim that they *were* botanists — had no political meaning. Adrian Desmond’s analysis of the uses of transmutation theories by working-class radicals in the 1830s and 1840s for particular social and political ends, stresses that science “was what worked politically”. The thrust of his argument is to explain the “propagandist importance” of materialist science in serving the republican interests of the deist and atheist Carlileans and Owenite socialists determined to overthrow priestcraft and kingcraft. As Desmond emphasizes, the egalitarian image of science also accounts for its central place in radical politics.<sup>171</sup> Yet the democratic aspect of science remains at the level of rhetoric in Desmond’s discussion and the quest of working people to achieve this expectation in practice is unexplored. By looking at the way in which artisans actually did science, and not just the ways in which they talked about its potential power, we can start to produce a political spectrum of working-class science that prises apart the extreme models of radical confrontation and incorporation into the bourgeois sphere. We can thus break away from the view that ‘genuine’ working-class science is ‘alternative’ or ‘fringe’ science. The political challenge from the artisan botanists consisted in participation by working men in what was rapidly being appropriated as the cultural property of the educated and leisured classes.

As Roger Cooter has argued, phrenology in the 1830s and 1840s appeared to be an area where the common people could break down the walls protecting intellectual estates and “regain the participatory right” in the “land of privileged learning” not unknown to some of their forefathers.<sup>172</sup> In botany this right did not need to be regained by artisans in Lancashire, but continued an activity pursued by their “forefathers”. Rather, participation had to be defended in a period of increasing class awareness. This political aspect has not been noticed by historians, possibly because the activity appears to conform so precisely to what

middle-class promoters of rational recreation wished artisans to do. However, the artisan belief that possession of skill entitled them to be cultural producers was perhaps best demonstrated by their struggle to participate in those areas of knowledge that were considered the province of the upper and middle classes.

Here a comparison with poetry is illuminating. In his analysis of self-taught poets, Brian Maidment points out that attention has been paid to Chartist, radical and dialect poetry, while what he labels “Parnassian poetry”, that is poetry that deliberately uses the most complex and elaborate traditional forms within the British literary tradition, has been ignored. This, he argues, is a mistake because these poems represent an important aspect of working-class aspiration: the ambition to participate on equal terms at a high cultural level.<sup>173</sup> This ambition should not be regarded as separate from the aims of Chartists or other working-class movements: several Chartist poets for example, also composed Parnassian poetry, the most prominent being Thomas Cooper.<sup>174</sup> It is entirely appropriate that the self-taught Parnassian poet Charles Swain composed the epitaph on Horsefield’s gravestone.<sup>175</sup>

## CONCLUSION

Science was contested territory in the first half of the nineteenth century. For many, including some in the scientific élite, the contest revolved around the issue of whether science should be popular, in the sense of being open to a wide range of participants (including women and artisans) who could contribute to and benefit from the production of knowledge.<sup>176</sup> Increasingly, however, the term ‘popular science’ was used by the dominant culture to signify bodies of literature and scientific activity that had little or no interaction with élite science. Thus, the meaning of ‘popular’ in ‘popular science’ by the mid-nineteenth century was, as Morag Shiach has shown, “that which is excluded from institutions of legitimation, either because of the material conditions of its production, or because its general accessibility lays it open to charges of debasement or simplicity”.<sup>177</sup> This was true for other cultural activities, but in science the argument is particularly clear. More than any other area of knowledge production, scientific practice became increasingly associated with specific sites from which “the people” were excluded. By defining the laboratory and the experimental station as the sites of legitimation of botany and zoology from the mid-nineteenth century (and thereby increasing their status), the place of science became strictly defined and popular science was marginalized. This marginalization did not, of course, exclude artisans alone. On the contrary, those to be excluded were clergymen, women and ‘non-professionals’ in general, thereby producing the category of the ‘amateur’ whose work was rarely of use to the professional scientist.<sup>178</sup>

The impotence embedded in the definition of popular science by the 1850s, and the emphasis of most twentieth-century histories of botany on tracing a progressive path to an experimental science, has obscured the effects that artisan



participation had on botany in the late eighteenth and early nineteenth centuries. Just as oppositional, overtly political uses of science affected the ways in which those with authority constructed the boundaries around knowledge, so the participation by artisans in natural history also shaped the response of the élite. The gentleman physician William Withering had been one of the first to open Linnaean botany to a wide range of participants. Written in English, with a guide to the pronunciation of Latin names from the second edition, his *Botanical arrangement* (1776) became a standard text.<sup>179</sup> By the fourth edition in 1801 Withering was drawing on the findings of William Evans, Caley and other artisans.<sup>180</sup> William Jackson Hooker, after meeting some of the artisan botanists in Manchester, wrote (with Thomas Taylor) the *Muscologia Britannica* (1818) in English “because we know many naturalists who pursue the study of this pleasing branch of natural history with the most unwearied industry, who are nevertheless in a situation of life which has precluded them from acquiring the knowledge of any but their native tongue”.<sup>181</sup>

The accessibility of the Linnaean classification made it a powerful tool for the production of reliable information by local collectors and travellers.<sup>182</sup> The usefulness of such participants and the desire to induct beginners, led some botanists to continue arranging their textbooks and monographs according to the Linnaean system well after they had accepted the superiority of the natural classification proposed by Antoine Laurent de Jussieu at the end of the eighteenth century.<sup>183</sup> Hooker continued to use the Linnaean system in his *British flora* until the late 1840s, although he thought the natural system superior for experts.<sup>184</sup> In 1843, Edward Forbes, in his inaugural lecture as professor of botany at King’s College, London, praised the Linnaean system for endowing botany with a “universal language”. Unpopular though the Linnaean classification was among experts by the time of his address, Forbes reminded his audience that it still served a useful purpose for travellers and collectors in the field. More literally than he realized, Forbes celebrated the Linnaean system because an “easy means of acquiring and arranging information is a great help to the workmen of science, and no department has gained more thereby than botany”.<sup>185</sup> For the same reason, and possibly because he had heard that the Royton blacksmith Bentley and other “young would be Botanists” were embarking on the study of bryology, in 1846 Hooker bemoaned the fact that Wilson would have to adopt the latest classificatory system in his monograph on mosses, as “with the Mosses especially, in proportion as you depart from the artificial system, you increase the difficulty ... & you cannot render the study popular”.<sup>186</sup>

The historical recovery of the practice of the artisan botanists, however, is not possible from the literary traces of élite botanists, nor even from the few botanical texts produced by the artisans themselves. For as Steven Shapin and Simon Schaffer have shown, one of the functions of scientific texts is to obscure the work involved in the production of scientific knowledge in order to render such knowledge objective. The careful construction of literary accounts of

scientific observations aims to produce a scientific community bound by particular forms and conventions.<sup>187</sup> In contrast to opposition, participation necessarily involves conforming to these conventions, and the more successful the participation, the less obvious the local concerns. It is thus essential to look beyond the literary conventions of science, which draw us towards characterizations of the artisans as mere providers of specimens to élite botanists. Instead, we need to regard science, like other aspects of culture, as a practice in order to understand its meaning in an artisanal context.<sup>188</sup> When science is viewed as an activity in which literary production is just a part, it becomes no less exact to call John Horsefield a botanist as to apply the term to the inept manager of a Suffolk brewery, a Liverpool banker or a Dante scholar — W. J. Hooker, William Roscoe and Charles Lyell Sr, respectively.

The contest over science in the early nineteenth century was a contest about who could participate and on what terms. The *result* of this contest was, as Alison Winter’s paper also shows, the redefinition of popular science. Fearful of the ability of the working class to appropriate knowledge for its own ends, the middle class increasingly rendered working-class scientific activity politically neutral through control over printed texts, a preoccupation with producing accounts of the lives of autodidacts to put forward moral lessons, and by giving natural history a central role in rational recreation. Unless we look at how the dominant culture reconstructed the popular by these means, we can never escape the mid-nineteenth-century middle-class view of the artisan botanists as “harmless and industrious”.<sup>189</sup> In recovering popular science in the early nineteenth century, then, we need to restore “the relations between social power, political democracy and cultural production” which are part of the history of definitions of “the popular”.<sup>190</sup> Only in this way can we see that the artisan botanists were part of the making and shaping of science.<sup>191</sup>

The use of the moral force of nature and the belief that knowledge could be used to control people, as expressed by the promoters of the early Mechanics’ Institutes, has engendered the view that the working-class rejection of bourgeois ideology also entailed a rejection of science. John Seed has pointed out that the Manchester Mechanics’ Institute failed because “the local workforce stubbornly refused to be tempted from the obscurity of the public house by the pleasures of chemistry and technical drawing”.<sup>192</sup> However, as I have shown, it was precisely in the “obscurity of the public house” that Lancashire artisans practised their science. It is only by shifting our angle of vision from the middle-class providers of science for the working class and by delving beyond the popular accounts of popular science, that artisan science will fall into place.

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17. L. H. Grindon, *Manchester walks and wild flowers: An introduction to the botany and rural beauty of the district. With biographical notices of the Lancashire botanists, and an account*

of their societies; select lists of the birds and other living creatures of the neighbourhood, etc. (London, [1859]), 1, 4, 8.

18. James Cash, *Where there's a will, there's a way! or, science in the cottage: An account of the labours of naturalists in humble life* (London, 1873), 90. Cash portrayed artisan botanists as unambitious in a scientific sense though not in terms of individual self-improvement. The later accounts by Vincent, *op. cit.* (ref. 10), and Allen, *op. cit.* (ref. 11), which echo this view, derive from Cash. While middle-class field clubs may have acknowledged the unambitious nature of their activities, I argue below that this description cannot be extended to artisans who practised natural history.
19. Cash, *op. cit.* (ref. 18), 76. For the social uses of Wordsworthian discourse, see Graeme Gooday, "'Nature' in the laboratory: Domestication and discipline with the microscope in Victorian life science", *The British journal for the history of science*, xxiv (1991), 307–41, pp. 310–18.
20. Grindon, *op. cit.* (ref. 17), p. v; Cash, *op. cit.* (ref. 18), pp. v–vi. For debates about the moral problems of leisure, see Bailey, *op. cit.* (ref. 12), 75–83.
21. This was a sensitive issue in the period in which Cash and Grindon published their books. Both the prohibition party, the United Kingdom Alliance, and the Central Association for Stopping the Sale of Intoxicating Liquors on a Sunday were founded in Manchester in 1853 and 1866 respectively. The 1860s and 1870s saw these campaigns at their height. See L. L. Shiman, *Crusade against drink in Victorian England* (Basingstoke, 1988), 75–90. Alcohol consumption also peaked in this period and although Lancashire was the home of teetotalism, in 1870 it was considered to be one of the areas where drunkenness was most prevalent. See Brian Harrison, *Drink and the Victorians: The temperance question in England 1815–1872* (Pittsburgh, 1971), 363.
22. Cash, *op. cit.* (ref. 18), 12–13; Grindon, *op. cit.* (ref. 17), 123, 125–6. For the offices Cash held in the Presbyterian Church at Sale, see *North Western naturalist*, xvi (1941), 33.  
Grindon did not condemn drinking itself; rather he condemned those who associated the botanists with drunkenness. He used the image of the pub as "detrimental to good order and sobriety" to reinforce his message that "delight in the objects of nature ... brings with it a moral ... influence on the heart" by claiming that the artisan botanists "are the most likely of all in their station of life to conduct themselves in a manner becoming intelligent beings" (Grindon, *op. cit.* (ref. 17), 125–6).
23. Cunningham, *op. cit.* (ref. 12), 90–91; Leonore Davidoff and Catherine Hall, *Family fortunes: Men and women of the English middle class, 1780–1850* (Chicago, 1987), 25–30; Arnold Thackray, "Natural knowledge in cultural context: The Manchester model", *The American historical review*, lxxix (1974), 672–709; Bailey, *op. cit.* (ref. 12), 47–67; Steven Shapin, "The Pottery Philosophical Society, 1819–1835: An examination of the cultural uses of provincial science", *Science studies*, ii (1972), 311–36; Steven Shapin and Barry Barnes, "Science, nature and control: Interpreting mechanics' institutes", *Social studies of science*, vii (1977), 31–74.
24. For discussions of the role of the pub in working-class life and for various middle-class campaigns against drinking places, see Cunningham and Bailey, *op. cit.* (ref. 12); J. M. Golby and A. W. Purdue, *The civilisation of the crowd: Popular culture in England 1750–1900* (London, 1984); Robert D. Storch, "The problem of working-class leisure. Some roots of middle-class moral reform in the industrial north: 1825–50", in A. P. Donajrodski (ed.), *Social control in nineteenth century Britain* (London, 1977), 138–62; Harrison, *op. cit.* (ref. 21), and "Pubs" in H. J. Dyos and Michael Wolff (eds), *The Victorian city* (2 vols, London, 1973), i, 161–90; Shiman, *op. cit.* (ref. 21); P. H. J. H. Gosden, *The friendly societies in England 1815–1875* (Manchester, 1961), 156–9. For a range of mid-century middle-class opinions of the pub, see the evidence of the witnesses to the Select Committees on Public Houses, *Parliamentary papers*, 1852–53, xxxvii; 1854, xiv.
25. Leon Faucher, *Manchester in 1844; its present condition and future prospects*, transl. by a member of the Manchester Athenaeum (London, 1844), 52.
26. Harrison, *op. cit.* (ref. 21), 46. Those middle- and upper-class men who continued to drink in public met only in the most respectable inns. For a hierarchy of drinking places according to respectability, see *ibid.*, 45.
27. Clive Behagg, "Secrecy, ritual and folk violence: The opacity of the workplace in the first half of the nineteenth century", in Storch (ed.), *op. cit.* (ref. 3), 154–79, p. 157. Behagg goes on to argue (p. 166) that the pub "was, if anything, more impenetrable to the social outsider than the workplace itself". For an excellent account of the importance of pubs in working-class politics, see Iain McCalman, *Radical underworld: Prophets, revolutionaries and pornographers in London, 1795–1840* (Cambridge, 1988), ch. 6.
28. For the involvement of gentlemen in popular sports in pubs, see Robert W. Malcolmson, *Popular recreations in English society 1700–1850* (Cambridge, 1973), 49, 68.
29. Many middle-class "public" places such as libraries and societies were for men only. The place of middle-class women was the private, domestic realm. See Catherine Hall, "The sweet delights of home", in Philippe Ariès and Georges Duby (general eds), *A history of private life* (5 vols, Cambridge, Mass., 1987–92), iv (ed. by Michelle Perrot, 1990), 47–93, p. 64. Middle-class drinking, even in the privacy of the home, was also gender-specific, with women withdrawing after dinner to leave the men to indulge more freely in drink (Davidoff and Hall, *op. cit.* (ref. 23), 399–400).
30. Yeo, *op. cit.* (ref. 16).
31. For middle-class fears in the 1840s and 1850s of the "moral diseases" prevalent in uncontrolled and crowded working-class places, see Felix Driver, "Moral geographies: Social science and the urban environment in mid-nineteenth century England", *Transactions, Institute of British Geographers*, n.s., xiii (1988), 275–87. See also A. P. Donajrodski, "'Social police' and the bureaucratic elite: A vision of order in the age of reform", in Donajrodski (ed.), *op. cit.* (ref. 24), 51–76.
32. Yeo, *op. cit.* (ref. 16), 159; Robert D. Storch, "The plague of the blue locusts: Police reform and popular resistance in northern England, 1840–57", *International review of social history*, xx (1975), 61–90, and "The policeman as domestic missionary: Urban discipline and popular culture in northern England, 1850–1880", *Journal of social history*, ix (1976), 481–502.  
Bolton publicans and beersellers, for example, had been cautioned against Sunday opening and warned in the *Manchester guardian* (hereafter *MG*) that "the police have instructions to use the utmost vigilance in detecting those who do so" (*MG*, 28 August 1850, 7).
33. *MG*, 30 November 1850, 7.
34. W. Cooke Taylor, *Notes of a tour of the manufacturing districts of Lancashire*, 2nd edn (London, 1842), 133–4, 164–5.
35. Grindon, *op. cit.* (ref. 17), 126. *MG*, 22 January 1851, 5, reported that the artisan botanists had presented Barge with half the fine and that the other half was still being collected.
36. Thomas Heywood, "History and origin of the Sunday botanical meetings", *MG*, 7 December 1850, 9, and 14 December 1850, supplement, 5. For John Horsefield's account, see *MG*, 21 December 1850, 5. The two accounts share portions of text.
37. J. C. Loudon, *An encyclopaedia of gardening* (London, 1822), 821–2, 1204–5; L. H. Grindon, *Lancashire: Brief historical and descriptive notes* (London, 1882), 41–42; Sylvia Harrop, "Community involvement in education in north-east Cheshire in the late eighteenth and

- early nineteenth centuries", *Transactions of the Lancashire and Cheshire Antiquarian Society*, lxxx (1979), 1–21, p. 14; Ruth Duthie, *Florists' flowers and societies* (Haverfordwest, 1988), 25–26.
38. "Lancashire and Cheshire florists", *The floricultural review; and florists' register*, i (1852), 45. The Middleton Auricula Society was established around 1750 (*ibid.*, 86). See also John Slater, *The amateur florists' guide* (Manchester, [1860]), 16–17. The widespread interest in gardening and horticulture is also reflected in the local poetry of this period. See, for example, Samuel Laycock's "Aw've turned mi bit o' garden o'er" and "Owd Fogey" in Brian Hollingworth (ed.), *Songs of the people: Lancashire dialect poetry of the Industrial Revolution* (Manchester, 1977), 107–8, 122–4.
  39. *The gooseberry growers' register, or an account of the different gooseberry shows held in Lancashire and Cheshire, and other parts of the kingdom, for the year 1843* (Manchester, 1843), 92. Shows were free (except for nurserymen and gentlemen) but contributions of a set amount were usually required "for liquor" and sometimes for a meal. The *Gooseberry growers' register* was first published in 1800, but there is evidence of widespread cultivation of gooseberries before this. A catalogue of gooseberries from 1777 lists 320 sorts from Lancashire, see John Harvey, *Early gardening catalogues* (London, 1972), 35, 82. See also Ronald Webber, *The early horticulturists* (Newton Abbot, 1968), 112.
  40. *The gooseberry growers' register ... 1843* (ref. 39), 30. For similar warnings regarding the honesty of exhibitors from the 1780s on, see handbills advertising gooseberry shows in pubs in the Manchester Central Library: Local History Library, f1789/8, f1790/15, f1794/10, f1812/18. George Caley, diary entry, 9 August 1813, University College London Library: MS ADD 325; Grindon, *op. cit.* (ref. 37), 42.
  41. [John Holland], *Memoir of the history and cultivation of the gooseberry* (London, 1834), 25–26.
  42. James Middleton, *The old road: A book of recollections. A historic account of the Oldham Road as it runs from Manchester, through Newton Heath and Failsworth, to the boundary of Hollinwood* (Manchester, 1985), 23. "Culpeper's herbal", originally published as *The English physician: or an astrologo-physical discourse of the vulgar herbs of this nation...*, continued to be reissued in new editions throughout the nineteenth century (F. N. L. Poynter, "Nicholas Culpeper and his books", *Journal of the history of medicine*, xvii (1962), 152–67, pp. 161–2). Wesley's herbal recipes also went through many editions. In the 1840s, at least six new or reprinted editions of Wesley's work appeared (S. W. F. Holloway, "The orthodox fringe: The origins of the Pharmaceutical Society of Great Britain", in W. F. Bynum and Roy Porter (eds), *Medical fringe and medical orthodoxy 1750–1850* (London, 1987), 129–57, p. 155).
  43. As Vincent, "The decline of the oral tradition", *op. cit.* (ref. 3), 25–28, has pointed out, from 1700 "there was a literary as well as an oral tradition in the culture of the labouring poor" and when the increased availability of print took place in the early nineteenth century "it was seen as an extension of indigenous working-class habits and tastes". See also Thomas Laqueur, "The cultural origins of popular literacy in England 1500–1850", *Oxford review of education*, ii (1976), 255–75.
  44. Richard Buxton, *A botanical guide to the flowering plants, ferns, mosses, and algae, found indigenous within sixteen miles of Manchester ... together with a sketch of the author's life* (London, 1849), pp. iii–v.
  45. Letter from George Caley to William Withering, 15 June 1798, reprinted in William Withering [Jr], "Further notice of the late Mr. George Caley", *Magazine of natural history*, iii (1830), 228–9. It is not clear to which of William Gibson's works on farriery Caley refers; both *The farrier's new guide* (London, 1720) and *A new treatise on the diseases of horses* (London, 1751) fit Caley's description.
  46. *MG*, 24 April 1850, 6.
  47. Caley, *op. cit.* (ref. 45); *MG*, 7 December 1850, 9.
  48. *MG*, 14 December 1850, supplement, 5.
  49. *MG*, 24 April 1850, 6.
  50. Grindon, *op. cit.* (ref. 17), 123; John Holt, *General view of the agriculture of the county of Lancaster* (London, 1795), 229; Middleton, *op. cit.* (ref. 42), 12.
  51. For Oldham, see Holt, *op. cit.* (ref. 50); for Prestwich, see *MG*, 31 December 1851, 3, and Joseph Fielding, *Rural historical gleanings in South Lancashire* (Manchester, 1852), 39–40. A list of the Royton Botanical Society's books in 1850 can be found in *MG*, 5 January 1850, 5. For those belonging to the Tyldesley Botanical Society in 1831, see letter from John Martin to William Wilson, 19 June 1831, Warrington Library: William Wilson correspondence, MS 53, in which Martin also referred to the "many valuable books" belonging to the Bolton Botanical Society.
  52. Thompson, *op. cit.* (ref. 9), 325.
  53. Letter from George Caley to Joseph Banks, 22 July 1798, Mitchell Library, State Library of New South Wales: Banks papers, viii, p. 10, ref. A79–1: FM4/1749.
  54. Buxton, *op. cit.* (ref. 44), p. v; *MG*, 24 April 1850, 6; C. H. Hassall, *Memoir of Joseph Evans, medical botanist, of Boothstown, near Manchester* (Farnsworth, [1890]), 7.
  55. Letter from George Caley to Robert Brown, 13 December 1811, British Library: Add. MSS 32439, ff. 347–8.
  56. Samuel Bamford, *Passages in the life of a radical* (1844; 2 vols in 1, London, 1967), i, 45. The deception was possible because artisan societies met in pubs. For a discussion of the effect of the Seditious Meetings Act on scientific societies in general, see Ian Inkster, "London science and the Seditious Meetings Act of 1817", *The British journal for the history of science*, xii (1979), 192–6; Paul Weindling, "Science and sedition: How effective were the acts licensing lectures and meetings, 1795–1819?", *ibid.*, xiii (1980), 139–53; Ian Inkster, "Seditious science: A reply to Paul Weindling", *ibid.*, xiv (1981), 181–7.
  57. For Hobson and Dewhurst, see Grindon, *op. cit.* (ref. 17), 133–4; for Horsefield, see *MG*, 24 April 1850, 6; for Kent and Plant, see Bamford, *op. cit.* (ref. 56), i, 127–43; for Kent, see also *MG*, 15 December 1849, 3, and 21 December 1850, 7; for Evans, see Hassall, *op. cit.* (ref. 54), p. v.
  58. R. F. Wearmouth, *Methodism and the working-class movements of England 1800–1850* (London, 1937), 216–18; Donald Read, *Peterloo: The 'massacre' and its background* (Manchester, 1958), 49.
  59. Robert Lyall, "Acc't. of a Botanical Society at Manchester, with the places of growth of some rather uncommon British Plants", read at the Linnean Society of London, 5 February 1811, Linnean Society of London: SP 728.
  60. *MG*, 21 December 1850, 5.
  61. Letter from John Martin to William Wilson, 19 June 1831 (ref. 51); Buxton, *op. cit.* (ref. 44), p. vii. The Middleton Botanical Society, for example, founded about 1780, became defunct in 1840 and was not revived until 1849 (*MG*, 24 March 1883, 5). The Royton Botanical Society existed from 1794 to 1834 and was reestablished in 1844 (Fielding, *op. cit.* (ref. 51), 127). For the numbers at the general meetings, see *MG*, 26 January 1858, 3; Grindon, *op. cit.* (ref. 17), 127–8; *MG*, 18 July 1859, 2. The gatherings of over 200 were special annual meetings for botanists from Lancashire, Cheshire, Yorkshire and Derbyshire.
  62. *MG*, 14 December 1850, supplement, 5. For rules imposed by working-class societies, see Thompson, *op. cit.* (ref. 9), 457–9, 788.

63. See C. R. Dobson, *Masters and journeymen: A prehistory of industrial relations 1717–1800* (London, 1980), 39, for the publican's role in keeping the box. At least two artisan botanists became publicans: Jethro Tinker in Stalybridge (Samuel Hill, *Bygone Stalybridge* (Stalybridge, 1907), 211) and William Worsley, president of the Middleton Botanical Society, who was the tenant of the Ring o' Bells pub where the society met (*Heywood advertiser*, 7 October 1910, 7).
64. Shiman, *op. cit.* (ref. 21), 32, and Middleton, *op. cit.* (ref. 42), 33. The proportion of the fee that was spent on drink varied slightly. On average, 4d. went on drink and 2d. on books. The Tyldesley Botanical Society, however, put the unusually high amount of 6d. on drink and 3d. on books, see letter from John Martin to William Wilson, 19 June 1831 (ref. 51).
65. Gosden, *op. cit.* (ref. 24), 117, 214–15.
66. *MG*, 31 December 1851, 3, gives the first verse of Horsefield's song:  

Then I'll sing to please myself, or my friends, I care not whether;  
 We're a set of friendly botanists, met once again together:  
 From classes, orders, genera, species, we derive our pleasures,  
 And meet each month to interchange our intellectual treasures.  
 While science circles with the glass, while sparkling ale keeps flowing,  
 While mirth and harmony prevail, we never think of going.

For Percival, see *MG*, 21 December 1850, 5; for Crowther, see Grindon, *op. cit.* (ref. 17), 126.
67. Hobson's abstinence (noted in William Wilson's "Greenfield memoranda", on the back of a letter from Mr Christy, 14 June 1832, Warrington Library: William Wilson correspondence, MS 52) may have been a reaction to his mother's drunkenness (John Moore, "A memoir of Mr. Edward Hobson", *Memoirs of the Literary and Philosophical Society of Manchester*, 2nd ser., vi (1842), 297–324, p. 299).
68. The names of several pubs in places around Manchester began to reflect the interest in natural history: for example, the "Railway and Naturalist" in Prestwich (Percy, *op. cit.* (ref. 5), 7); the "Botanical Tavern" in Ashton, kept by an "enthusiast in the science" (J. Ginswick (ed.), *Labour and the poor in England and Wales 1849–1851* (3 vols, London, 1983), i, 92); and another "Botanical tavern" near Haughton Dale (Joseph Sidebotham's annotations in his interleaved copy of J. B. Wood (ed.), *Flora Mancuniensis* (Manchester, 1840), opposite p. 38, now in the Linnean Society of London Library). Publicans also cashed in on the interest in natural history with the development of "public-house museums", see Harrison, "Pubs" (ref. 24), 175; Bailey, *op. cit.* (ref. 12), 43.
69. *MG*, 5 January 1850, 5.
70. Harrison, *op. cit.* (ref. 21), 336.
71. Letter from R. Astley to W. E. A. Axon, 8 August 1881, Manchester Central Library: Archives Department, W. E. A. Axon's loose papers on "Artisan naturalists of Lancashire", MS f 920.04272 A1.
72. In 1875, W. E. A. Axon compiled a list of existing botanical societies, the majority of which met in pubs. See *Manchester city news*, 23 January 1875. For evidence of pub meetings in the 1920s, see T. A. Coward, *Bird haunts and nature memories* (London, 1922), 137. The importance of pubs in both mediating change and maintaining continuity in working-class culture is emphasized in Anthony Delves, "Popular recreation and social conflict in Derby, 1800–1850", in Yeo and Yeo (eds), *op. cit.* (ref. 16), 89–127, pp. 115–16.
73. *MG*, 24 April 1850, 6.
74. Gosden, *op. cit.* (ref. 24), 19.
75. *MG*, 21 December 1850, 5.
76. *MG*, 14 December 1850, supplement, 5.
77. Buxton, *op. cit.* (ref. 44), p. vii. The same aim was stated in the printed rules of the Middleton Botanical Society, *Heywood advertiser*, 7 October 1910, 7.
78. *MG*, 21 December 1850, 5. For evidence of the communal method in use in 1830, see John Horsefield, "Notice of the Prestwich Botanical Society, and the Bury Botanical and Entomological Society, preceded by some critical remarks on a passage in the account of the conductor's tour in France", *The gardener's magazine*, vi (1830), 392–5, p. 394.  

Dr David Allen has told me that in the 1950s he was present at a meeting of the Digbeth Field Club, Birmingham, where the practice of the president naming piles of plants in front of a silent audience was still followed.
79. Vincent, *op. cit.* (ref. 14), 19. The artisan naturalist Jethro Tinker, Stalybridge's "local Linnaeus", was reputed to have an excellent memory (Hill, *op. cit.* (ref. 63), 213).
80. As Jack Goody, *The interface between the written and the oral* (Cambridge, 1987), 177–9, points out, learning by exact repetition in this way is rarely a feature of oral societies who have no texts to serve as a corrective. Rather, it is a procedure intrinsic to the literate tradition.
81. *MG*, 21 December 1850, 5; *MG*, 31 December 1851, 3. The Prestwich Botanical Society had also exempted Horsefield from paying into the book fund from the mid-1820s.
82. Lyall, *op. cit.* (ref. 59).
83. Middleton, *op. cit.* (ref. 42), 23.
84. *MG*, 2 March 1850, 9, and *MG*, 24 April 1850, 6. Repudiating the preeminence of book learning, Horsefield stated that his father, Charles Horsefield, despite his illiteracy, "possessed a considerable stock of information".
85. For the sense of disempowerment of women with the increased availability of books in the early nineteenth century, see Vincent, "The decline of the oral tradition" (ref. 3), 20–21, 28, 40–41, and *idem*, *op. cit.* (ref. 14), 180. For a discussion of the problems in trying to recover the cultural struggles of working-class women, see Morag Shiach, *Discourse on popular culture: Class, gender and history in cultural analysis, 1730 to the present* (Cambridge, 1989), 12–13, 78–80.
86. *MG*, 16 August 1855, 4.
87. The record of marriages at St Mary the Virgin, Leigh, show that Betty Entwistle and Alice Hurst made a mark on 18 May 1802 and 25 September 1826 respectively, whereas Martin clearly signed his name in the register (Manchester Central Library: Local History Library, Microfilm of parish records, MF418). There are dangers in using marriage registers as indicators of female literacy, but one reason, namely that a literate bride might have feigned illiteracy if her husband was illiterate, obviously does not hold in this case. See R. S. Schofield, "The measurement of literacy in pre-industrial England", in Jack Goody (ed.), *Literacy in traditional societies* (Cambridge, 1968), 311–25, p. 322; Colin D. Rogers, "Parish records in the Salford Hundred of Lancashire", *Manchester region history review*, i (1987), 29–33, p. 31.
88. For the herbal practice of wise women, see Vincent, *op. cit.* (ref. 14), 170–3; J. F. C. Harrison, *The second coming: Popular millenarianism 1780–1850* (London, 1979), 45–46; P. S. Brown, "Hebalists and medical botanists in mid-nineteenth-century Britain with special reference to Bristol", *Medical history*, xxvi (1982), 405–20, pp. 406–7. For the opposition of male medical botanists to women practitioners, see Barrow, *op. cit.* (ref. 2), 164.
89. Lyall, *op. cit.* (ref. 59).
90. *MG*, 24 April 1850, 6. According to the record of marriages at St Mary's Church, Oldham,

- Horsefield married Ester Eccorsley on 20 December 1812, Manchester Central Library: Local History Library, Shaw MSS, MS.942.72.S154.
91. Harrison, *op. cit.* (ref. 21), 47. For the decline in the number of female publicans in the early nineteenth century, see Davidoff and Hall, *op. cit.* (ref. 23), 299–301.
  92. Dorothy Thompson, “Women and nineteenth-century radical politics: A lost dimension”, in Juliet Mitchell and Ann Oakley (eds), *The rights and wrongs of women* (Harmondsworth, 1976), 112–38, and *The Chartists: Popular politics in the industrial revolution* (Aldershot, 1986), 122–3; Anna Clark, “The rhetoric of Chartist domesticity: Gender, language, and class in the 1830s and 1840s”, *Journal of British studies*, xxxi (1992), 62–88; Barbara Taylor, *Eve and the new Jerusalem: Socialism and feminism in the nineteenth century* (London, 1983), 228–9; Bamford, *op. cit.* (ref. 56), i, 165.
  93. George Caley, diary entries for 10 August 1812, 26 July 1813, 13 February 1815, *op. cit.* (ref. 40). For female friendly societies, see Gosden, *op. cit.* (ref. 24), 62. For bull-baiting in publicans’ yards, see Malcolmson, *op. cit.* (ref. 28), 45–46.
  94. *Eclectic journal and medical free press*, ii (1868–9), 115, 121–2.
  95. Middleton, *op. cit.* (ref. 42), 23–24.
  96. *MG*, 21 December 1850, 5. Richard Buxton also used this network to gather information for his *Botanical guide*, *op. cit.* (ref. 44), pp. x–xi, xiv.
  97. Letter from George Caley to Robert Brown, 27 July 1815, British Library: Add. MSS 32440, ff. 85–86.
  98. Moore, *op. cit.* (ref. 67), 300.
  99. Letter from George Caley to Robert Brown, 18 September 1812, British Library: Add. MSS 32439, ff. 361–2. For Caley’s attendance at botanical meetings, see the numerous entries in his diary, *op. cit.* (ref. 40). Caley stopped going to Sunday meetings in April 1813, but he did attend meetings of the Royton and Middleton Botanical Societies throughout the period 1811–16, before his departure for St Vincent.
  100. This is reflected in Caley’s correspondence and diary of this period. I am very grateful to Dr Joan Webb, who is preparing a biography of Caley, for sharing her views with me and also for telling me about Caley’s diary.
  101. Letter from George Caley to the Middleton Botanical Society, 12 October 1800, Rochdale Museum. This letter was reprinted in the *Heywood advertiser*, 15 April 1910, 3, and in *The Lancashire naturalist*, iii (1910), 259–60.
  102. The challenge of Allen’s work is to consider natural history as “cultural behaviour rather than a network of ideas”, see “Life sciences: Natural history”, in P. Corsi and P. Weindling (eds), *Information sources in the history of science and medicine* (London, 1983), 349–60, p. 356; “Naturalists in Britain: Some tasks for the historian”, *Journal of the Society for the Bibliography of Natural History*, viii (1977), 91–107, p. 94. See also D. E. Allen, *op. cit.* (ref. 11); *The botanists: A history of the Botanical Society of the British Isles through a hundred and fifty years* (Winchester, 1986); “Women members of the Botanical Society of London, 1836–1856”, *The British journal for the history of science*, xiii (1980), 240–54; D. E. Allen and Dorothy W. Lousley, “Some letters to Margaret Stovin (1756?–1846), botanist of Chesterfield”, *Naturalist*, civ (1979), 155–63.
  103. Bruno Latour, *Science in action: How to follow scientists and engineers through society* (Milton Keynes, 1987); *idem*, “Drawing things together”, in Michael Lynch and Steve Woolgar (eds), *Representation in scientific practice* (London, 1990), 19–68.
  104. For an account of Joseph Banks’s botanical practice in Latourian terms, see David Philip Miller, “Joseph Banks, empire and ‘centers of calculation’ in late Hanoverian London”, in David Philip Miller and Peter Reill (eds), *Visions of empire: Voyages, botany and representations of nature* (Cambridge, in press). The inadequacy of Latour’s model is particularly apparent in the discussion of Charles Lyell and amateur collectors in Latour, *Science in action* (ref. 103), 146–50.
  105. Star and Griesemer, *op. cit.* (ref. 7). For a useful critique of the models proposed by Latour and Star and Griesemer, see Joan H. Fujimura, “Crafting science: Standardized packages, boundary objects, and ‘translation’”, in Andrew Pickering (ed.), *Science as practice and culture* (Chicago, 1992), 168–211.
  106. Star and Griesemer, *op. cit.* (ref. 7), 389, 393. For examples of intersecting social worlds, see James A. Secord, “Nature’s fancy: Charles Darwin and the breeding of pigeons”, *Isis*, lxxii (1981), 163–86; *idem*, “Darwin and the breeders: A social history”, in David Kohn (ed.), *The Darwinian heritage* (Princeton, 1985), 519–42; Nicholas Thomas, *Entangled objects: Exchange, material culture, and colonialisation in the Pacific* (Cambridge, Mass., 1991).
  107. *MG*, 21 December 1850, 5.
  108. For Horsefield’s hybrids, see *Paxton’s magazine of botany, and register of flowering plants*, xiv (1848), 51, and *Daffodil year-book 1933* (London, 1933), 24–25; for William Horsefield, ‘see *Gooseberry growers’ register ... 1843* (ref. 39), 93; for the Evans’s, see Hassall, *op. cit.* (ref. 54); for Mellor, see *MG*, 11 October 1848, 6.
  109. Letter from John Martin to William Wilson, 19 June 1831, *op. cit.* (ref. 51); *MG*, 16 August 1855, 4. The divergent interests of the members of the Tyldesley society also affected the contents of their library. For more specialized botanical works, Martin had to use the library of the Bolton Botanical Society.
  110. “Medical botany and systematic botany”, *Coffin’s botanical journal and medical reformer*, i (1849), 333.
  111. *MG*, 14 December 1850, supplement, 5, and *MG*, 21 December 1850, 5. This was a sensitive issue as several cases of manslaughter had been brought against medical botanists, albeit over the toxicity of lobelia rather than misidentifications of plants. See Brown, *op. cit.* (ref. 88), 410–14. Cases of accidental death from eating fool’s parsley, for example, were also reported in the local press. William Withering’s *A botanical arrangement of British plants*, one of the most common books to be found in artisans’ botanical libraries, stressed in the second edition (3 vols, Birmingham, 1787–92), i, p. xxxvii, that “it is the Linnaean botany alone which can transmit with certainty to our posterity, those discoveries which the present age has made of the powers of vegetable remedies”.
  112. “Medical botany and systematic botany” (ref. 110).
  113. John Skelton, “The sexual system of Linnaeus”, *Eclectic journal and medical free press*, ii (1868–9), 45; for the series of articles see pp. 45–46, 60–62, 83–85, 91–93, 113–15, 135–8, 152–3, 161–2, 182–5. For Coffin, Skelton, and systems of medical botany, see John V. Pickstone, “Medical botany (self-help medicine in Victorian England)”, *Memoirs of the Manchester Literary and Philosophical Society*, cxix (1976–7), 85–95; J. V. Pickstone and Ursula Miley, “Medical botany around 1850: American medicine in industrial Britain”, in Roger Cooter (ed.), *Studies in the history of alternative medicine* (London, 1988), 140–54; J. F. C. Harrison, “Early Victorian radicals and the medical fringe”, in Bynum and Porter (eds), *op. cit.* (ref. 42), 198–215; P. S. Brown, “Social context and medical theory in the demarcation of nineteenth-century boundaries”, in *ibid.*, 216–23; *idem*, *op. cit.* (ref. 88); Barrow, *op. cit.* (ref. 2), 161–73, 182–94.
  114. *Eclectic journal and medical free press*, ii (1868–9), 115, 121–2. Although the report states that the wooden hut was “much more than comfortably filled”, it seems inconceivable that it could hold thousands of people. Presumably, it was open on one side and a large part of the audience remained outside.
  115. And quite possibly throughout this period. Although many provincial family herbals denounced astrological herbalism, the folklorists, John Harland and T. T. Wilkinson noted in their

- Lancashire folk-lore (Manchester, 1882), 10, that "more copies of Culpepper's *Herbal* and Sibley's *Astrology* are sold in Lancashire than all other works on the same subjects put together, and this principally on account of the planetary influence with which each disease and its antidote are connected".
116. Frans A. Stafleu, *Linnaeus and the Linnaeans: The spreading of their ideas in systematic botany, 1735–1789* (Utrecht, 1971), 205.
  117. James Lee, *An introduction to botany. Containing an explanation of the theory of that science, and an interpretation of its technical terms. Extracted from the works of Dr. Linnaeus, and calculated to assist such as may be desirous of studying that author's method and improvements* (London, 1760).
  118. Buxton, *op. cit.* (ref. 44), pp. 6, vi. L. H. Grindon, *The Manchester flora: A descriptive list of the plants growing wild within eighteen miles of Manchester, with notices of the plants commonly cultivated in gardens; preceded by an introduction to botany* (London, 1859), 318, noted that this plant also grew in Bowden, but still gave as the first habitat, "the garden of the cottage occupied by the widow of the late John Horsefield".  
For nineteenth-century views on protecting plant habitats, see D. E. Allen, "Changing attitudes to nature conservation: The botanical perspective", *Biological journal of the Linnean Society*, xxxii (1987), 203–12.
  119. Middleton, *op. cit.* (ref. 42), 23.
  120. *MG*, 15 December 1849, 3.
  121. Letter from John Martin to William Wilson, 18 July 1831, Manchester Central Library: Archives Department, copy in W. E. A. Axon's scrapbook on "Artisan naturalists of Lancashire", MS f 920.04272 A1, pp. 133–41.
  122. George Caley, diary entry for 13 April 1811, *op. cit.* (ref. 40); letter from Caley to James Dickson, 5 May 1813, Natural History Museum, London: Botany Library, Robert Brown correspondence, i, letter 111, Banksian collection manuscript; Grindon, *op. cit.* (ref. 17), 127. For the rise of the nurseryman and the trading of plants as commodities, see John Harvey, *Early nurserymen* (London, 1974); J. H. Plumb, "The acceptance of modernity", in Neil McKendrick, John Brewer and J. H. Plumb, *The birth of a consumer society: The commercialisation of eighteenth-century England* (London, 1982), 324–6.
  123. Letter from George Caley to Robert Brown, 27 July 1815 (ref. 97).
  124. William Wilson bemoaned the loss of *Saxifraga hirculus* from Knutsford Moor, which he believed had "been extirpated by nurserymen", in his letter to W. J. Hooker, 15 October 1831, Royal Botanic Gardens Kew: Directors' correspondence, vi, letter 347. See also Grindon, *op. cit.* (ref. 118), 228.
  125. George Caley, diary entry for 8 June 1812, *op. cit.* (ref. 40).
  126. *Rules and regulations to be observed by a society established at the house of Mr. Henry Rayner, the sign of the Woodman, George-Street, Hyde, on Monday, July 2nd, 1849, to be called Hyde Faithful Botanical Society* (Hyde, [1849]), 10–11. I am grateful to William Shercliff for sending a copy of this pamphlet to me. The original is in the collections of the Tameside Local Studies Library, Stalybridge, ref. DD3/45.
  127. William Wilson, diary entry for 12 January 1833, Warrington Library: *Wilsoniana*, MS 72. Olivia Smith, *The politics of language 1791–1819* (Oxford, 1984), 13, points out that Samuel Johnson used the word 'illiterate' to signify ignorance of Latin and Greek.
  128. Letters from William Wilson to W. J. Hooker, 23 June 1831 and 19 July 1831, Royal Botanic Gardens Kew: Directors' correspondence, vi, letters 344 and 346.
  129. In making this point, I draw on Bourdieu, *op. cit.* (ref. 7), 81: "when we speak of class habitus, we are insisting ... that 'interpersonal' relations are never, except in appearance, individual-to-individual relationships and that the truth of the interaction is never entirely contained in the interaction."
  130. I. J. Prothero, *Artisans and politics in early nineteenth-century London* (Folkestone, 1979), 336. For the decline in the status of handloom weavers, see Thompson, *op. cit.* (ref. 9), ch. 9.
  131. Letter from John Martin to William Wilson, 19 June 1831 (ref. 51). William Jackson Hooker was completing Sir James Edward Smith's *English flora*, which is why Martin knew that if his moss was rare, Wilson would tell Hooker.
  132. Vincent, *op. cit.* (ref. 14), 19.
  133. *MG*, 7 December 1850, 9. As a stationer, Heywood would have been well aware of the power of the printed word. His complaint was not against "the great Ray". Rather, his assumption was that Richard Richardson had not revealed his sources of information. There is, however, no evidence of artisan botanical societies in existence in this early period. Moreover, Richard Pultenay, *Historical and biographical sketches of the progress of botany in England, from its origin to the introduction of the Linnaean system* (2 vols, London, 1790), ii, 185–8, remarked that Richardson was noted as a patron of other botanists. For an excellent account of John Ray's collecting methods, see Jo Gladstone, "'New world of English words': John Ray, FRS, the dialect protagonist, in the context of his times (1658–1691)", in Peter Burke and Roy Porter (eds), *Language, self, and society: A social history of language* (Cambridge, 1991), 115–53.
  134. W. J. Hooker, *The English flora of Sir James Edward Smith* (London, 1833), v ("or vol. ii of Dr. Hooker's *British flora*"), pt i, 12. Wilson had informed Hooker of Martin's wish for Evans to be named as the discoverer of the moss in his letter of 23 June 1831, Royal Botanic Gardens Kew: Directors' correspondence, vi, letter 344.
  135. Letter from W. J. Hooker to William Wilson, 16 July 1831, Royal Botanic Gardens Kew: "Letters from W. J. Hooker", ff. 48–49. By 1830, Hooker's herbarium was considered one of the richest in Europe and in 1841 it was declared to be "the largest and most valuable collection in the world, in possession of a private individual" (J. D. Hooker, *A sketch of the life and labours of Sir William Jackson Hooker* (Oxford, 1903), p. xxxii).
  136. The visit to Martin took place on 26 July 1831, Wilson diary, *op. cit.* (ref. 127). For Wilson's description of Tyldesley, see letter from Wilson to W. J. Hooker, 19 July 1831; for his impressions of Martin and his cottage, see letter to Hooker, 15 October 1831, Royal Botanic Gardens Kew: Directors' correspondence, vi, letters 346, 347.  
Martin possibly obtained his books when the first Tyldesley Botanical Society folded and the contents of the library were shared out among the members. If so, it is not surprising that they were grubby as they would have been heavily used by the members of the society. Books that belonged to the Boothstown Botanical Society, now in the author's possession, are almost black in parts.
  137. For reasons as to why Wilson would have been surprised by the inconsistency of Martin's inward and outward order, see Steven Shapin and Barry Barnes, "Head and hand: Rhetorical resources in British pedagogical writing, 1770–1850", *Oxford review of education*, ii (1976), 231–54. According to Cash, *op. cit.* (ref. 18), 156, Wilson's "order and neatness were very remarkable". For the dinner, see letter from William Wilson to W. J. Hooker, 19 July 1831, Royal Botanic Gardens Kew: Directors' correspondence, vi, letter 346.
  138. Letter from John Martin to William Wilson, 19 June 1831 (ref. 51).
  139. Letter from William Wilson to W. J. Hooker, 19 July 1831 (ref. 137).
  140. Letter from John Martin to William Wilson, 18 July 1831 (ref. 121).
  141. From the time he expressed his initial interest in Martin, Hooker cautioned Wilson "not to mention it to him: but rather let me know more particulars about him". Letter of 16 July 1831 (ref. 135).
  142. As Behagg, *op. cit.* (ref. 27), 158, has shown, intruders in the pub "were confronted by an alternative set of values and beliefs that would intimidate them both physically and

- intellectually". For cultural barriers controlling space, see Ophir and Shapin, *op. cit.* (ref. 13), 10–11.
143. Lyall, *op. cit.* (ref. 59).
  144. *MG*, 14 December 1850, supplement, 5.
  145. John Rule, "The property of skill in the period of manufacture", in Patrick Joyce (ed.), *The historical meanings of work* (Cambridge, 1987), 99–118, and "Artisan attitudes: A comparative survey of skilled labour and proletarianization before 1848", *Bulletin of the Society for the Study of Labour History*, 1 (1985), 22–31; Thompson, *op. cit.* (ref. 9), ch. 8; Prothero, *op. cit.* (ref. 130).
  146. Vincent, *op. cit.* (ref. 14), 108. The grounds for distrusting middlemen in natural history are clear from the experience of the Banff shoemaker and naturalist Thomas Edward, as related in Cash, *op. cit.* (ref. 18), 208–9.
  147. Rule, "The property of skill", *op. cit.* (ref. 145), 107–8. See also Sally Alexander, "Women, class and sexual differences in the 1830s and 1840s: Some reflections on the writing of a feminist history", *History workshop*, xvii (1984), 125–49, pp. 135–7; Maxine Berg, *The age of manufactures: Industry, innovation and work in Britain 1700–1820* (Oxford, 1985), 160; Clark, *op. cit.* (ref. 92).
  148. Rule, "The property of skill" (ref. 145), 108.
  149. *MG*, 21 December 1850, 5. Horsefield did not insist that everyone learned Latin names; only that you were not a botanist unless you did.
  150. Vincent, *op. cit.* (ref. 14), 163. Caley was the only artisan botanist who went to Manchester Grammar School and received lessons in Latin (Withering [Jr], *op. cit.* (ref. 45), 227, 229). Other artisans had only a year or two of schooling, frequently of an informal nature. Keith Thomas, *Man and the natural world* (Harmondsworth, 1984), 86–87, implies that the adoption of Linnaeus's Latin plant names alone excluded the ordinary people from botanical pursuits. Vincent's point presumably refers to botanical texts written in Latin, not just Latin plant names. This, however, was no more of a problem in the late than the early part of the nineteenth century as most botanical books continued to be published in English. Nonetheless, the classification of plants using the Linnaean system was not as straightforward as is often suggested. In contrast to Horsefield's experience, the self-taught poet John Clare "puzzled wasted hours over Lees Botany" before abandoning Linnaeus's "dark system". Clare preferred "the works of Ray Parkinson and Gerrard were [*sic*] there is more of nature and less of Art". See Eric Robinson (ed.), *John Clare's autobiographical writings* (Oxford, 1983), 49. See also Gladstone, *op. cit.* (ref. 133), 118, for Clare's preference for dialect plant names.
  151. As Horsefield admitted: "Of Latin, as a language, we know very little; but this we know, that a uniform nomenclature is far preferable to a mixed one.... A Latin name is, in our opinion, as easy to learn as a mere English one" (*MG*, 21 December 1850, 5). In this case, the Linnaean nomenclature functioned as a "boundary object", carrying different meanings for artisans and educated botanists.
  152. Letter from William Bentley to W. J. Hooker, 20 February 1843, Royal Botanic Gardens Kew: Directors' correspondence, xix, letter 86. For the elitism of the Linnean Society, see A. T. Gage and W. T. Stearn, *A bicentenary history of the Linnean Society of London* (London, 1988), 195. Mellor, president of the Royton Botanical Society, was not helped by the Linnean society. He did, however, receive aid from Manchester's scientific élite.
  153. Rule, "The property of skill" (ref. 145), 108.
  154. Horsefield, "Notice of the Prestwich Botanical Society" (ref. 78), 393. For Loudon's original remarks, see his "Notes and reflections made during a tour through parts of France and Germany, in the autumn of the year 1828", *The gardener's magazine*, v (1829), 113–25, p. 123.
  155. Martha Vicinus, "The study of Victorian popular culture", *Victorian studies*, xviii (1975), 473–83, p. 474.
  156. Shiach, *op. cit.* (ref. 85), 15. See also Stuart Hall, "Notes on deconstructing 'the popular'", in Raphael Samuel (ed.), *People's history and socialist theory* (London, 1981), 227–40, pp. 234–5; Patricia Anderson, *The printed image and the transformation of popular culture 1790–1860* (Oxford, 1991), 1–15.
  157. Cunningham, *op. cit.* (ref. 12), 102–4; Harrison, *op. cit.* (ref. 21), 325–6. Similarly, Delves, *op. cit.* (ref. 72), 95, reveals the double standards used in evaluating the upper-class participation in "low" activities such as betting, racing and blood sports.
  158. Shapin and Barnes, *op. cit.* (ref. 137).
  159. J. W. Hudson, *The history of adult education* (London, 1851), 148, 211. Hudson's emphasis, as Bailey, *op. cit.* (ref. 12), 23, points out, recognized the incredulity with which such revelations would be met. Pub libraries were also described in reports in *MG*, 15 December 1849, 3, and 5 January 1850, 5. The existence of these independent working-class libraries made a mockery of the painstaking care with which middle-class managers had selected the contents of Mechanics' Institute libraries. See Jonathan Topham, "Science and popular education in the 1830s: The role of the *Bridgewater Treatises*", *The British journal for the history of science*, xxv (1992), 397–430, pp. 407–13.
  160. J. M. Ludlow and Lloyd Jones, *Progress of the working class 1832–1867* (London, 1867), 19.
  161. Quoted in Vincent, *op. cit.* (ref. 14), 217.
  162. Manchester translator of Faucher, *op. cit.* (ref. 25), 49, n. 20.
  163. Grindon, *op. cit.* (ref. 17), 122; *idem*, *op. cit.* (ref. 118), p. vi.
  164. Coward, *op. cit.* (ref. 72), 133.
  165. Bamford, *op. cit.* (ref. 16), 13–14. An important argument about craft traditions providing women with skills appropriate to the practice of science is made in Londa Schiebinger, *The mind has no sex? Women and the origins of modern science* (Cambridge, Mass., 1989), 66–101.
  166. As Bailey, *op. cit.* (ref. 12), 182–6, has argued, respectability was not an ideology or uniform life-style for working men but rather a behavioural mode, a role which they could adopt and abandon with no inherent conflict. This was incomprehensible to the middle class who defined itself by its moral virtues and for whom respectability was a cultural absolute. Artisan botanists were always careful to stress to middle-class audiences that they met in "respectable" public houses, although this distinction had little meaning (indeed, was a contradiction in terms) to those who positioned themselves in opposition to the culture of drink. Attention should be paid, however, to the distinctions working people made between various types of drinking places. Pubs in which artisan naturalists gathered were very different from urban gin palaces, for example. See Golby and Purdue, *op. cit.* (ref. 24), 119–20.
  167. I shall be exploring other aspects of artisan natural history in forthcoming work.
  168. John Belchem, *Industrialization and the working class: The English experience, 1750–1900* (Aldershot, 1990), 57.
  169. Laqueur, *op. cit.* (ref. 43), 270.
  170. McCalman, *op. cit.* (ref. 27), 234–5.
  171. Desmond, *op. cit.* (ref. 2).
  172. Cooter, *op. cit.* (ref. 2), 175.
  173. Brian Maidment, *The poorhouse fugitives: Self-taught poets and poetry in Victorian Britain* (Manchester, 1987), 14–17.
  174. *Ibid.*, for examples of Chartist and Parnassian poems by Cooper, Ebenezer Elliot and Joseph Skipsey.



175. Horsefield's gravestone can be seen in the graveyard of St Mary the Virgin, Prestwich. Charles Swain's poem is more clearly seen on a 1918 photograph in Manchester Central Library: Reference Library Print Collection, Accession no. 13562.
176. This was especially true of science periodicals. See Susan Sheets-Pyenson, "Popular science periodicals in Paris and London: The emergence of a low scientific culture, 1820–1875", *Annals of science*, xlii (1985), 549–72. My argument, however, cuts across Sheets-Pyenson's distinction between popular and low forms of science. For the participation of women, see D. E. Allen's work (ref. 102) and Ann B. Shteir, "Linnaeus's daughters: Women and British botany", in B. J. Harris and J. K. McNamara (eds), *Women and the structure of society: Selected research papers from the fifth Berkshire conference on the history of women* (Durham, N.C., 1984), 67–73, and "Botany in the breakfast room: Women and early nineteenth-century British plant study", in P. G. Abir-Am and Dorinda Outram (eds), *Uneasy careers and intimate lives: Women in science 1789–1979* (New Brunswick, 1987), 31–43.
177. Shiach, *op. cit.* (ref. 85), 33. For an analysis of the history of changing definitions of "the popular", see *ibid.*, ch. 1.
178. For examples of the distinction between the work of scientific amateurs and professional scientists, see Star and Greisemer, *op. cit.* (ref. 7); John Lankford, "Amateurs versus professionals: The controversy over telescope size in late Victorian science", *Isis*, lxxii (1981), 11–28; D. E. Allen, "The survival of the amateur tradition in the newly professional world of biology", *Program, papers, and abstracts for the joint BSHS–HSS Anglo-American conference* (Manchester, 1988), 77–84. For overviews of professionalization and the exclusion of the people from nineteenth-century science, see J. B. Morrell, "Professionalisation", and Steven Shapin, "Science and the public", in R. C. Olby, G. N. Cantor, J. R. R. Christie and M. J. S. Hodge (eds), *Companion to the history of modern science* (London, 1990), 980–9, 990–1007.
179. William Withering, *A botanical arrangement of all the vegetables naturally growing in Great Britain. With descriptions of the genera and species, according to the system of the celebrated Linnaeus. Being an attempt to render them familiar to those who are unacquainted with the learned languages* (2 vols, Birmingham, 1776). Withering's book was also designed to be accessible to women. For the second edition see ref. 111.
180. William Withering, *A systematic arrangement of British plants; with an easy introduction to the study of botany*, 4th edn (4 vols, London, 1801), i, p. v. The names of Lancashire artisans also appear in John Hull's *The British flora, or a Linnean arrangement of British plants* (Manchester, 1799) and Dawson Turner and Lewis Weston Dillwyn's *The botanist's guide through England and Wales* (London, 1805).
181. W. J. Hooker and Thomas Taylor, *Muscologia Britannica; containing the mosses of Great Britain and Ireland, systematically arranged and described* (London, 1818), p. viii.
182. M. L. Pratt, *Imperial eyes: Travel writing and transculturation* (London, 1992), 24–35; A. G. Morton, *History of botanical science* (London, 1981), 275.
183. For some of the debates over botanical classification in Britain in the first half of the nineteenth century, see Allen, *The botanists* (ref. 102), 4–5; D. J. Mabberley, *Jupiter botanicus: Robert Brown of the British Museum* (London, 1985), ch. 9; J. Reynolds Green, *A history of botany in the United Kingdom from the earliest times to the end of the nineteenth century* (London, 1914), 309–53.
184. W. J. Hooker, *The British flora* (London, 1830). Intended for beginners, the first four editions of this work were arranged according to the Linnaean system. In the fifth edition of 1842 Hooker used the Jussieuian or natural system, but retained the Linnaean classification "as an easy introduction to a knowledge of the more important or Natural Method" (p. v). It was not until the sixth edition of 1850 (written with G. A. W. Arnott) that Hooker completely abandoned the Linnaean system. From the 1820s, however, despite objections from some of his Glasgow students, Hooker had argued that medical men should learn the natural system because plants in the same natural order may possess analogous or more powerful medicinal properties. See J. D. Hooker, *op. cit.* (ref. 135), p. xxix, n. 2.
185. Edward Forbes, *An inaugural lecture on botany, considered as a science, and as a branch of medical education* (London, 1843), 18–19. Forbes may have emphasized this point as his counterpart at University College London was John Lindley, one of the foremost proponents of natural systems of classification in botany. For Lindley's low opinion of the Linnaean system, see his *An introductory lecture delivered in the University of London* (London, 1829). In her forthcoming book on women and botanical culture in England from 1760 to 1860 (Johns Hopkins Press), Ann Shteir argues that one of the underlying aims of Lindley's anti-Linnaean stance was the "de-feminization" of botany.
186. Letter from William Bentley to W. J. Hooker, 21 January 1846, Royal Botanic Gardens Kew: Directors' correspondence, xxiv, letter 62; W. J. Hooker to W. Wilson, 26 November 1846, Royal Botanic Gardens Kew: "Letters from W. J. Hooker", f. 101. In a letter of 26 December 1846, *ibid.*, ff. 104–6, Hooker suggested that at least Wilson should use the artificial system as an index to the new moss classification. William Wilson's *Bryologia Britannica* (London, 1855) opens with an account of his "grave deliberation" before adopting the natural system.
187. Steven Shapin and Simon Schaffer, *Leviathan and the air-pump: Hobbes, Boyle, and the experimental life* (Princeton, 1985), 76–79. See also Steven Shapin, "The politics of observation: Cerebral anatomy and social interests in the Edinburgh phrenology disputes", in Roy Wallis (ed.), *On the margins of science: The social construction of rejected knowledge* (Keele, 1979), 139–78.
188. For arguments that science should be regarded as sets of practices rather than a single conceptual network, see Andrew Pickering, "From science as knowledge to science as practice", in Pickering (ed.), *op. cit.* (ref. 105), 1–26.
189. Ginswick (ed.), *op. cit.* (ref. 68), i, 40.
190. Shiach, *op. cit.* (ref. 85). See also Pierre Bourdieu, "The uses of the 'people'", in Bourdieu, *In other words: Essays towards a reflexive sociology*, transl. by Matthew Adamson (Stanford, 1990), 150–5.
191. I do not intend to imply that botanists like Forbes regarded participation in the same way as artisans. In his address, *op. cit.* (ref. 185), 18, he made a clear distinction between field botanists who rendered good service by their "hands and energy" in contrast to the botanist in his herbarium who served by using his "head and philosophy". Rather, my concern in this essay has been to attempt to understand the practice of botany in artisanal terms and to offer an explanation as to why some artisans felt they had the right to be acknowledged as producers of botanical knowledge.
192. John Seed, "Unitarianism, political economy and the antimonies of liberal culture in Manchester, 1830–50", *Social history*, vii (1982), 1–25, p. 13.